DEPARTMENT OF THE INTERIOR, CANADA

HON. W. J. ROCHE, Minister; W. W. CORY, Deputy Minister

FORESTRY BRANCH—BULLETIN No. 51

R. H. CAMPBELL, Director of Forestry

GAME PRESERVATION

IN THE

ROCKY MOUNTAINS FOREST RESERVE

W. N. MILLAR, B.S., M.F.

OTTAWA
GOVERNMENT PRINTING BUREAU
1915

Photo. W. N. Millar.

A View of the Range East of the Sunwapta.

Suitable feed for big game animals is very scarce in this vicinity and bear and goats alone are found at the present time.

Photo. W. N. Millar.

Typical Mountain Sheep Range in the Brazeau Forest.

Seven rams were observed about the middle of the picture and farther up the valley more than twenty head of sheep were counted on October 1, 1913.

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
FORESTRY BRANCH,
OTTAWA, September 3, 1914.

SIR,—I submit herewith the manuscript of a report by Mr. W. N. Millar, formerly District Inspector of Forest Reserves for Alberta, regarding the question of game preserves within the Rocky Mountains Forest Reserve.

The Rocky Mountain region offers a unique opportunity for the creation of preserves for the purpose of preserving the game animals native to the region. The author of the bulletin, after a consideration of the present status of the problem in the province, discusses the question of the conditions necessary to a game preserve, and the relative advantages of different plans of administration.

Following a brief treatment of the various game animals of the region and their characteristics, he outlines four proposed game preserves, showing the advantages of each for different kinds of game, and outlines a plan of administration for the preserves.

I would recommend that this report be published as Bulletin No. 51 of this branch.

Respectfully submitted,
R. H. CAMPBELL,
Director of Forestry.

W. W. CORY, Esq., C.M.G.,
Deputy Minister of the Interior,
Ottawa.

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ROCKY MOUNTAINS FOREST RESERVES

INTRODUCTION.

The purpose of this report is to outline in a general way the present status of game preservation on the east slope of the Canadian Rockies south of the Grand Trunk Pacific railway, and to suggest a comprehensive scheme for game preservation in the Rocky Mountains forest reserve which will be adapted, not only to the natural conditions known to exist within this reserve, but also to the requirements of a rapidly developing community, and to the organization of the various branches of the Government service having jurisdiction over this portion of the Dominion lands.

In a general discussion of game preservation, it is well to point out the reasons why wild game should be preserved. There seem to be three principal arguments for the preservation of wild game, based upon the following considerations:—

(1) Considerations of conservation.
(2) Considerations of financial revenue.
(3) Considerations of sentiment.

Viewed from the standpoint of conservation it will be readily apparent that the preservation of wild game can be justified on the ground that there are large areas of land, particularly in mountain countries, that will not support any other form of large animal life; these the principle of conservation would require to be devoted to the production of large game animals, either as a source of food supply or as a source of revenue through other means. That such areas of land exist in all mountain countries, as well as in many regions that are not mountainous, needs no detailed discussion, although later in this report I will deal with this phase of this subject at some length in a discussion of specific areas recommended for game preserves.

Financial considerations would require that land which can be made to yield a net revenue of any sort be so handled as to do so. It can be readily shown that the greater part, if not all, of the Rocky Mountains forest reserve can be made to yield a revenue from game animals, either a direct revenue from the production of meat and hides, or an indirect revenue from licenses to hunt and from the hire of guides, packhorses, outfits, the purchase of supplies, and other expenditures made by hunting and tourist parties.

Sentimental considerations cannot be measured in terms of dollars and cents, but most people will agree that it is the duty of the Government to recognize demands based upon such considerations, even in many cases where financial considerations cannot likewise be urged. That there is a real demand for the preservation of the larger game animals which are now threatened with extinction, and that this demand is worthy of consideration even if based only on the argument that the Government fails in its duty if it allows any of the large game animals to become extinct seems to me to be evident.

In discussing game preservation, however, it is necessary to keep in mind the fact that the presence of large bands of the bigger game animals is not consistent with a high state of agricultural development and civilization, and that a middle course must be arrived at between the proposals of the enthusiastic game-protectionists, who would apparently devote a large part of the continent to the propagation of the original wild fauna, and the anti-game-protectionists, who would confine the game of the continent to menageries of the circus and the city parks. The big game of the continent has disappeared because it and a high state of civilization cannot be maintained in most regions together, but I think the statement is scarcely open to criticism that game destruction has gone far beyond those regions where wild game cannot legitimately be expected to exist, and that game is disappearing from large areas that are not being used for any other useful purpose.

As a general rule, it is not difficult to demonstrate even to the satisfaction of the most enthusiastic game-protectionist that certain lands are not suited to the use of large game animals. It is obvious, for instance, that herds of buffalo or elk are decidedly out of place in a farming country. At the other extreme it is not particularly difficult to show that certain types of land can be used by no other animal but some species of wild game. The bleak limestone summits of the Canadian Rockies, for instance, support the Rocky Mountain goat, but are worthless for any other purposes except to ornament the landscape. Intermediate between these extremes, however, there is room for a great deal of argument as to what type of land can best be used by wild game and what is put to its highest use if devoted to other purposes. There are many millions of acres of land on the continent which are valuable only for grazing. Millions of acres lying at an elevation too great for tree growth, nevertheless support a growth of low shrubs and herbaceous plants, which afford range for domestic stock, particularly sheep. It is a well-known fact, however, that sheep cannot be ranged on the same land that is occupied by grazing big-game animals such as elk, deer, or mountain sheep. In recommending measures for the protection and preservation of game it is therefore necessary to decide what lands are most valuable for use as range for domestic stock and what lands are put to their highest use if devoted to range for wild game. As an illustration of how a conflict of interests arises over such lands, I would cite the case of the national forests of the United States; here certain interests are urging that all be established as game preserves, although statistics show that about thirty per cent of all sheep in the United States find pasturage within these national forests. Apparently the game-protection enthusiast considers the preservation of wild game of more value than the sheep-raising industry. Personally, I do not think that this propaganda will receive any great amount of popular support.

Another factor that must always be considered is the cost of protection. It will be obvious that to be effective a game preserve must be efficiently maintained. It will likewise be obvious that the difficulties and, therefore, the cost of protecting game will vary largely according to conditions of settlement within, or in the vicinity of, the game preserves. Not only will the relative location of settlements have to be considered, but the character of the settlers themselves is of as great importance as their location, if not, indeed, of greater importance; and in considering game protection through the establishment of game preserves this factor must be given full weight.

ADVANTAGES OF THE EAST SLOPE OF THE ROCKIES AS A GAME PRESERVE.

The east slope of the Canadian Rockies, to which this report particularly applies, has numerous advantages as a preserve for many of the larger game animals of the continent. These may be briefly stated as follows:—

(*a*) It is the natural habitat of nine species of the largest game animals of North America. These are white-tailed deer, mule deer, elk, moose, bighorn sheep, Rocky

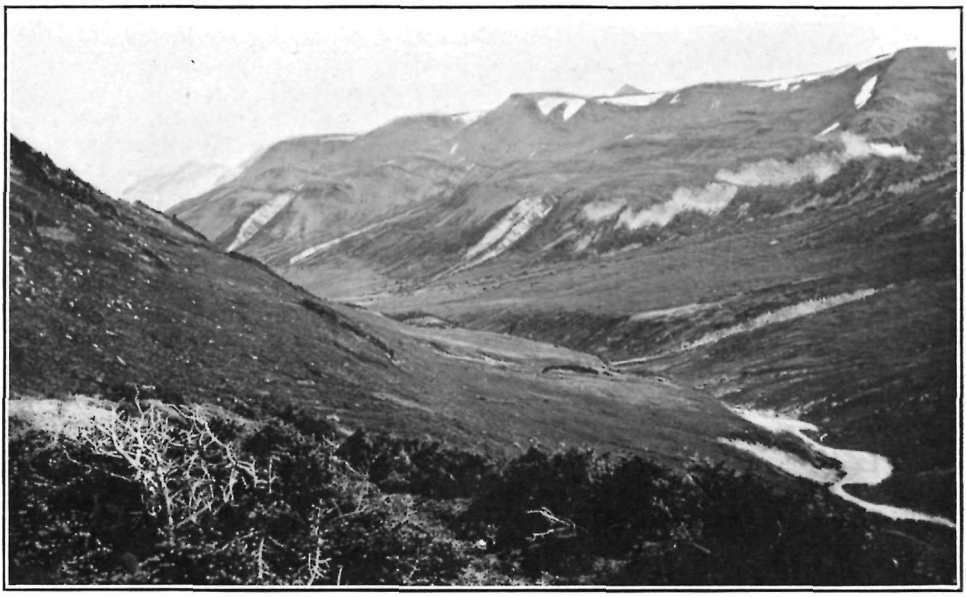

Photo. W. N. Millar.

A View of a Typical Mountain Sheep Range Country.

Such country is found between the Red Deer River and Ram Creek, especially in the valleys draining into the Clearwater. Note the moderate slopes adjacent to high rugged mountains.

Photo. C. H. Morse.

Mountains on the West Side of the Athabaska River Between the Whirlpool and the Chaba.

The lower slopes of these mountains are typical goat ranges and are well stocked with this animal.

Mountain goat, caribou, grizzly bear, and black bear. Ideal ranges for all of these animals are found within the limits of the East Slope, and it might possibly be suited to the propagation of others not now found within its limits.

(*b*) Many parts of the East Slope of the mountains are valuable for no other purpose than the propagation of big-game animals, or at least for nothing but game- and timber-production.

(*c*) Many parts of the slope have natural boundaries of an impassable nature, which, if employed as boundaries of game preserves, would greatly facilitate administration and protection.

(*d*) The presence of wild game in the mountains adds greatly to the attractiveness of the region for tourists, who are each year becoming more numerous, especially in the regions included within the Dominion Parks.

(*e*) The Slope is readily accessible to a very large prairie region, which must ultimately be thickly populated and will then possess no other accessible hunting-ground or area suitable for recreation purposes.

(*f*) By combination of scenic and big-game attractions the region can be made to yield a very large direct revenue and a still larger indirect revenue to the people of the province.

(*g*) The Slope contains under natural conditions some important big game animals that are found practically nowhere else on Dominion lands and under the protection of the Dominion Government. Most important among these are the bighorn sheep and the Rocky Mountain goat.

(*h*) The entire Slope is a Dominion forest reserve and administered under special restrictive regulations governing the occupation and use of all its resources, and is being developed with roads, trails and other permanent improvements by a permanent staff of forest rangers and protected from fire-damage by the same organization.

PRESENT SITUATION IN GAME PROTECTION IN ALBERTA.

At the present date there are three Government agencies actively interested in game protection in the province of Alberta. These are: (1) the Alberta Provincial Government and the Dominion Government, through (2) the Dominion Parks Branch of the Department of the Interior, and (3) the Forestry Branch of the same department. Of these the most important, naturally, is the Alberta Provincial Government, which, under the Canadian constitution, has full charge of game protection and matters in general pertaining to game animals throughout the province.

The Game Act of Alberta contains the usual provisions in regard to resident and non-resident licenses, close seasons, restrictions on export and sale, and also provides for the appointment of a chief game guardian and assistant guardians acting under his instructions. The Alberta Game Act further provides that certain Dominion parks which existed at the time of its passage should constitute game preserves, and prohibits the killing of game or the carrying of firearms within these preserves. It further provides that any other reservations for park purposes that may be set aside by the Dominion Government shall constitute a game preserve with the same restrictions.

Quite naturally the Alberta Provincial Government is more largely interested in game preservation than any other agency, both because it is a local question and because there is a very large direct revenue and a very much larger indirect revenue obtainable from this source. The direct revenue is, of course, secured in the form of license fees, and for the year ending December 31, 1912, which is the latest report available, this revenue amounted to $20,734.50. The expenditure during the same year in game protection was $14,042.17. Since that the revenue has continued to increase until during the past year it was approximately $30,000, while the expenditure amounted to about $15,000. The direct revenue, however, is not by any means the largest or the most important. Very imperfect statistics of expenditure made

in the province by big-game hunters alone during the hunting season of 1912 showed a revenue of $25,000 simply for purchase of supplies and the hire of pack-horses and guides and other camp assistants. I think it is well within the facts to say that the big game of the province yields an annual revenue, both direct and indirect, of at least $100,000.

To assist in the protection of the game and the conservation of this resource, the expenditure of $15,000 per annum seems a very small amount, and it would seem to be fully justifiable for the province to expend upon game preservation at least the entire amount derived as direct revenue from license fees.

The organization for protection consists of a chief game guardian, who is also fire warden of the province, with an office staff, one paid field-officer for the entire province, and a very large number of volunteer unpaid wardens. For the year ending December 31, 1911, the number of these wardens, as given in the Game Guardian's report, is 439. Wardens are empowered to enforce the Act and also to issue licenses, upon which they derive a small commission. Aside, however, from the activities of the one paid field-officer employed, the results obtained from volunteer assistants may be said to be of little value as far as actual protection is concerned. This is no reflection upon the character of the wardens, but is a condition which has been found to be universally true in the enforcement of game laws by volunteer wardens, and is an inherent defect of the system itself, which it seems impossible to eradicate. Some protection is secured through the appointment of the constables of the Northwest Mounted Police *ex-officio* game wardens, but the number of such officers throughout the province is extremely limited, and their activities confined almost entirely to settled regions where they have little or no connection with enforcement of the Act as regards big-game animals.

Two quite noticeable defects of the Act are of importance. The first is the inadequacy of the penalty imposed. The fine for violation, except in the case of buffalo, is limited to a maximum of $50. Quite naturally the great bulk of the fines are much less than this maximum figure, and a fine of $25, or even $50, for the killing of a big ram or elk out of season or in excess of the legal limit can hardly be considered a deterrent in view of the fact that many persons are willing to spend from $200 to $1,000 for the purpose of getting a chance to shoot a mountain ram. Were the maximum fine placed at $250, with a minimum of $50, the enforcement of the Act would be very materially improved.

The second defect in the Act is the fact that it makes no provision for the creation of game preserves aside from the Dominion parks. As all the unoccupied land in the province is the property of the Dominion Government, there can be no creation of game preserves on a large scale except through the co-operation of the Dominion and Provincial Governments. The Dominion Government has reserved from occupation within the province some 25,000 square miles of timbered land, which includes the rough mountainous region of the east slope of the Rockies. This land is held as a Dominion forest reserve primarily for the purpose of timber protection, but limited areas within this reserve have been created into Dominion parks, primarily for recreation purposes and for tourist resorts. Incidentally they have also been constituted game preserves by the provincial Act as previously cited, and administered as such under Dominion Government regulations. The largest two of these parks, and the only ones of material importance in connection with this report, are both traversed by transcontinental railways throughout their longest dimensions, and aside from this defect are not specially suitable in some other respects as game preserves. The value of wild game, however, as an attraction for tourists is such that even in spite of their obvious defects as game preserves there is ample justification for the restrictions on hunting which are applied to these parks.

For strictly utilitarian purposes, however, there are many areas in the mountainous and forested lands within the province included within the forest reserves, which are far more valuable as game preserves than are those already created. As the law

now stands, in order to create game preserves in these areas it is believed to be necessary to constitute them Dominion parks, but this procedure has the very obvious and serious objection that in so doing not only is game preservation provided for but it is necessary to withdraw from public use and lock up in the parks great areas of valuable timber lands, mineral land, and grazing lands which cannot be utilized at all under park regulations or only under extremly onerous restrictions.

The obvious answer to this problem is an amendment of the provincial Act which will give the Dominion Government the privilege of creating game preserves within the forest reserves that will be game preserves only, and will not, therefore, from creation into parks make necessary the imposition of burdensome restrictions on the utilization of all other natural resources in the area.

As will be shown in this report, there can be no doubt that by taking advantage of it the province and the Dominion can, in co-operation, make ample provision for all of the big game in the province without in any way interfering with the proper and natural development of the mineral and timber wealth of the province that may be involved in the game preserves thus created.

The Dominion parks, which, as previously stated, are game preserves not only by Dominion regulation but also by Act of Provincial Parliament, are wholly administered by the Dominion Government, there being no provincial officers employed in the administration of these parks nor any of the expense borne by the province. On the East Slope, the parks are three in number, known as the Waterton Lakes park, the Rocky Mountains park of Canada, and the Jasper park. Technically, the parks are simply limited portions of the forest reserve administered under special restrictive regulations, for which provision is made in the Forest Reserves Act, by authority of which the parks are created and specially organized as tourist attractions and places of recreation and resort, rather than on a strictly utilitarian basis as sources of timber supply and water conservation, which is the fundamental basis of the organization and administration of the forest reserves proper. As will be hereafter explained in this report, there is, or should be, a very well-marked distinction drawn between parks and forest reserves, and, while both are necessary for the proper handling of such an area as the east slope of the Rockies, yet this distinction must be kept in mind and both parks and forest reserves strictly limited to the function which each has to perform.

WATERTON LAKES PARK.

This park is situated in the extreme southern portion of the Rocky Mountains forest reserve just north of the international boundary, and at present comprises an area of 13·5 square miles[1]. Originally the park was somewhat larger, but the reduction was made following the passage of the Forest Reserves and Parks Act in 1911, when all of the adjacent mountain country was created into a forest reserve and placed under organized administration. It is a little difficult to see just what useful purpose the present park serves, whether as a game preserve or as a recreation ground, which would not be equally well served were it an undistinguished part of the forest reserve under the same administration as the surrounding area. As a game preserve it is of little or no value because it does not have natural boundaries, the boundaries are entirely unmarked, and the area is too small to be of much use as a game refuge. While game is decidedly plentiful in the region of this park, it is perfectly evident to an unprejudiced observer that this result is due to causes entirely distinct from the influence of the park itself. The first cause is the valuable protection afforded game in the region by the paid warden of the Provincial Government, who is stationed about 20 miles north of this park, and covers very effectively all of the adjacent region. The second cause is the influence of the Glacier National park on the south side of the international boundary, which is effectively patrolled and protected by a qualified staff of rangers. There are many reasons why an extension of the game preserve in this vicinity is urgently needed, as will be pointed out later in this report, but no reason

(1) Since the above was written the boundaries of the park have been extended.

exists why the game preserve should be created through the extension of the Waterton Lakes park. On the contrary, there seems to be ample reason why this park as a park reservation should be abandoned, and the entire area administered simply as a forest reserve.

ROCKY MOUNTAINS PARK OF CANADA.

This is the oldest and considerably the largest Dominion park on the East Slope. It was first created in 1887, with an area of 260 square miles. In 1902 this area was enlarged to about 5,000 square miles, but was reduced, under the Forest Reserves and Parks Act of 1911, to 1,800 square miles. The region included within the present boundaries of the park is most admirably suited for park purposes. The advantages of this particular area as a game preserve are not by any means as obvious. Between 1902 and 1911 the park was roughly triangular in size, having a natural boundary only along the summit of the Rocky mountains. The north and east boundaries were undelineated, and, as might naturally be expected, the protection afforded game within many miles of these unlocatable boundaries was practically valueless. With the reduction of the park area in 1911 its boundaries were made to conform to the topography of the region, so that game protection within this area might become of some real and lasting value. As a park, considered from the standpoint of the proper function of a Dominion park, the present area and boundaries would seem to be all that could be desired. Considered wholly as a game preserve, distinct from its other functions, the present limits are not by any means satisfactory. Not only are the natural conditions as regards range and other important features not by any means of the best within the present park boundaries, but the presence of the main line of the Canadian Pacific, traversing the entire length of the park, and the presence of a great number of travellers, tourist and mining settlements within the area of the park very seriously reduces its value as a game preserve and breeding ground for large game animals. That game is fairly numerous within the areas of the park in spite of these well-marked disadvantages simply is evidence of the possibilities in the line of game increase which may be expected wherever protection is afforded from the artificial destructive agencies that threaten the extinction of big game in the Rockies at the present time. If such results as have been obtained under the disadvantage of location of the present Rocky Mountains park are possible, it is easy to anticipate how much better can be the results obtained in game preserves which are in every respect adapted for this special purpose, and suffer from none of the disadvantages which abound in the Rocky Mountains park. It is important that these possibilities be kept in mind when considering the question of game preservation on the East Slope, as there has been some suggestion made that to secure adequate game preservation the entire East Slope should be thrown into a game preserve whose boundaries should be coincident with those of the Rocky Mountains forest reserve.

The results of protection in the Rocky Mountains park are best set forth in the reports of the Commissioner of Dominion Parks, and show an abundance of bighorn sheep, Rocky mountain goat, black-tailed deer, and black bear. Moose, elk, white-tailed deer, and grizzly bear are not mentioned among the big-game animals at large in the park, and are not believed to exist in any appreciable numbers. The absence of moose is to a large extent due to absence of any possible range for this animal, and the absence of elk is due to the former extermination of this animal and the impossibility of re-establishing it except by importation, and a further doubt as to the feasibility of such re-establishment, owing to the fact that the area suitable for elk range is now very largely occupied by mining villages and industries of this character that would seriously interfere with the use of the elk range by elk under natural conditions. There seems to be no reason why white-tailed deer would not be at home in the park. The fact that this region is not the original home of white-tailed deer, and that they are only gradually spreading into it in the course of their distribution over the larger part of the continent, probably accounts for their present scarcity.

JASPER PARK.

The Jasper park, as originally constituted, included about three and a half million acres. On the passage of the Forest Reserves and Parks Act of 1911 the entire, or original, area of Jasper park was included within the forest reserve to which extensions were made on all sides except the west, and the area within the reserve designated specifically for park purposes was materially reduced, so that the present area of the park is approximately 1,000 square miles, or 640,000 acres. The Government at that time apparently had in mind a very clear distinction between parks and forest reserves, and recognized the fact that parks lying along transcontinental railways, as is the Jasper park, are mainly valuable to tourists travelling such railways, and can therefore very advisedly be limited to the immediate vicinity of the railway line to which the activities of the vast majority of visitors are strictly confined. On this account the Jasper park was restricted to a strip of country 10 miles wide along each side of the Grand Trunk Pacific's main line from the eastern boundary of the forest to the summit of the Rockies at the British Columbia line.

In making this delimitation the Government had in mind more the numerous functions of the park as a recreation ground than its function as a game preserve, since the boundaries as established are practically useless in the preservation of big game, however well suited they may be as boundaries for a mountain recreation ground. In addition to boundaries which are impossible of location and unsuitable in other respects for a game preserve, the Jasper Park area has the same disadvantage as has already been mentioned in the case of the Rocky Mountains park, in that it is traversed through its long dimension by a transcontinental railway line, and includes within it several collieries with the usual settlement that accompanies such operations. It is much better provided with natural range for big-game animals than is the Rocky Mountains park, especially such animals as black- and white-tailed deer, elk and bighorn sheep, while closely adjacent to the boundaries both goat and caribou find suitable range. This park is very poorly stocked with game animals of any kind, owing to the destruction of game which took place at the time of the location and construction of the Grand Trunk Pacific railway, and it may be anticipated that years will elapse before the park area is again restocked. It will probably be the last portion of the region that will again become the home of large numbers of big game, even under efficient protection.

PROPOSALS FOR GAME PRESERVATION ON THE EAST SLOPE.

The subject of greater protection for big game on the East Slope has been under consideration for some years, not only by the Dominion Government, but also by the Provincial Government and by sportsmen's associations, perhaps the most prominent of which is the Camp Fire Club of America. The latter made a proposition to the Dominion Government some years ago in connection with a proposed extension of the Waterton Lakes park so as to supplement the protection afforded game in the Glacier National park in Montana. The following three suggestions have been made in regard to this subject:—

(*a*) Creation of the entire forest reserve into a game preserve.

(*b*) Extension of the Dominion parks over large areas of the reserve adjacent to their present boundaries.

(*c*) Establishment of specifically delineated portions of the forest reserve into game preserves under the forest reserve regulations.

A brief consideration of these different suggestions will readily show the advantages and disadvantages of each. The disadvantages of creating the entire forest into a game preserve may be briefly stated as follows:—

(*a*) Some of the larger animals, such as sheep and goats, occur nowhere else on Dominion lands, and the creation of the entire reserve into a game preserve would be equivalent to an absolute close season upon these animals. Others, such as mule deer and elk, occur only sparingly outside the forest reserve, since the reserve includes practically all of the land suitable for these animals, and they would probably increase to such numbers inside the reserve that they would become a nuisance to the surrounding farming and ranching country.

(*b*) The character of the east boundary of the reserve, which is largely an unsurveyed line following no natural features of the country, would make the question of protection one of the greatest difficulty, and real protection could only be accomplished at an enormous expense.

(*c*) There are numerous mining towns and other settlements within the forest reserve boundaries which would very greatly complicate the question of protection.

(*d*) No adequate argument has ever been advanced to show any real necessity for utilizing such an immense area as the entire reserve for game-preserve purposes.

(*e*) The regulations that would have to be enforced to make the reserve fully effective would prevent the utilization of some of the natural resources, particularly grazing lands, many of which are already pre-empted and should not be disturbed, and many more of which have a greater value to the community as range for cattle, horses, and sheep than they have as ranges for game, unless the people of the province are willing to attach a much higher value to the sentimental side of game preservation than, I believe, is the fact at the present time.

The solution of the game preservation problem by means of large extensions of the parks does not have the same objections as those cited to the creation of the entire forest reserve into a game preserve; but, to offset this, it has a number of special objections peculiar to the parks themselves. The disadvantages of attempting to accomplish game preservation by park extension may be briefly cited as follows:—

(*a*) Extension of the parks involves the imposition of burdensome restrictions on the use of other natural resources which are not essential to game protection alone, and are objectionable from the standpoint of the present and future commercial development of the country. This, of course, assumes that regulations designed to accomplish park purposes will be made to apply to all parts of the parks. If it is the intention to administer those parts of the parks which serve park functions under one set of regulations, and those parts which are valuable only as game preserves under other regulations which will permit utilization of the natural resources of the area, then it is a little difficult to understand why both the Parks Branch and the Forestry Branch should be maintained as separate organizations, since it is scarcely within the bounds of reason to maintain that game protection is distinctly a function of the Parks Branch and distinctly *not* a function of the Forestry Branch.

(*b*) Extension of the parks for game preservation alone involves the inclusion of land in parks which has little or no value for game protection in order to provide suitable boundaries for administration, since these lands will be in the hands of a distinct department, or else lands must be left out to be administered as forest reserves which are extremely poor administrative units viewed from the forest-reserve standpoint. This is particularly well illustrated in the case of the drainage area of the Rocky river, which, if not included in the park, puts on the hands of the Forestry Branch an extremely awkward administrative unit, while if it is included within the park it gives the game preserve a boundary that it is almost hopeless to expect to protect, and puts land into the preserve that has practically no value for game-preserve purposes.

(*c*) Extension of the parks merely to accomplish game preservation is a cumbersome, unnecessary, and indirect way of accomplishing an object that can be secured just as efficiently by direct means without raising the question of the reasonableness of withholding large areas of provincial resources from utilization.

GAME LAW VIOLATIONS: CHIEF OFFENDERS.

While the possible violations of the Alberta game law are decidedly numerous, many of them are of a more or less technical character and do not seriously threaten the extinction of the larger game. The two violations which are mainly important, and which should be especially guarded against, are the killing of game in excess of the limit imposed by the law, and the killing of female stock. Of these the latter is, if anything, the more serious violation.

The chief violators of the game laws fall under the following classes in the order of their importance:—

1. Stony Indians.
2. Resident miners.
3. Transients.

The number of persons travelling in the region of the East Slope is at all seasons of the year decidedly limited, so that game law violations from this source cannot under any circumstances be very considerable. It may be anticipated that this number will be largely increased in the not very distant future, but it is generally found that the persons travelling in the mountains are of a class which is almost universally disposed to a proper observance of the game laws, and little danger may be anticipated from persons of this character. It cannot be doubted that an occasional large game animal is picked off out of season by transient travellers in the mountains for the purpose of augmenting their food supply or relieving the monotony of camp fare, but it is generally found that such persons are likely to be careful as to the sex of the animal thus secured, and the effect upon existing game is practically negligible.

A more important and dangerous class, viewed from the game-preservation standpoint, are the residents of the various mining villages established in the coal-mining sections of the East Slope. These miners are to a very large extent foreigners, many of them of nationalities to whom the slaughter of wild game of all kinds appears to appeal as a sort of duty. Furthermore, aside from pure wanton slaughter, which is, on the whole, limited in amount, there are several other factors which cause these settlements to be of very serious importance in a consideration of game preservation. One of these is the very obvious fact that the cost of food supplies in such localities is generally much higher than in the towns and settlements outside the mountains. This is particularly true where the business of operating stores is a monopoly of the local mining company, and as the miners are frequently men with families, the augmenting of their food supply with the available big game of the locality appeals to them as both right and profitable. A further factor is the frequency of labour troubles in settlements of this sort, which give rise to periods of inactivity, when, as a general rule, the surrounding forests swarm with unemployed miners, some of whom take advantage of these periods of inactivity to indulge in camping trips, and all of whom do more or less hunting in a sadly unrestrained manner.

None of the other agencies of destruction, however, on the East Slope—nor indeed all others put together—can in any way compare with the depredations on big game for which the Stony Indians are responsible. The Stony Indians, who are located on a large reserve along the main line of the Canadian Pacific between Calgary and Banff, have from ancient times been known as the most expert hunters and mountain men of the Canadian Rocky Mountain region. These Indians appear to have been originally confined in their operations largely to the mountains, through the hostility of the Blackfoot confederation which occupied all of the plains and foot-hills to the east, and with which the Stonies were wholly unable to cope. Since their establishment on a reservation there has been no very marked change in their mode of living, and large numbers of them are domiciled in various portions of the East Slope, particularly on the Kootenay plains along the Saskatchewan river, and never return to the reservation at all. Neither at the reservation nor at their various locations in the mountains do they engage in any industry which would contribute to their support,

Photo. W. N. Millar.

STONY INDIAN SKINNING GOAT ON THE UPPER SIFFLEUR, OCTOBER, 1912.

Photo. W. N. Millar.

A STONY INDIAN CAMP ON THE KOOTENAY PLAINS ALONG THE SASKATCHEWAN RIVER.

and a very material part of the tribe, which numbers between four and six hundred individuals, depends almost exclusively upon the wild game of the east slope for sustenance. Throughout the year, parties of Indians are constantly travelling over the numerous trails of the east slope, both north and south of Morley, but particularly between Morley and the Saskatchewan river. Although they depend to some extent upon rabbits as a source of food-supply, nevertheless it is a noticeable fact that game birds of all kinds are practically extinct along the route of these trails, and that the larger game animals are equally scarce wherever a favourite camp-ground is located as, for instance, in the Kootenay Plains region itself. It is further perfectly well known that these camps are seldom without a supply of fresh meat, whether moose, deer, or sheep, at practically any season of the year. In addition, during the fall it is customary for the Indians to spread out over the entire mountain region from the Brazeau river southward almost to the Crowsnest pass and hunt the country very thoroughly, laying in at that time a huge stock of dried and smoked meats to carry them over the winter. I might say that this is not hearsay, but facts resulting from my own observation gained through frequent intercourse with the Stonies at all periods of the year throughout the larger part of the East Slope region. It is, of course, difficult to arrive at a reliable estimate of the number of head of game killed, but from various indications and information that I have obtained on the ground I feel safe in stating that the Stony tribe alone kills not less than two thousand head of big game in each year in that portion of the Rocky mountains lying between the Crowsnest pass and the Brazeau river. Deer and moose no doubt constitute at least two-thirds of this number, with bighorn sheep supplying practically all the rest. It is a noticeable fact that the Indians kill very few goats, this being the only other animal of importance in the region, the reason being that the pursuit of goats would involve extra travelling, and take them out of their usual hunting ground, and the meat is not held in as high esteem as an article of food as is the deer, moose, or sheep.

Not only do these Indians kill game vastly in excess of the legal restrictions, and to the great detriment of the game supply of the region, but they also exercise no restraint whatever in the matter of age or sex. I have associated with hunting parties of Stony Indians on a number of occasions, and find that the confining of game killing to males alone is a thing absolutely incomprehensible to a Stony. This is a feature that is of particular importance in connection with the bighorn sheep, for the reason that the females of this species are generally more easy of approach than the males, and as they run in bands in a type of country where they can be easily surrounded and cut off it is not infrequent for a hunting party of Stonies to completely exterminate bands of sheep numbering as high as twenty-five.

Until quite recently this unrestricted slaughter of game by the Stony Indians was entirely within their legal rights, but by public notice issued by the Department of Indian Affairs, dated June 1, 1914, the Stony Indians have been placed under the operation of the Alberta Game Act, so that henceforth they are subject to the same law as the white man, and if the law is enforced a considerable improvement in the game situation may be anticipated.

QUALIFICATIONS WHICH A GAME PRESERVE SHOULD HAVE.

In the establishment of a game preserve it will be readily recognized that a haphazard creation of such preserves without some adequate knowledge of the country is not likely to be very effective. But before considering the necessary qualifications of a game preserve it is well to consider what is the function of a game preserve, as a clear understanding of this fundamental point is requisite for the framing of a consistent and logical policy. A game preserve is primarily an area set apart for the purpose of protecting and propagating wild game animals under natural conditions. This is really its sole and only function, and any other purposes which it may serve are wholly subsidiary and incidental to the principal function of providing for the

preservation and increase of native wild game. As will be pointed out in a discussion of the necessary qualifications for a game preserve, it is essential that this prime function be kept in mind and clearly understood; but when, as so often arises, there is a confusion and a conflict of interests among game preserves, forest reserves, and national parks, it is particularly necessary that the functions of each be definitely known, and that each be, in so far as is possible, confined to such territory as is necessary for the accomplishment of its fundamental purposes. It will therefore appear that a game preserve need not necessarily be either a forest reserve or a park. Timber-cutting is neither necessary nor unnecessary in a game preserve. It is largely a matter of indifference, and restrictions on the cutting of timber within a game preserve need only go so far as is necessary to prevent an increase of the fire hazard, as forest fires are one of the most dangerous menaces to game preserves. In forest reserves, on the other hand, the primary purpose of the reserve cannot be accomplished unless timber is cut, while in parks the practical purpose of the park is destroyed if timber is allowed to be cut. In selecting an area for a game preserve the main points to be considered are totally distinct from points considered in the selection of either forest reserves or parks. Parks must contain some scenic feature of an unusual nature, or some special attraction, such as hot springs, etc., but scenery in relation to a game preserve is wholly a matter of indifference, just as it is in relation to a forest reserve. Many of the most valuable locations from a game-preserve standpoint are wholly without scenic attractions. In fact, striking scenery, at least mountain scenery, is more apt to be associated with regions devoid of large game animals than a region where such animals are found. Forest reserves must be land either bearing timber or valuable for timber production. Game preserves need not necessarily be timbered at all, this depending upon the species of game animals which it is desired to protect. Some animals, such as the antelope, are never found in timbered land. Others, such as elk, black-tailed deer, and sheep prefer decidedly open lands, but are also found in the timber. Still others, such as moose, caribou, and white-tailed deer, are essentially forest animals and cannot maintain themselves except in a densely forested preserve.

In considering the relation of game preserves, parks, and forest reserves to grazing, there is a much greater resemblance than in their relation to timber. Unregulated grazing is antagonistic to the purpose of all three forms of reservation. It is antagonistic to game preserves because the domestic stock use up much of the available forage, especially that needed by such animals as elk, black-tailed deer, and mountain sheep. It is practically necessary for the accomplishment of game preservation to prohibit grazing of sheep entirely, and to limit very closely, if not altogether to prohibit, the grazing of cattle and horses.

In relation to a forest reserve, grazing has the great disadvantage of affecting adversely the reproduction of timber. Sheep and goats are the most objectionable, and cattle and horses the least. All classes of stock, however, have an adverse influence upon timber reproduction, and while grazing can be permitted within forest reserves it can only be permitted under very stringent regulations.

Grazing in a park is much more objectionable than it is in a forest reserve. In a forest reserve all that needs to be considered is the relation of sheep grazing to forest reproduction. In a park, not only must this point be considered, but, as parks are of necessity game preserves, grazing must be restricted in order to assist in the accomplishment of this object. Furthermore, the presence of large bands of stock has many objectionable features which must be considered in a park that can be wholly disregarded in a forest reserve. For instance, large bands of grazing stock would destroy the necessary forage at tourist camp-grounds with which a park must be well provided and, if for any reason they congregated at these camp-grounds in large numbers the grounds would be otherwise spoiled for camping purposes. Moreover, it is a well-known fact that ticks and flies of all kinds are more abundant in regions that are pastured by domestic stock than regions not so pastured, and this would be a highly objectionable feature in areas frequented by tourist parties. It would be likely that

the water supply would be contaminated to a certain extent, particularly where sheep are grazed. A further objection to sheep arises from the occasional prevalence of diseases among sheep which have been shown to be communicable to the bighorn, and to be particularly virulent when transferred to that species.

In many other respects than those already stated, game preserves differ markedly in their requirements from either forest reserves or parks, and there are certain well-defined qualifications which any area that is created into a game preserve must have, and unless these qualifications are secured the possibilities of successful operation are very decidedly limited. These may be briefly stated as follows:—

(*a*) Suitable natural range for all the large animals which the preserve is designed to serve, including both winter and summer range.

(*b*) A minimum of commercial assets, such as coal, oil, or other minerals, which require establishment of permanent settlements for their development.

(*c*) Natural boundaries conforming to well-marked topographic features of the country, which are easily located and easily guarded against trespass.

(*d*) A minimum of lands valuable for grazing live stock which are pre-empted by stock-raisers or primarily valuable for stock range.

(*e*) No railway lines or probabilities of future railway construction.

In considering the above requirements for a game preserve it will, of course, be admitted that the first requirement is absolutely essential and so obvious as to require no further discussion. A game preserve which does not furnish food for the animals that it is designed to serve is a preserve in name only. As a sample of the difficulties attending the working out of such a preserve, it is only necessary to cite the case of the Yellowstone National park, where the elk herd has abundant summer range within the limits of the park, but must find winter range outside, with the result that thousands have died of starvation, and the Government has been forced, after wide extension of the game-preserve boundaries, to adopt a system of rounding up the excess and shipping to distant parts. Under no circumstances should a game preserve be established which does not provide for the feeding of all the different animals contained within the boundaries at all times.

The second requirement stated above is almost equally obvious, especially to those who have had experience in the administration of game laws. Interior settlements in game preserves, especially mining settlements, give rise to a constant danger of illegal shooting, and even though this violation of the regulations is kept down to the minimum, the mere presence of such settlements leads to a constant disturbance of the game on their breeding grounds which would frequently take place were a game preserve to include mining settlements, and is just as disadvantageous as would be the regulated hunting of game that would take place were the land not included in a preserve.

The third requirement, that is, that the game preserves have natural boundaries conforming to the topography of the region, requires somewhat detailed discussion. Those who are experienced in administrative problems of this sort will easily recognize the extreme desirability of this requirement, although there seems to be some divergence of opinion as to what constitutes the most satisfactory boundary for a game preserve. That a natural boundary is essential for proper administration is admitted by all men of experience without question. Without a well-defined boundary, real protection of game becomes a farce, and not only is it impossible to enforce the regulations essential for game preservation within a preserve, but through this impossibility of enforcement the protective staff becomes thoroughly discouraged and ultimately disorganized and inefficient. Not only this, but the failure of the protective staff to perform its duty, and the readiness with which the law may be set at naught, leads to the growth of a feeling of contempt and disregard for the entire subject among all members of the adjacent community, which my experience leads me to think results in a much greater destruction of game than would ordinarily take place were there no effort made to preserve the game at all.

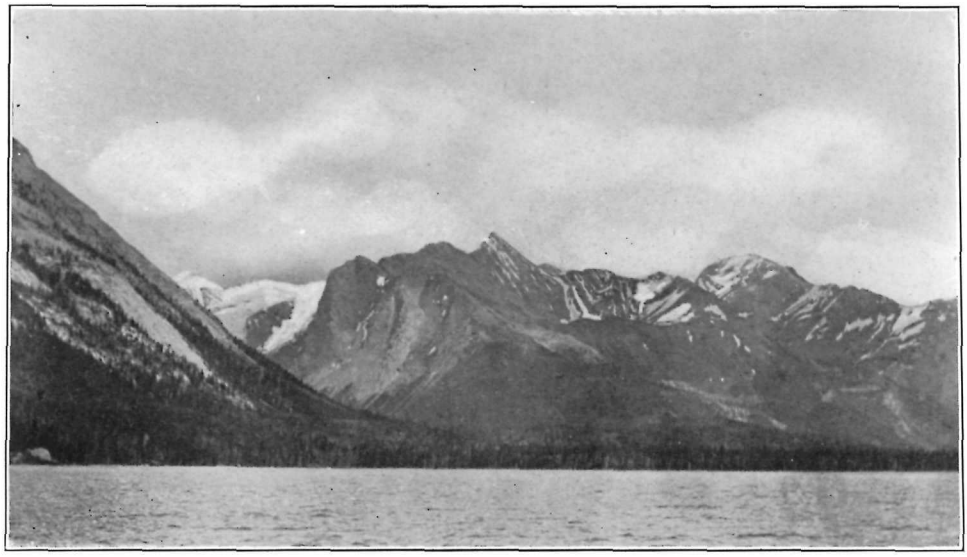

Photo. C. H. Morse.

East Shore of Maligne Lake.

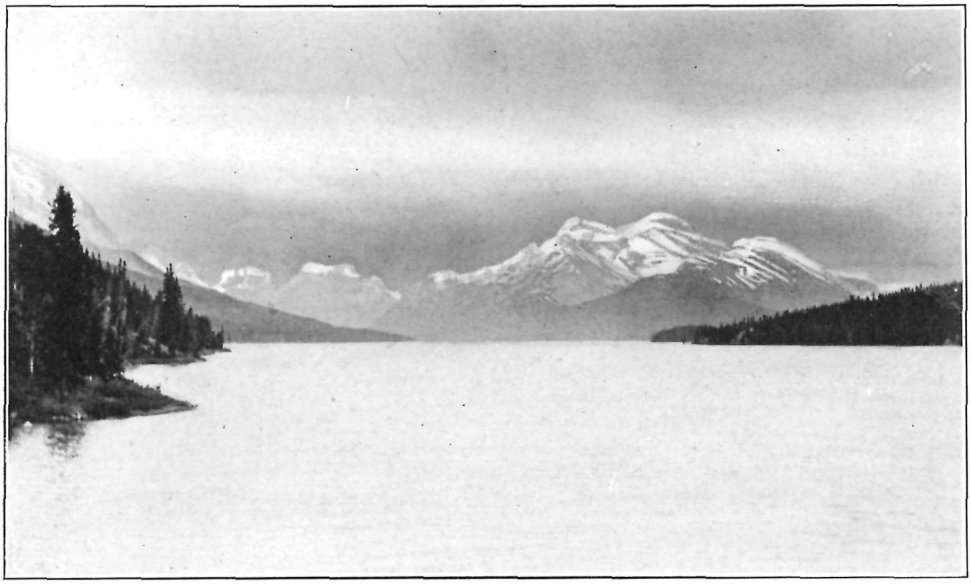

Photo. C. H. Morse.

Maligne Lake Looking South.
Note precipitous character of shore.

There are three possible boundaries for game preserves, all of which are used to a greater or less extent. These are as follows:—

(*a*) Section lines or other surveyed lines.
(*b*) Rivers.
(*c*) Mountain ranges.

A boundary that consists of section or other surveyed lines is wholly valueless. It has been found that the only practicable way of securing real protection in a game preserves is to prohibit the carrying of guns in the preserve, or else to require that all guns in the preserve be sealed. This, of course, means that the wardens charged with the protection of the preserve must be in a position to keep a continuous surveillance over travellers in the preserve, and especially be in a position to note the egress and ingress of such parties. Where the boundary is simply a surveyed line, it is obvious that to maintain such surveillance a wholly disproportionate staff must be employed. Where the boundary is an unsurveyed line, as was the original boundary of the Rocky Mountains park, protection over its entire area is impossible, and was very wisely not attempted by the parks staff.

The great advantage of natural boundaries for a game preserve lies, not in the ease with which such boundaries may be delimited, as is often urged, but in the fact that such boundaries in a mountainous region may be of an impassable nature, or of such a nature that ingress and egress is limited to a comparatively few points. The claims which are frequently made that natural boundaries are required for the purpose of being visible on the ground so that travellers and hunters may know when they reach the boundaries of a game preserve are decidedly more plausible than true. In such a region as the east slope of the Rockies, or, indeed, in any timbered country, a surveyed line cut through the woods and blazed and posted with warnings is an extremely conspicuous object and one that, as far as being visible on the ground is concerned, is just as noticeable as is a stream or divide. The disadvantage of surveyed lines, however, and the advantage of streams and divides lies not in their superior conspicuousness but almost exclusively in their affording obstacles to ready access to the preserve, and consequently their value for game preserve boundaries depends directly upon their impassability.

Arguing from the standpoint that natural boundaries are more noticeable and more readily found than artificial boundaries, it is often claimed that a river is more easily found on the ground than a divide. There is some slight weight to this argument, although I can hardly conceive of a good woodsman in a mountain country who is not perfectly well able at any time to tell whether he is on one or another watershed. Granting, however, that streams constitute more readily discernible boundaries than do mountain ranges and divides, nevertheless this argument loses weight because it is not conspicuousness that is particularly sought in the natural boundaries to game preserves, but rather such a degree of impassability as it is possible to secure. Considering, therefore, the rivers and divides in the Rocky mountains from the standpoint of their relative impassability, or the comparative nature of the obstacles which they interpose to access to specified regions, it becomes readily apparent that the ranges are by far the more impassable feature. After an experience on the Rocky Mountains east slope which has involved personal examination of practically every township from the international boundary to the Athabaska river, I have ascertained the fact that there are only two streams on the entire East Slope which cannot be crossed readily at any time of the year at practically any point that might be selected. These two streams are the North Saskatchewan between the mouth of the Siffleur and the east boundary of the forest reserve, and the south fork of Ram creek[1] between the

[1] The Geographic Board of Canada has decided that the name of Ram creek is henceforth to be applied to the tributary of the North Saskatchewan heretofore commonly known as Sheep river, which forms part of the north boundary of the proposed Red-Deer Clearwater game preserve.

upper falls in its canyon through the first main range of the Rockies and the mouth of the fork just west of the Brazeau range. In all, the total length of stream in the east slope of the Rockies which offers an obstacle to travel that needs any consideration whatever is not more than 75 miles.

The reasons for the impassable nature of the two streams cited are wholly distinct. The difficulty in crossing the North Saskatchewan is the great size of the stream, which at high water in all places and at low water throughout a great part of its length makes it impossible to ford, and therefore introduces the necessity of swimming, which may be considered a fairly effective bar to trespassers. Even in the case of the Saskatchewan, however, there are numerous fords at distances of from 5 to 10 miles apart throughout the entire portion of the stream cited above, where the river may be easily crossed on horseback or even afoot at low-water or medium high-water stages, and low water occurs during at least nine months of the year, while during a considerable portion of the year, probably five months, the river is frozen over and may be crossed on foot or horseback without any difficulty whatsoever. There is only a short period during the entire year when the Saskatchewan river may be said, for

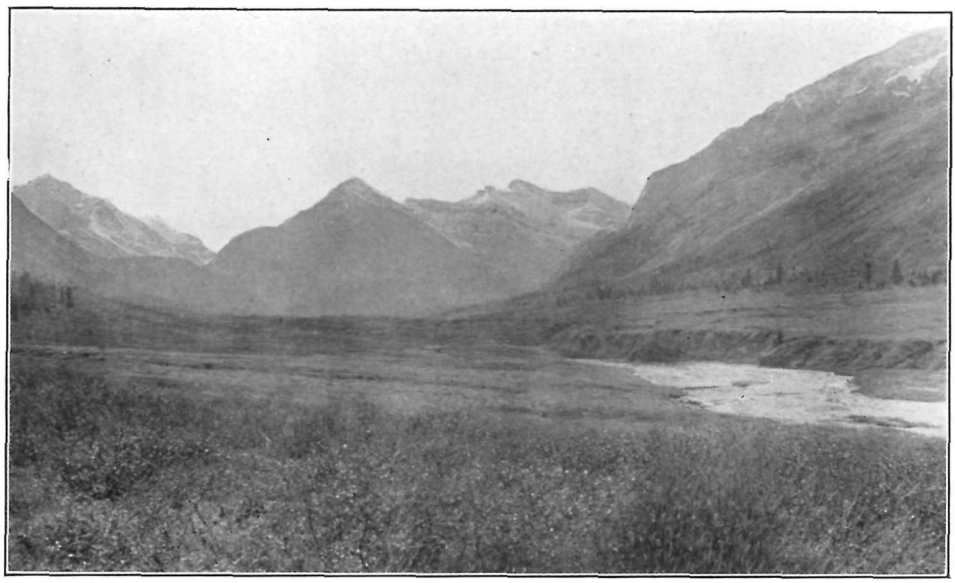

Photo. W. N. Millar.

VIEW OF THE HEADWATERS OF THE SOUTH FORK OF RAM CREEK LOOKING SOUTHWARD.
This portion of the river is not impassable itself, but the character of the adjacent mountain country limits travelling to a very few well-marked trails.

all practical purposes, to be absolutely impassable, and that is during the few weeks in the late fall and early winter when the river is only partially frozen across and is full of drifting ice. Throughout the entire hunting season, which is naturally the most dangerous season, viewed from the standpoint of game preservation, the river stands at its lowest water and can be crossed with horses at numerous places.

The south fork of Ram creek is only a small stream running at low water about 60 feet wide and 2 to 4 feet deep. As an obstacle to travel, however, it is just as serious in the portion mentioned as is the North Saskatchewan, for the reason that throughout this portion of the river it lies in a precipitous canyon of 100 to 300 feet in depth, across which it is wholly impossible to take horses except at a comparatively few places where small tributary streams give access to the main river. As a game preserve boundary the south fork of Ram creek would be even more effective than the North Saskatchewan.

The other streams of the East Slope, outside the present parks and south of the Athabaska are the Brazeau, the Clearwater, the Red Deer, the Highwood, the Castle[2], the north fork of the Oldman river, and the Waterton river. I have crossed all of these streams except the Waterton at their highest flood stage, and do not consider any of them an obstacle worthy of consideration.

The mountain ranges and divides, on the other hand, present an entirely different aspect. As is well known, the Canadian Rockies are formed almost exclusively of limestone rock which weathers in the characteristic fashion of limestone, forming slopes of the most precipitous character. As will be pointed out in a specific discussion of suggested game preserves it is readily possible to delineate game-preserve boundaries which follow ranges that are wholly inaccessible to pack-horses, and only accessible on foot through the formation of a veritable mountain-climbing expedition. Such impassable mountain ranges constitute natural fences through which access can be gained only by those passes which can be traversed on foot or with horses. Under these circumstances, entrance to game preserves having an impassable mountain barrier as exterior boundaries is confined to a very limited number of well-defined and easily protected gateways where guards may be stationed who can enforce, in a manner that will command respect, regulations prohibiting the carrying of firearms or unsealed weapons in the reserve.

The many advantages of mountain ranges as game preserve boundaries over streams may be briefly stated as follows:—

(*a*) Mountain ranges offer a real obstacle to access because of their impassable nature, and such impassable ranges are common in the Rocky mountains, while there are practically no impassable rivers anywhere in the mountains.

(*b*) Rivers are but little better defined than are divides, and the advantage is so slight that no one who can possibly travel without assistance in the Rocky mountains could justly plead ignorance of a boundary located on a divide.

(*c*) The passes formed by the rivers cutting through the various ranges of the Rockies constitute gateways to the interior valleys, and the result of adopting a river for a boundary would be the same as having one half of a gate closed and the other half open, and expecting the gate to serve its proper function.

(*d*) Many wounded animals, especially black- and white-tailed deer, moose, and black- and white-tailed elk will seek to cross streams in order to throw their pursuers off their trail. It would inevitably happen that hunters close to the reserve boundary where hunting would be especially good, if the boundary were a river, would wound many animals that would be able to cross the river boundary into the game preserve where they could not be pursued and put out of their misery.

(*e*) Enforcement of regulations providing for the total prohibition of guns in the preserve, or requirements that guns be sealed, would be attended with the utmost difficulty along a river boundary, especially where the trail following the river crosses from side to side as is frequently the case In many cases they are compelled to do so because of the precipitous nature of the slopes on one side or the other of the river. The result under such circumstances would be that either the prohibition would be set at naught or else there would be constant friction between the game guardians and the public that could not help but react adversely to the interest of the game preserve through the natural and wholly justifiable resentment stirred up.

(*f*) With rivers as boundaries, any attempt at regulating guns carried in the preserve by the obviously efficient method of stationing guards at the gateways would be rendered wholly ineffective for the reason that parties entering on the unprotected side of the river could readily claim an intention to remain on the unprotected side and thereby gain immunity from the gun regulation, and as soon as they get out of sight of the warden they could cross to the game-preserve side and hunt at will.

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(2) Formerly known as the Southfork river, or the south fork of the Oldman river.

Those who have had experience of this sort know that there is only one adequate solution to the game-preserve problem, and that is to absolutely prohibit all firearms inside the game preserve. It is a physical impossibility to keep such a close watch upon travellers in a game preserve as to prevent the killing of game unless the gun restriction is adopted. Especially is this true of the Stony Indians. In a region as large as the East Slope, and as easily traversed, even where trails do not exist, hundreds of hunters can establish themselves, and unless the number of game guardians was far in excess of any that may be reasonably anticipated they might never be discovered at all. The only possible solution of this problem is to establish game preserves which have impassable boundaries with the fewest possible number of gateways, and then devote the entire attention of the protective force to watching these gateways. Such a system, coupled with a regulation prohibiting the carrying of guns within the preserve, would be absolutely effective. Any other system must, from the very nature of the country, be both ineffective and highly expensive.

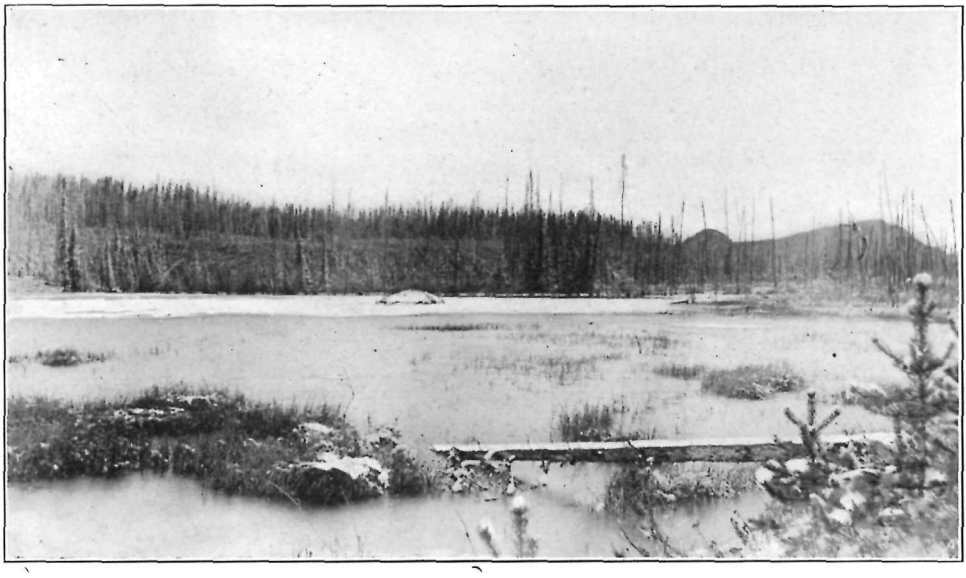


Photo. W. N. Millar.

A Beaver Lake and Beaver House on the Upper Athabaska.
Since trapping has been prohibited beaver have again established themselves in this valley.

The requirements that a game preserve contain as little range as possible that is of value for domestic stock is particularly important in the Rocky mountains at the present time in those regions where stock raising has already become well established. Stock raising, especially sheep grazing, and game preservation on the same area are wholly inconsistent. This is particularly true as regards elk, although it applies with almost equal force to the Rocky Mountain bighorn sheep. To be effective, therefore, a game preserve must be closed absolutely to sheep grazing, and grazing of any kind of stock should be discouraged as thoroughly as possible. In this way only can the full forage resources of the reserve be made available for the game preserve, as all the grass or other forage consumed by domestic stock is just so much less for the game in the preserve. It must be realized that in a preserve, no matter what its area, game does not exist under exactly natural conditions. As a general rule, predatory animals which prey upon big game are both reduced in numbers by the activities of the protective staff and by the bounties or other inducements for extermination in the surrounding country. It will be readily seen that game preserves adjoining stock-grazing localities, as will be the case with all preserves in the Rockies, canot be allowed

to become the breeding places of predatory animals, such as wolves, coyotes, grizzly bears, or mountain lions, without raising justifiable complaints from the stock-raising interests. The big game of the preserve, therefore, being protected from their natural enemies, must inevitably increase so as to be more abundant than they would be under natural conditions. More than this, it is found that effective game preservation on a definite area generally results in the migration into that area of a large part of the big game from the unprotected regions, and as long as big game exists outside the game preserve at all, the game within the preserve is augmented not only by its own natural increase, but by a portion of the natural increase of the game existing in the surrounding country. The result of this is already apparent in many game preserves, as, for instance, the Algonquin National Park of Ontario, the Yellowstone National Park of Wyoming, and several private preserves in the Adirondacks of New York, and even in whole states which prohibit the killing of deer, as, for instance, Connecticut and New Jersey. In the game preserves above mentioned, the wild game has become so abundant that, as in the notable instance of the elk herd of the Yellowstone, the forage available is not sufficient to support the game itself, much less afford good pasture for domestic stock. In such regions as Connecticut and New Jersey, deer have become so abundant that they constitute a menace to the crops, and the state of Connecticut is compelled to maintain a fund for the purpose of paying damages done by deer to farmers' crops and gardens. In the establishment of a game preserve, therefore, not only would established grazing rights properly demand consideration, but it is an open question whether or not land which has a distinct value as range for domestic stock does not serve its highest purpose when utilized for stock raising rather than when devoted to the protection of big game under natural conditions. Personally, I am not convinced that the big game of the continent has such an overwhelming value that many small stockmen and sheep raisers of the foothills country should be put out of business simply for the purpose of maintaining this game in a natural state, and, before any game preserve is created, its present or probable future usefulness as a range for domestic stock should be given full consideration. I might point out that game preserve enthusiasts in the States have gone to the extent of advocating the establishment of the one hundred and eighty-five million acres of National Forest into game preserves, wholly disregarding the fact that there are twenty-seven thousand stock-owners ranging their stock within these National Forests under permit, and that probably fifteen million head of live stock would be excluded from range through an action of this sort.

The disadvantage of having a railway line located in a game preserve is so obvious as to require little comment. Railways are not only routes of travel for legitimate railway passengers, but are also used to a greater or less extent by foot passengers and always by a great floating class of tramps who are frequently armed and have no conscience whatever in regard to game protection. While a railway does not necessarily make the preservation of game entirely impossible, it introduces so many complications, and its very presence is of such a disturbing nature, that wherever it is possible to create a reserve and avoid a railway line, other things being equal, the line should by all means be avoided.

FOREST RESERVES AND PARKS—THEIR DISTINGUISHING CHARACTERISTICS.

As has been suggested in this report, it is necessary to draw a clear distinction between the function of a Dominion forest reserve and that of a Dominion park, particularly where both parks and forest reserves exist in the same region, as is the case on the East Slope, to which this report specifically applies. This distinction is not always well understood, particularly in the popular mind, and it is for that reason that it is specially emphasized in this report.

A forest reserve may be defined as a specifically delimited area of land set aside by the Government from the public domain and withdrawn from settlement and alien-

ation under the various Acts by which natural resources may be acquired for the specific purpose of raising timber in commercial quantities. Incidental to the purpose of raising timber, forest reserves also serve the purpose of conserving water-supply, affording range for domestic stock, preserving the natural scenery, and affording recreation grounds. They may also act as game refuges if so provided. The primary purpose of a forest reserve is, of course, the production of commercial timber, and the only restrictions that need be placed upon the utilization of forest-reserve resources are those which are necessary for the protection of its destructible resources and for the utilization of the timber under such conditions as are required by good technical forestry practice so as to ensure a continuous forest crop. All resources of a forest reserve are, or should be, open to exploitation under no other restrictions than are required to ensure the realization of the primary purpose of the forest reserve, unless it is desired to impose special restrictions on the taking of game for the specific purpose of preserving game animals.

A Dominion park may be defined as an area set aside either within the forest reserve, as is the case on the East Slope, or outside, as is the case in other portions of Dominion lands for the purpose of affording a public recreation ground. Incidentally to this primary function, the parks, when in timbered regions, as in the Rockies, also serve as conservators of water, and as game preserves, the latter function being desirable owing to the well-known fact that live game in its natural environment is one of the most attractive features of mountain recreation grounds.

A park, as distinguished from a forest reserve, is distinctly a non-commercial proposition. To properly fulfil its function, the timbered lands of a park should be retained in a natural condition, and cutting or other utilization should be prohibited. Similarly, the pasturing of live stock on a commercial scale in a park is inconsistent with the purpose of the park, both because of the influence on natural scenery which it is the main function of the park to conserve, and because of the detrimental influence which it has on game preservation. The ideal forest, viewed from the standpoint of a forest manager, is diametrically the opposite of the ideal forest as viewed from the standpoint of a park manager. The former works towards the establishment of a highly artificial forest condition; the latter works toward the retention of the forest in its natural state. In a forest reserve, timber cutting on a large scale is absolutely necessary for realization of the purpose of a reserve and the accomplishment of its proper function. In a park, timber cutting on any but the most restricted scale is entirely inconsistent with the fundamental purpose of a park. Forest reserves are almost entirely utilitarian in their purpose. Parks, on the other hand, are more largely sentimental and only of practical utility in an indirect way. A park to serve its proper function must of necessity interfere with and restrict very seriously the commercial development of the natural resources found in its area, particularly the renewable resources, such as timber and forage. Forest reserves, on the other hand, exist primarily for the purpose of utilizing these renewable resources under such restrictions as will ensure their continuous production. In considering, therefore, the creation of a forest reserve, regard need be given only to whether or not the tract is mainly suitable for timber production and is not more valuable for some other form of commercial exploitation, and whether the extra cost of handling its resources under regulations that will ensure continuous production is justified by the requirements of the public interest. In the creation of a park, however, a much more serious question is involved, namely, whether the purpose served by the park is of such outstanding value to the public interest that an entire withdrawal of its natural resources from commercial exploitation is justified in order to serve the primary purpose of a park, which is recreation and the preservation of natural scenery. The creation, therefore, of parks simply for the purpose of game preservation and the consequent withdrawal of large areas of timbered lands and other resources from commercial development would hardly seem to be wholly in the interests of the public at large.

To avoid the necessity, on the one hand, of creating parks which are needed for game-protection purposes alone, and thereby withdrawing from utilization great areas

of timbered land and other natural resources which are necessary for the prosperity of the province, or else of having parks which are parks in name only and are not administered under regulations which are adapted to the primary purpose of a park, but are administered in the same manner as a forest reserve, it would seem better to create game preserves within the forest reserve for this specific purpose alone and administer the areas so set aside subject to the same regulations as the forest reserve except in so far as these regulations might be antagonistic to the primary function of the game preserve. The only regulations that are antagonistic are those which provide for the grazing of live stock, and these should be suspended in so far as game-preserve areas are concerned. The advantage of handling game preservation as a subsidiary to forest conservation may be briefly stated as follows:—

(*a*) Game preserves can be created without the necessity of locking up every natural resource in a park where they will be under the more rigid restrictive regulations that are necessary to accomplish the objects of a park.

(*b*) On the East Slope the forest reserve staff is already located on the ground, and has all the facilities and organization necessary to put special regulations into force.

(*c*) The development and protection of the forest reserve requires a large investment for improvements that will also serve the purpose of facilitating game protection and tourist travel.

(*d*) Game preserves may be created within the boundaries of the forest reserves with well-defined natural boundaries that facilitate efficient protection without involving the creation of inconvenient and unwieldy administrative units that must inevitably result from the creation of these same areas into parks and their consequent removal from the hands of one branch into those of another.

(*e*) The method of handling the natural resources of the province should be adapted as far as possible to the benefit of the local population, and, if parks are to be confined to their proper function, great extensions of them must have much more weighty reasons than mere game preservation to meet the approval of the people of the province.

(*f*) The only argument for the creation of game preserves by declaring park extensions lies in the technical requirement of section 20 of the Alberta Game Act, and the province has already agreed to amend the Act to make provision for preserves that are not parks, and has approved those recommended in this report.

(*g*) The creation of parks sufficiently extensive to provide the needed game preserves would be a heavy blow at forest conservation, in that it is going far beyond the needs of the situation and can only result in such so-called parks being ultimately forced to permit the utilization of their timber and other resources under the same fundamental regulation as on the forest reserves, in which case the maintenance of two distinct government branches both doing precisely the same work becomes wholly illogical and unreasonable. Separate branches for parks and forests can only be justified by separate and distinct functions, and the areas assigned to each must therefore serve only their own proper function and no other.

DESCRIPTION OF THE LARGE GAME ANIMALS OF THE EAST SLOPE.

ELK.

Foremost among the large animals of the East Slope in need of protection, although least in actual numbers, is the elk (*Cervus canadensis*) also known as the wapiti, and, among the Stony Indians, as the red deer. A comparison of the original enormous range of the elk in North America with its extremely limited distribution at the present day will at once make evident the fact that unless stringent measures are taken for the protection of this animal it will very shortly disappear entirely as a part of the North American fauna outside the game preserves and parks. The elk originally

covered all of the continent from the Atlantic seaboard, between the St. Lawrence on the north and the coast of South Carolina on the south, westward to a line connecting northern Alberta with the northern boundary of New Mexico. At the present day it has disappeared absolutely from this entire range except for scattered bands along the main range of the Rocky mountains from southern Colorado to the Crowsnest pass, and a few isolated bands in northern Manitoba. The only place where elk at the present day are at all abundant is in the Yellowstone National Park in northwestern Wyoming and in one or two of the forest reserves of northern Manitoba, such as the Riding mountain reserve. Originally the elk probably existed in millions Recent estimates compiled from the best available sources place the present number at not more than sixty thousand, of which probably not over two thousand are permanently located in the Dominion. About fifty thousand are domiciled in the Yellowstone National Park, the rest being scattered in very small bands elsewhere in the Western States and in the Adirondacks of New York.

The elk is the largest and finest of all the round-horned deer in the world, and, unlike the moose, which is almost exclusively a browsing animal, the elk both browses and grazes. It lives largely on low brush, such as poplars, birch, and willows, but in mountainous country subsists very largely on the native grasses found in the open groves of timber and mountain parks. Unlike the moose, the elk has a comparatively small hoof and its legs are slender and clean-cut, so that the animal is not at all adapted to low marshy ground or swamps or muskeg, but it is essentially an animal of the dry uplands, plains, and mountain slopes. Although it originally existed in great herds on the open plains and foothills, it is nevertheless a forest animal as well, but prefers the open park-like country of the East Slope, where there are lodgepole pine and poplar groves interspersed with grassy openings, rather than the dense coniferous forests of the western side of the range. It is true that in northern Manitoba, in such regions as the Riding mountains, elk and moose are found together in the same locality, but it will be noted that, while the moose hang more to the dense timber and marshy areas, the elk are found principally in the drier open poplar groves and dry open hillsides. Moose are practically never found out in the open away from brush or timber, but elk are very frequently found grazing in large bands out on the open grassy plains or hillsides.

In Alberta the principal range of the elk seems to have originally been the high plains, and especially the foothills just east of the forest reserve boundary. From the number of old horns scattered over the foothills region it is very evident that elk were at one time enormously abundant, and have only disappeared in comparatively recent years. Inside the present boundaries of the Rocky Mountains forest reserve the principal elk range was the larger river-valleys, all of which are bordered a long way into the mountains with dry open plains and poplar groves. This is particularly true of the Bow river, the Red Deer, the Clearwater, and, above all, the Saskatchewan and Athabaska. Judging from my own observations, I would say that elk existed last in considerable numbers along the north Saskatchewan in the vicinity of the Kootenay Plains. At the present time the last small remnant of elk on the East Slope exists in the open poplar country along the main Brazeau river just inside the forest boundary. A number of reports have been made within the last few years by parties who claimed to have seen a small band of elk in this vicinity, and last fall a band of Stony Indians under Chief Wesley killed four elk including a three-year-old bull near the mouth of Southesk river on the main Brazeau. It seems doubtful if there were more than ten or twelve elk in this band as a maximum, and there is reason to fear that the entire band has been exterminated by the Stonies.

After the complete destruction of native elk which took place throughout the East Slope region from the international boundary to beyond the Saskatchewan, there was, and still continues to be, a small influx of elk from the adjacent region of British Columbia south of the head of the Kananaskis river. The Kootenay valley and a

large portion of the Elk river in British Columbia is timbered with an open growth of yellow pine, larch and Douglas fir, affording first-class elk range, and this portion of the mountains has for many years been so remote that the large game in it has escaped extermination. Some of the elk from Alberta may have migrated into British Columbia, as it is a well-known fact that the elk is a great traveller, and in a very short time will wander 40 or 50 miles.

Since the placing of an absolute close season on elk in Alberta they have been gradually working back from the ranges of British Columbia, but have only begun to re-establish themselves on the East Slope in very limited numbers. The largest band has worked across the North Kootenay pass from the head of the Flathead river, and is now established in the valley of the Castle river within the Crowsnest forest reserve. There is every reason to believe that this band, if protected, will stock the proposed game preserve in the Waterton Lakes district. North of the Crowsnest pass a few head have worked across from the head of the Elk river to the

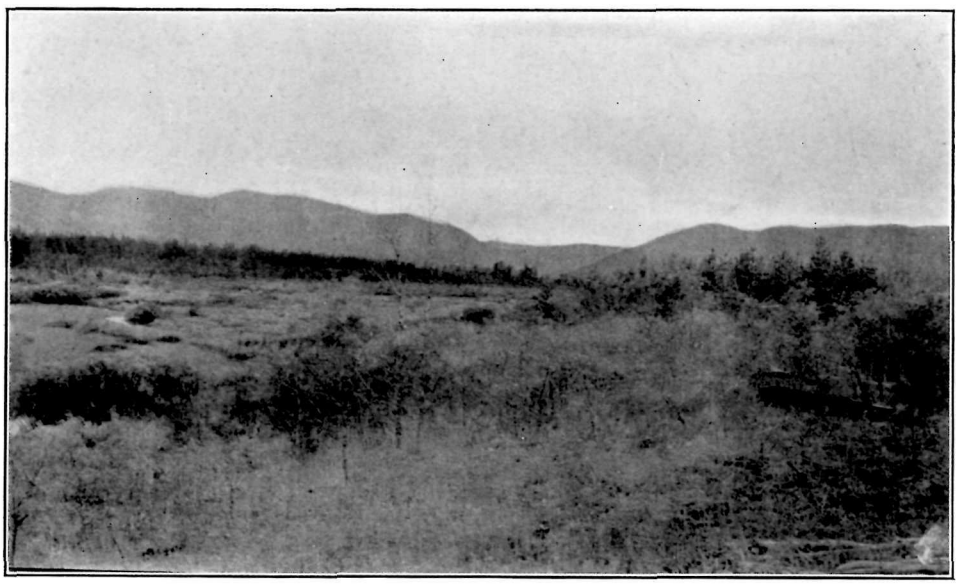


Photo. W. N. Millar.

A View of the Brazeau Range at the Clearwater Gap.
The sum nit of this range is proposed as the east boundary of a game preserve. Meadows in the foreground afford excellent range for mule deer and elk.

Highwood, where they are located within the proposed Highwood game preserve. Each year an occasional elk wanders across to the head of the Kananaskis, but it is practically certain that none remain on the Alberta side of the range throughout the year. North of the Canadian Pacific railway in British Columbia, as far as I know, there are no elk, and certainly there are none working across the mountains north of the Rocky Mountains park. The only elk in this portion of the Rocky mountains are the small band that remains of the original elk herds on the main Brazeau river, and this band was reduced to a very small remnant as early as 1896, when they were reported by J. Alden Loring, of the United States Biological Survey.

It will be noted that the favourite habitat of elk, unfortunately, is the type of country that is most valuable for stock range, and it is practically impossible to consider the retention of elk on the open foothills or plains which form its natural habitat. There is no reason, however, why elk in a natural state cannot exist in considerable numbers within the limits of the Rocky Mountains forest reserve along the

larger streams which are otherwise adapted for the purpose of a game preserve. Both the Rocky Mountains park and the Jasper park contain extremely valuable elk range, the Jasper park being especially adapted to winter range for this animal, and the only disadvantage is the presence of the railway lines and the large number of travellers who frequent the vicinity of these lines. Of the additional game preserves recommended in this report, two are particularly well adapted for elk, the most important being the Red Deer-Clearwater preserve, which will afford an enormous area of first-class range available both winter and summer, but would probably need to be artificially stocked before a beginning could be made. The Highwood preserve also offers excellent opportunities for re-establishment of elk, and contains both winter and summer range, and has the extra advantage that elk are already established in small numbers and, under protection, will no doubt increase by migration from British Columbia. In the proposed extension of the Jasper park the elk range available is very limited, but there are feeding grounds both for winter and summer.

MOOSE.

The moose (*Alces americanus*) is the largest member of the deer family either living or extinct, and ranges entirely across the continent from the tree line southward in the eastern states to Pennsylvania and through the northern Lake states and in the Rocky mountains to Wyoming. Except in the northern New England states, particularly the state of Maine, and in the northern Lake states, especially Minnesota and Wisconsin, the moose has become practically extinct south of the international boundary. It apparently never existed in large numbers in any of the Rocky Mountain states, and is found now only in scattered localities, being much more abundant west of the continental divide. It is scattered more or less throughout southern British Columbia, becoming more abundant towards the north, but the principal home of the moose is in the low rolling woodland country north of the plains of Manitoba, Saskatchewan and Alberta. The moose is essentially not a mountain animal, and is adapted for life in dense forests, especially low-lying forests interspersed with muskegs and swamps and heavy thickets. It is altogether a browsing animal, and lives on the bark, leaves, and twigs of trees and shrubs, and also on moss and lichen. It is strictly a forest animal, preferring coniferous forests, and never ranges out on the plains. It frequents small lakes and ponds of still water and marsh lands and sloughs, where it frequently feeds upon lily pads and rushes. It will thus be readily seen that the dry open hillsides and poplar groves which afford excellent range for elk on the East Slope are not at all adapted for range for moose.

There is no reason to think that moose ever occurred in very considerable numbers within the present limits of the Rocky Mountains forest reserve. This is especially true of that portion of the reserve lying between the Crowsnest pass and the Red Deer river, where it is doubtful if moose were ever found in any numbers at all. South of the Crowsnest pass, especially near the international boundary on the British Columbia side of the range, there is a considerable area of coniferous forest in the valley of the Flathead river, which affords a fairly satisfactory range for moose, and since the establishment of the Glacier National Park, which includes much of this country on the United States side, moose have been increasing and a few have wandered across into the extreme southern end of the Rocky Mountains reserve. It is doubtful, however, if it may be anticipated that they will establish themselves in any considerable numbers on the East Slope, although a few might become permanently located in the proposed Waterton preserve. Northward there is little range suitable for moose until the Red Deer river is reached, but from that point north the amount of such range rapidly increases as the boundary of the forest reserve trends more and more away from the higher mountains. Moose are now found in limited numbers all the way from the James river to the northern limit of the forest reserve. They occur in the greatest numbers in the valley of the Pembina and the north tributaries of the Brazeau

river, and also in the valleys of the Baptiste and the Little Brazeau. A few are found in the Clearwater river and the Ram Creek drainage areas. It is probably safe to say that moose are never found west of the first main range of the Rocky mountains, but are confined wholly to the lower mountains and timbered foothills lying east of this range and extending out in the northern portion of the reserve to join the great belt of woodland which lies north of the Great Plains and extends northward to the barren grounds.

Although a very large conspicuous animal, the moose is not a particularly easy animal to exterminate because of its habitat in dense timber, and seems, on the whole, to be increasing rather than decreasing its range. Moose have, of course, disappeared from portions of the northeastern states where they were once found abundantly, and also from portions of the lower provinces, but on the other hand there is reason to think that they have extended their range northward in the vicinity of Hudson bay. As this animal frequents the great northern woodlands up to the tree-limit in great numbers, there is no reason to anticipate that it will be exterminated in the immediate future. No doubt it will be greatly reduced along the southern border of the northern forests as settlement pushes farther into timberlands, but there must always remain a great belt of woodland north of any possible settlement where moose will continue to exist. As far as moose on the East Slope are concerned, I do not feel that the measures that would be necessary to ensure complete preservation are justified. Few of the game preserves which are recommended contain any considerable area of country suitable for moose, and it would be impossible to lay out such preserves and at the same time comply with other requirements which have been pointed out as necessary for successful game preservation. All of the preserves recommended will afford range for a limited number of moose, and the Red Deer-Clearwater preserve will afford range for large numbers of them, at least in the valley of the Clearwater and its tributaries. This is the only recommended preserve which at the present time contains moose in any number, but in all of those where moose can find suitable range there is reason to believe that they will establish themselves by migration from adjacent regions. As far as is known there are no moose in any of the Dominion parks now established on the East Slope.

MULE DEER.

The mule deer (*Odocoileus hemionus*), also known as the black-tailed deer, is the largest member of the deer family commonly called by the name "deer." The mule deer is confined entirely to the western mountain portion of the continent, and is not found east of the Great Plains; in fact it has been found practically impossible to acclimatize this deer in the eastern portion of the continent. In habitat it is quite distinct from the white-tailed deer or Virginia deer, and more nearly resembles the elk in the type of country that it frequents, except that it does not roam in large herds on the open plains. It is found in all the open park-like country and the lower slopes and foothills which, as has already been described, form the favourite summer range for elk, and also frequents deep ravines with grassy slopes along rivers well up into the mountains, and is frequently found on the high grassy slopes above timberline which constitute the favourite range for mountain sheep. The mule deer, in fact, occupies what might be called a transition range between the range of mountain sheep and the summer range of elk. It prefers an open country, being most abundant in the dry open meadows which sometimes are found along the streams in the Rockies and on the dry grassy south slopes which border most of the larger rivers. The mule deer browses on twigs and foliage, but, like the elk, it also grazes on good grass, and is most frequently observed grazing close along the edge of timber where coniferous forests border the dry open grasslands along the streams well up in the mountains. The mule deer is characteristically an animal of a dry upland climate with more or

less rarefied atmosphere, and lives almost exclusively on dry food, so that it has been found very difficult to raise in lower altitudes or in moister regions.

Although not as easily hunted as the elk nevertheless the mule deer has been very rapidly killed out in the regions where it was formerly most abundant, and although the exterior boundaries of its range have not been materially altered, nevertheless the numbers existing have been reduced to a mere fraction of what they were originally and its complete extermination over large areas of the western mountain country is only a question of a comparatively short time. It would therefore appear desirable to make provision for the preservation of this species in game preserves suited especially to its requirements and such preserves may very readily be established on the east slope of the Rockies.

As may be readily judged, the large game animals most needing protection on the East Slope are the elk and the mountain sheep. In the provision of game preserves which afford range for both of these animals, suitable range for the mule deer must inevitably be included, since the mule deer, as previously pointed out, occupies what is essentially a transition range between the bighorn sheep and the elk. All of the game preserves already established or proposed on the East Slope contain abundant range for black-tailed deer, and all of them except the Jasper park extension are already well stocked with this animal. This is particularly true of the proposed Red Deer. Clearwater preserve, where mule deer exist in very large numbers. This animal appears to increase very rapidly under protection as is demonstrated by the number which exist in the Rocky Mountains park and especially around the head of the Red Deer river. On one occasion while travelling in this valley I was in sight of eighteen mule deer at one time, and there is every reason to think that hundreds are located both in the Red Deer valley and in all the forks of the Clearwater river and Ram creek well up into the mountains. I have found in the course of my inspection work that these deer are most abundant in the valley of the Brazeau, particularly along the northern side of the river around the mouth of the north fork, where I have already stated that moose occur in the greatest numbers in the Rocky Mountains reserve. This abundance in this particular region is easily explained by the fact that it has until the last few years been the most remote portion of the mountains as far as white hunters are concerned, and that it is a sort of neutral belt between the hunting grounds of the Stonies on the south and the Crees on the north so that moose and deer have undoubtedly been forced into this narrow belt of country as a result of the activities of both the Crees and the Stonies, and have more or less concentrated in this locality.

No particular measures need be taken in regard to the introduction of black-tailed deer even into the proposed Jasper park extension, where they are at the present time comparatively scarce. This animal travels rather extensively, and my observations show that it is able to cross what might often be considered impassable mountain ranges, showing in this respect an ability to climb which is second only to that of the mountain sheep. I have on a number of occasions followed the trail of black-tailed deer well above timber-line into the high rocky summits of the ranges, where it was extremely difficult to go on foot, and wholly impossible to take horses.

WHITE-TAILED DEER.

The white-tailed deer (*Odocoileus virginianus macrourus*) sometimes known as the Virginia deer or red deer, occurs rather sparingly on the east slope of the Rocky mountains. This deer was not originally native to the region, but has gradually been extending its range ever since the discovery and settlement of the continent in spite of the continuous hunting to which it has been subjected. The white-tailed deer differs markedly from the black-tailed, or mule deer, both in the nature of its habitat and in appearance and habits. Instead of frequenting dry open hillsides and valley bottoms, the white-tailed deer lives almost exclusively in the densest timber or brush-

lands. It is found throughout the continent from the Atlantic coast westward almost to the Pacific coast, and from the Gulf States well north into the Dominion. It has not yet spread extensively into the northwest of Canada, although it was reported north of Edmonton as early as 1901. White-tailed deer inhabit mostly low ground heavily covered with brush and timber, and, as stated above, are essentially forest animals seldom seen out in the open. Unlike the black-tailed deer or the elk, the white-tailed deer takes very readily to civilization, and will persist in a fairly densely populated region. In characteristics it differs very much from the black-tailed in possessing little or no curiosity, and flees immediately upon being disturbed instead of stopping to investigate the cause of the disturbance as the mule deer very frequently will. For this reason the white-tailed deer is very easily able to hold its own and unless very diligently hunted it is not often seen except where it has become comparatively tame. The greatest numbers of white-tailed deer exist at the present time in the Adirondacks of New York and in those New England and other northeastern states which have declared close seasons. This deer is, however, found more or less in other states and provinces and also among the western states, being particularly abundant in northeastern Washington and northern Idaho.

The existence of this species on the East Slope is known to me only by report, since I have not myself seen any white-tailed deer in the course of my inspection work, but there can be little or no doubt that it occurs in limited numbers and that with protection it will soon become numerous in the game preserves. Any of the game preserves recommended would afford suitable range for white-tailed deer, but the Red Deer-Clearwater preserve and the northern end of the extension of the Jasper park are best adapted to this animal. I do not consider that special measures need be taken in connection with the establishment of preserves specifically for white-tailed deer, as under reasonable game laws such as now exist practically all over the continent this deer can readily maintain itself. In fact, where close seasons have been established, or large preserves created, as in some of the New England and Middle states, the white-tailed deer actually becomes a nuisance and a menace to crops.

BIGHORN SHEEP.

The mountain sheep, or Rocky Mountain bighorn (*Ovis canadensis*) which occurs throughout the east slope of the Rocky mountains in the Rocky Mountains forest reserve is probably the most sought after of the six species of mountain sheep which are known to inhabit the North American continent. This sheep formerly ranged from Mexico northward probably to the Peace river along the Rocky mountains and among all the ranges to the west of it, but did not reach the Pacific coast.

It is now possible to legally kill mountain sheep only in three states of the Union, and in British Columbia, Alberta, Alaska and the Yukon Territory. All the other states of the Union where it exists have put a close season on sheep, and it does not exist in any other Canadian province. It seems very doubtful if even under protection the bighorn sheep will ever regain much of the territory which it has lost in the United States. This is mainly due to the fact that regions where bighorn were formerly most abundant have since been occupied by domestic stock, especially sheep, and there is now little or no unoccupied range where bighorn sheep can maintain a foothold. The main centre of this species at the present time is the Rocky mountains of Alberta and British Columbia, and it is claimed that this species attains its present maximum development in that portion of the Rockies which lies immediately adjacent to the international boundary. In Montana the species is protected in this range by the Glacier National park. During the winter, however, great numbers of the Glacier Park sheep drift northward into the vicinity of the Waterton lakes, and for the full protection of the species in the region the Waterton lakes preserve as recommended in this report is absolutely essential. North from the Crowsnest pass, sheep are found scattered in smaller or larger bands all the way through the mountains. They are

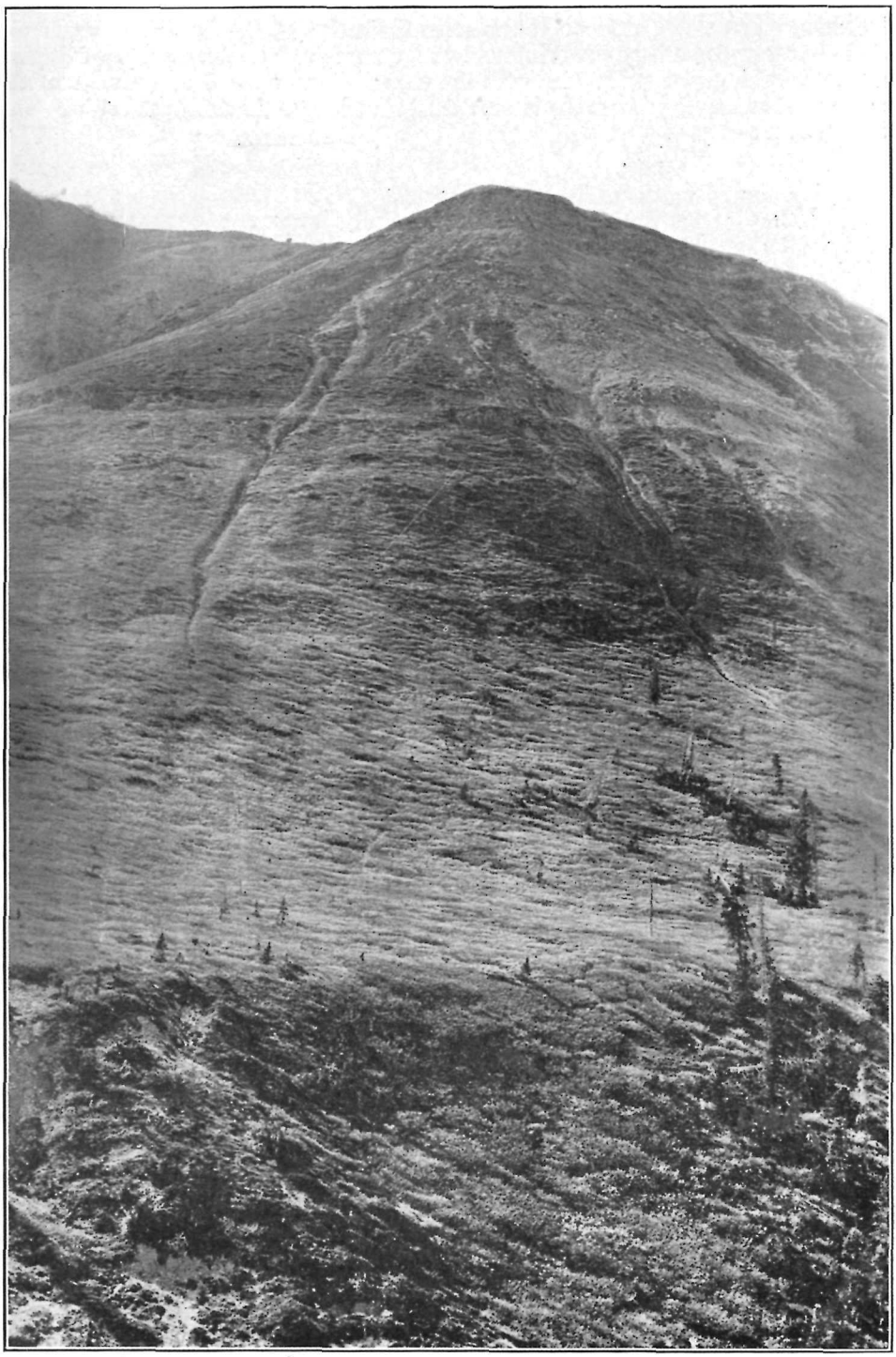


Photo. W. N. Millar.

Characteristic Sheep Range in the Brazeau Valley.

nowhere abundant, and owing to the depredations of the Stony Indians are every year becoming scarcer. In order to secure some indication of the number of mountain sheep in the region I have communicated with a number of hunters, guides, and game guardians who are most familiar with the situation and secured an estimate of the sheep on the East Slope from the international boundary to the Athabaska river. This is as follows:—

Locality.	Not more than	Not less than
International boundary to Crowsnest	1,000	500
Crowsnest to Rocky Mountains park	800	400
Rocky Mountains park	700	500
Rocky Mountains park to head of Athabaska	450	200
Athabaska drainage	250	75
Brazeau drainage	200	100
Total	3,400	1,775

It is impossible to arrive at any figure in regard to the number of mountain sheep of this species in British Columbia nor have I ever seen any information in regard to its actual distribution in the province. However, it is undoubtedly widely distributed in British Columbia over a north-and-south range at least as long as in Alberta, and a very much wider east-and-west range, so that considering the extent of its distribution and the fact that much of the country where it ranges is even yet very inaccessible, there is every reason to assume that there are more sheep in British Columbia than in Alberta. It is certainly to be hoped that this is the case, as the law is still very liberal both in Alberta and British Columbia, and estimates of the number of sheep remaining in the States, where the killing of sheep is practically prohibited in any region where they are at present known to exist except the state of Montana, places the number considerably higher than what I have given above for Alberta. The latest estimate of which I have any record is that prepared by Mr. Hornaday in 1913 and is as follows:—

Colorado	3500
Montana	500
Wyoming	500
Yellowstone park	200
Glacier park	700
Idaho	200
All other Western States	200
Lower California	500
Total	6,300

On the east slope of the Rocky mountains in Alberta the range adapted to bighorn sheep is very clearly marked. The mountains consist of alternating strata of hard grey limestone and softer brown or reddish-brown shales and shaly limestone. The high precipitous ranges are formed by the outcropping edges of uptilted blocks of limestone which slope toward the west and are broken off abruptly toward the east where they face the plains. Between these high ranges are developed valleys and ridges of lower rounded hills in the shale layers that are found throughout the East Slope. These layers vary in thickness up to 8 or 10 miles on the horizontal, and it is in such belts that the typical mountain sheep range of the Rockies is found. While the mountain sheep lives at great elevations, and pastures well up above timber-line, nevertheless it is not an animal that lives exclusively on the most precipitous rocky slopes. On the contrary sheep frequent the bare grassy or shaly summits and slopes below the high rocky ranges, and feed on the low shrubs and herbaceous plants which

cover these slopes. At the elevations where sheep are generally found, grass is not at all common, but many kinds of small flowering weeds and plants thickly cover the ground, and there are also a number of small shrubs of which sheep are very fond. The typical sheep range is a steep open weed-covered hillside lying at the base of a high precipitous range to which the sheep can retreat in case they are disturbed. Although sheep are not ordinarily found among the precipitous mountain crags, nevertheless it is a mistake to assume that they cannot climb almost any rocky slope with the greatest ease. Mountain sheep are seldom found in timber, except when they descend a short distance below tree-line in search of food, but they make quite frequent descents to the valley bottoms, either in crossing from one pasture to another or in search of salt-licks. As far as I have been able to observe they do not change their dwelling place to any marked degree in the winter, but continue to live at high elevations, securing food by pawing away the snow or from bare ridge-tops which have been swept clean by the wind. I am, however, reliably informed that in earlier days mountain sheep were quite common in the high foothills adjacent to the main ranges south of the Crowsnest pass, but this may be true without altering materially the description of sheep habitat as given above, for the reason that in the extreme southern portion of the province the foothills are very high, attaining an elevation at the base of the range of probably 5,000 feet, and do themselves constitute fairly typical sheep pastures, being almost at timber-line. At the present time the sheep on the east slope of the Crowsnest pass seldom, if ever, get down on the foothills, but remain well up toward the summit of the mountains and around the heads of the numerous small streams which drain out toward the east.

Mountain sheep have a habit of living together in fairly large bands. The largest that I have ever seen myself numbered eighteen head, but I have had reports from trustworthy sources of bands numbering as high as thirty-five or forty head. The does and rams dwell entirely apart during the greater part of the year, and are separate all through the hunting season in Alberta. They are extremely keen-sighted, and owing to the open nature of the country in which they are invariably found great caution must be exercised in approaching them. The greatest danger which threatens the mountain sheep on the East Slope at the present time is the Stony Indian. The habits of the sheep are such that it is not especially difficult to surround a herd or corner them in a blind canyon from which escape is practically impossible, and this method of hunting is very largely followed by the Indians who on many occasions that have been reported have thus cornered fifteen to twenty-five head and slaughtered the whole band. Mountain sheep meat is probably the best wild game meat on the North American continent, and is a favourite dish with the Stonies, many of whom live on sheep practically the year round. Prior to the destruction of the buffalo and the elk herds it is likely that the sheep were very little disturbed, as other meat could be obtained much more readily, but now that there is practically nothing left but sheep and mule deer the Indians have turned almost exclusively to a sheep diet. This will inevitably result in the complete extermination of the sheep on the East Slope within a very few years, unless an immediate stop is put to the excessive killing of sheep by these Indians.

During the last hunting season I made a special investigation in regard to the sheep killed by the Stonies in the vicinity of the Kootenay Plains, and estimate that the eleven camps which I either visited or from which I secured reliable figures had killed a total of between seventy-five and one hundred head. This represents only meat designed to last about three months and does not take into consideration large numbers killed in the Clearwater river and Ram creek valleys. Probably during the hunting season alone the Stony Indians killed at least 300 head of sheep, and I would estimate that during the rest of the year they alone killed another 300, so that it can be readily seen that mountain sheep outside the protected areas will be practically extinct on the East Slope in from four to five years. The number killed by white hun-

Photo. W. N. Millar.

STONY INDIANS DRESSING MOUNTAIN SHEEP KILLED IN THE VALLEY OF THE BRAZEAU RIVER IN OCTOBER, 1913.

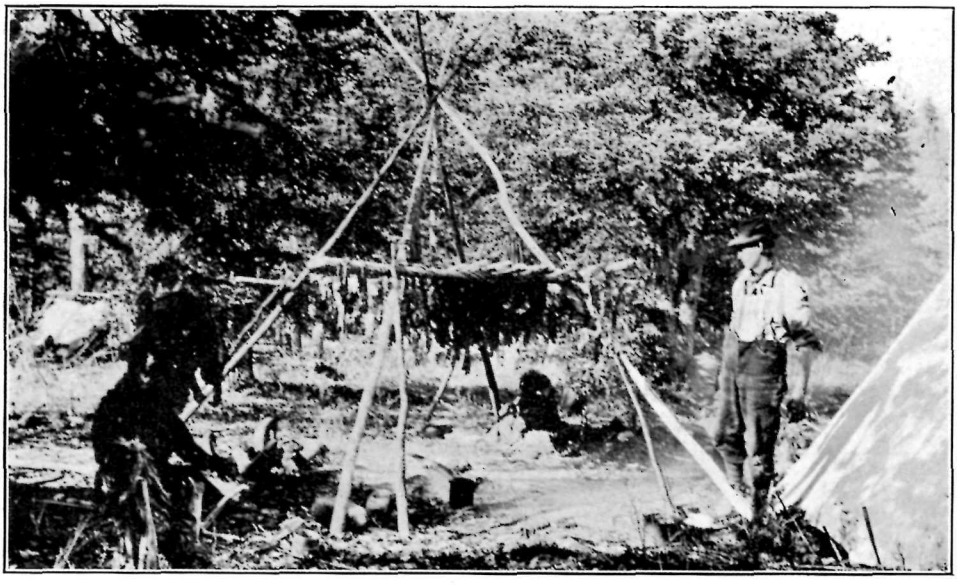


Photo. W. N. Millar.

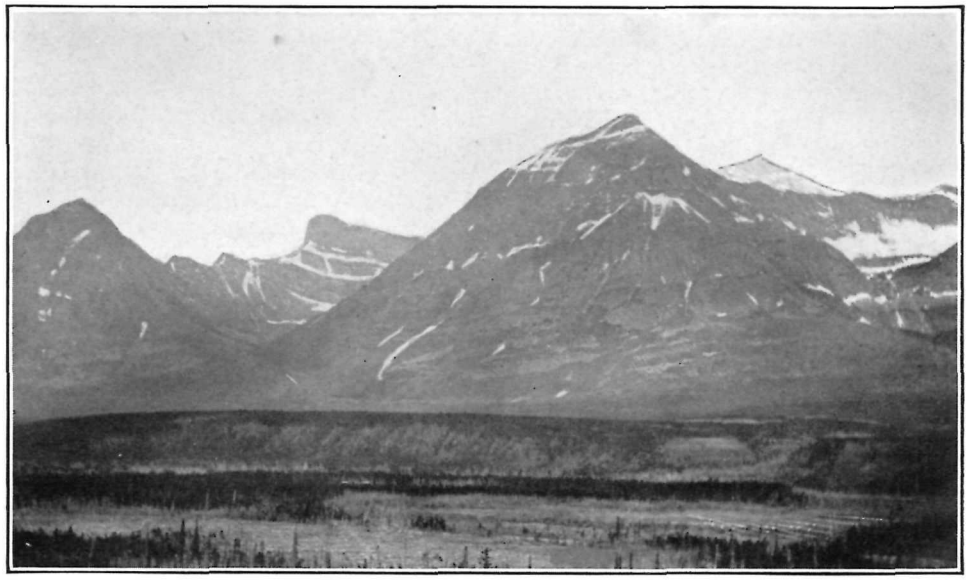
A STONY INDIAN RACK FOR DRYING MEAT USED IN DRYING SHEEP ON THE BRAZEAU RIVER.

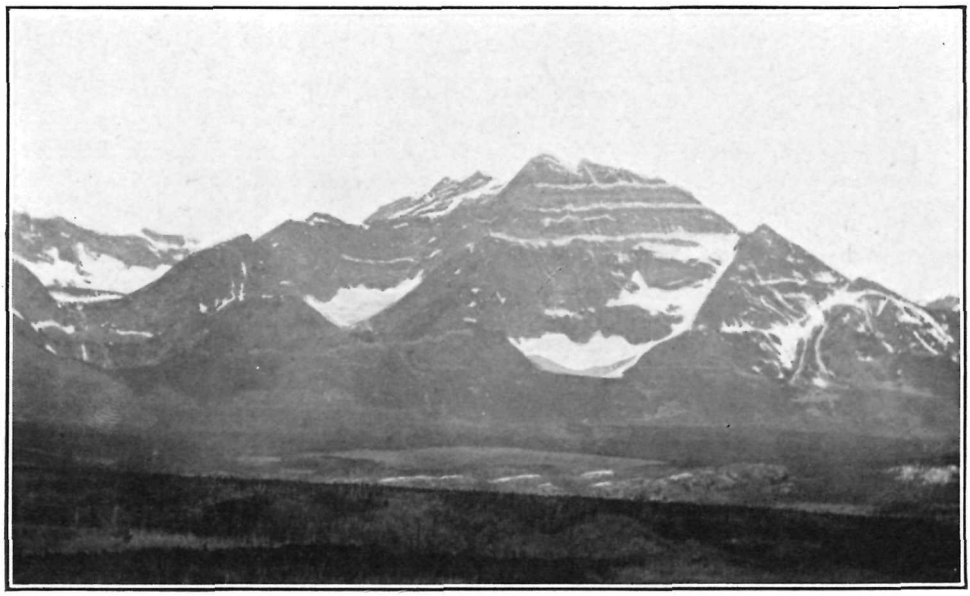
ters is extremely limited, many parties going into the mountains and returning without even seeing a sheep, and in very few cases getting heads of even reasonable size. In 1912 the report of the Game Guardian for Alberta shows that ninety sheep were killed in the province and reported. This would probably not include any of the sheep killed by Indians, but would, I believe, include the great bulk of sheep killed by white men, as I have no reason to believe that there are many mountain sheep killed illegally by white men in the East Slope.

In recommending game preserves for the East Slope region consideration should, therefore, be given to the fact that one of the principal functions of these preserves should be protection of bighorn sheep, and in recommending preserves within the Rocky Mountains forest reserve I have had this especially in mind. All of the preserves recommended contain abundance of sheep range and, in fact, include practicaliy the bulk of the first-class mountain-sheep range on the East Slope. The only range suitable for sheep that is not included in these game preserves is a large area in the vicinity of the Mountain Park mine between the head of the McLeod and the North Brazeau and another large area at the head of the Brazeau and the North Fork of the Saskatchewan. The reason for not including the range near the head of the McLeod is the impossibility of securing suitable boundaries that would include this range, and the presence of a railway and large mining developments right in the centre of the range. The reason for not including the range on the head of the Brazeau and the North Saskatchewan is that by so doing practically all of the sheep range in the Rocky Mountains would then be covered by game preserves and legitimate hunting of bighorn sheep would be at an end. I do not think that conditions justify an absolute close season for sheep, and believe that anyone who is willing to take the time and trouble to make a trip to the head of the North Saskatchewan for the purpose of shooting a mountain sheep should have the opportunity to do so. The large preserves both north and south of this region can be depended upon to keep up the supply, and the same is true of the similar range left unprotected at the head of the Kananaskis river between the proposed Highwood preserve and the present Rocky Mountains park.

ROCKY MOUNTAIN GOAT.

The Rocky Mountain or white goat (*Oreamnos montanus*) is one of the most abundant wild animals distributed throughout the region of the East Slope. For various reasons the goat is not likely to suffer very extensively in the next few years, and both from my own observation and that of numerous hunters and guides with whom I have been in correspondence I would say that the number of goats has increased rather than decreased within the last five years. The range of the mountain goat originally extended well down into the United States along the Rocky mountains, and it is even reported to have occurred far out on the Great Plains on such isolated groups of mountains as the Little Rockies, the Bear Paw, and the Crazy mountains. It reached over into northeastern Washington and the Bitterroot mountains of Idaho, but probably did not reach the Pacific coast in the United States. It was found practically throughout all of British Columbia and northward to Cook inlet in Alaska and north along the Rockies almost to the Arctic. It still occurs in the United States in large numbers in the northern Rockies within the Glacier National park and adjacent regions, being still found in the Cabinet mountains between the Kootenay river and Clark Fork and in limited numbers in the Bitterroot mountains southward toward Wyoming. On the East Slope goats are very abundant and widely distributed. They occur in considerable numbers through that portion of the Crowsnest forest reserve which lies south of the Crowsnest pass, being particularly abundant in the proposed Waterton preserve. Northward they are probably found along the main range from the Crowsnest pass to the head of the Kananaskis, although this is a portion of the reserve which has never been examined in much detail with reference to goats. Goats occur abundantly around the head of the High-





Photos. C. H. Morse.

MOUNTAINS ON THE WEST SIDE OF THE ATHABASKA RIVER BETWEEN THE WHIRLPOOL AND THE CHABA.
The lower slopes of these mountains are typical goat ranges and are well stocked with this animal.

wood and the Kananaskis rivers and more sparingly through the Rocky Mountains park up to Laggan. North of Laggan, in the headwaters of the Pipestone, they again become abundant, and I have noted large numbers on the headwaters of the Clearwater and the Siffleur. They also occur in numbers around Glacier lake and become especially abundant around the head of the Brazeau and Athabaska and all the way down the Athabaska valley. I have also seen goats in the Maligne valley although there they are comparatively scarce and appear to have been much hunted in that region. They were reported also well down the McLeod within the last two years, but this report was not well verified. It will be seen, however that goats exist in numbers everywhere along the main chain of the Rockies and in some places well out on the outlying ranges.

Although goats and sheep are very frequently found together, yet there is a well-marked distinction in the class of range that forms the favourite feeding ground of these two animals. It is the mountain goat rather than the mountain sheep which occupies the precipitous crags above timber-line, and it would seem that no rocky slope was too steep or too difficult for a mountain goat to surmount. They are almost invariably found in close proximity to towering rock cliffs, if not well up on the summits of such pinnacles. While sheep are generally found out in the large open meadows and grassy slopes above timber-line below the high rocky summits of the principal ranges, it is rare to find goats in such localities. The preference of the sheep for the peculiar shale ranges and valleys lying between the main limestone ridges is not shared by the mountain goat. It is true that goats descend far below timber-line in search of salt-licks, and frequently cross even the larger rivers, but as a general rule they are not seen very far from the edge of the bare rock, and their favourite range seems to be the rocky mountain-sides or -tops where there is a scattering growth of grass and weeds between the outcropping boulders. In hunting goats the only qualification required is the ability to follow them up the almost inaccessible cliffs which they surmount with apparent ease. Were it not for their climbing abilities and the nature of their habitat, goats would not now exist in any appreciable numbers, as they are extremely stupid and apparently fearless of man and, on account of their white coat, afford an excellent mark except on the snow.

There are several explanations of the present abundance of goats and their comparative immunity. The most important reason why they are increasing is because they are almost entirely disregarded by the Stony Indians. The meat of the mountain goat is not especially palatable. By this I do not mean to infer that it is uneatable, as is frequently stated, because such is not the fact, but I do not think anyone would deliberately prefer it to either sheep or deer, and this is the choice now before the Stony Indian. As long as deer and sheep can be secured the Stonies are not likely to make any inroads on the goats. In addition to being thought less of as a source of food, the goat hide is of practically no value, the heads are not much sought after, and the chase of the animal involves more or less hardship and very considerable actual risk, while the positions in which it is found result in so many of the animals falling over high cliffs and being crushed so badly as to render the meat almost unfit for use, that the Indians at the present time kill very few goats at all. The same may be said to be true of the white hunters, and unless conditions change radically the goat is very likely to hold its own for a good many years to come. Such a change, however, may be anticipated in a very short time if the activities of the Stony Indians are not curbed, as it is only a question of comparatively few years before they will have the sheep and deer exterminated and once they turn their attention to the Rocky Mountain goat his chances of surviving simply need not be considered at all.

The value of the mountain goat lies almost entirely in its picturesqueness and in the fact that it adds a touch of life to mountain regions which are otherwise entirely devoid of any living thing. The goat inhabits those portions of the mountains which support no other form of big game animal, and exists in numbers on precipitous bare rocky ranges where it is difficult to believe anything could survive. It is an

Photo. C. H. Morse.

A View from the Head of Poboktan Looking Toward the Sunwapta.

The mountains above timber-line on each side of this valley afford characteristic goat range and are wel stocked with this animal.

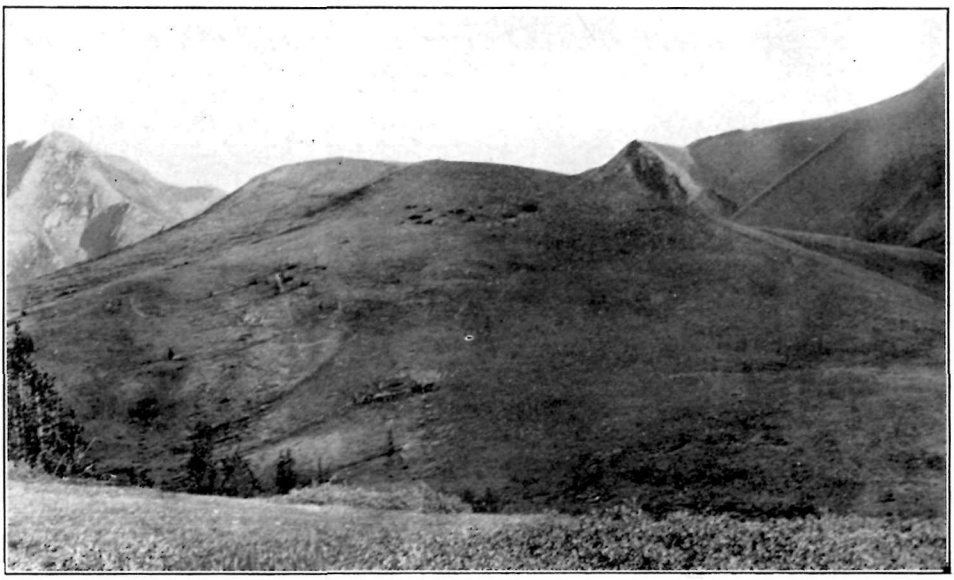


Photo. W. N. Millar.

Characteristic Sheep Pasture in Shale Rock Between the Clearwater River and Ram Creek.

This locality is already stocked with sheep and there were two sheep grazing on the hillside when the picture was taken.

animal readily observed by tourists, and never fails to provoke interest and, because of its sluggish habits, it lends itself very readily to the operations of the wild-game photographer, besides affording an object for observation to those travellers who are not equipped to follow it into its actual feeding grounds.

Although at the present time every evidence tends to show that goats are on the increase in the East Slope region, nevertheless measures for its perpetuation will not be entirely amiss and the preserves recommended in this report fully provide for the mountain goat. Three of the favourite haunts of this animal are included within the preserves, these being the region adjacent to the international boundary, the head of the Clearwater river and the Athabaska valley. The great extension of the Jasper park recommended is better adapted for a goat preserve than any other portion of the Rockies. Not only is this region well stocked with goats, containing more probably than any other similar locality, but it is of such a nature that it affords very limited range for any other big-game animal except the goat. The whole region is extremely mountainous with very narrow valleys through which the rivers generally flow in rugged canyons. The valleys contain practically no meadow lands and very few timbered flats. Above timber-line, however, it is usually found that there is a considerable range of mederately steep boulder slopes in which there are scattered some herbs and small shrubs where goats find an ideal range. All along the Athabaska river they may be observed feeding on the mountain sides on both sides of the trail, and last October on the high summits above timber-line at the head of the Poboktan creek I observed sixteen goats in a few hours.

CARIBOU.

The caribou (*Rangifer caribou montanus*) is a comparatively rare animal within the portion of the East Slope covered by this report. I have never seen either this animal or its tracks on the East Slope, but understand that it is the same species that is found in southern British Columbia, with which I am familiar.

The only portion of the East Slope south of the Athabaska where caribou are known to range at the present time is between the main Athabaska river and the Rocky mountains south of the Miette. Most of these caribou come across from the Wood River and Canoe River valleys of British Columbia over the main range into the Athabaska drainage, entering for the most part through the pass at Fortress lake. Whether or not they remain on the Alberta side throughout the year I am not prepared to state, but the evidence of persons who are familiar with the region is to the effect that they are only on the Alberta side during the summer months, and winter in British Columbia. This, however, has not always been the case, as caribou were found in moderate numbers well down the Athabaska in 1895, and ten years ago are reported to have been quite abundant in the valley at the mouth of the Whirlpool and farther up stream. Down the Athabaska below the park, caribou are found even at the present time, as I recently saw a head in Edmonton that had been killed along the Athabaska between Hinton and Athabaska. This is apparently the eastern woodland caribou, which is distinguished from the western caribou more in point of size than by any other distinctive characteristic. As I have observed the caribou in northern Idaho, it ranges almost exclusively in the high mountain beaver-meadows which are characteristic of the region of the Selkirk range. It is not, however, distinctly an open-ground animal, but is confined largely to the timber especially during the winter months. The principal food seems to be mosses and lichens, especially the long grey moss which grows abundantly on cedars and other moist-ground species west of the divide. Range suitable for caribou south of the Athabaska river is extremely limited, and is confined principally to the west side of the river in that small portion of the recommended Jasper preserve lying between the Miette and Fortress lake. In this region, caribou have lately been seen in limited numbers and, with protection, there is every reason to anticipate that they will again establish themselves.

Considering the caribou as a whole there is not much reason to anticipate its extermination at any very early date. It is still reported to exist in large numbers throughout southern British Columbia, and although it has entirely disappeared from northern Idaho, and northwestern Montana, where it once existed in considerable numbers, nevertheless this was undoubtedly the extreme southern end of this range, where it would naturally be expected to give way first before the advance of settlement. What effect the new railway construction in British Columbia south of the Grand Trunk Pacific will have upon the caribou it is difficult to say, but north of the Grand Trunk Pacific there is still a vast inaccessible mountain region, largely valueless from a commercial standpoint, where it may be anticipated caribou will remain in numbers for many years. It is, on the whole, not an animal adapted to the East Slope region south of the Athabaska river, and for lack of suitable range it would probably be impracticable to establish the caribou anywhere on the East Slope except in the limited district specified. For this reason no particular effort has been made to make provision for the maintenance of caribou except that all of the present known range of the animal on the East Slope has been included within the proposed Jasper preserve.

PROPOSED GAME PRESERVES.

For the purpose of accomplishing the game preservation described in detail in the foregoing portion of this report, I am recommending herein the establishment of four game preserves in that portion of the Rocky Mountains forest reserve south of the Grand Trunk Pacific railway. Three of these are extensions of the present existing Dominion parks; the fourth preserve which I am proposing is separate from any of the parks. In recommending these preserves I have endeavoured in so far as was possible, to make them comply with all the requirements that have been indicated as necessary in a fully qualified game preserve. In order to accomplish this I have, in the course of my general inspection work, made a personal examination not only of all the proposed game preserves but also of all the adjacent regions, this involving approximately 5,000 miles of pack-horse travel during a period of three seasons. I have also personally examined practically the entire length of boundary of all the proposed preserves, and have in addition secured a vast amount of information from guides and packers who have for years been familiar with the regions described and the game situation within them. I was also able to make a personal study of the game animals which frequent these regions during two hunting seasons and have successfully hunted all of the big-game animals of the East Slope that might be legally killed, except the caribou.

As a result of the field-work described, I am recommending preserves which I feel confident are not only well adapted to the purpose because of their situation and internal characteristics, but are also excellently well adapted to administration on an efficient basis at a minimum of cost. The following is a detailed description of the various preserves which I would recommend be established as game preserves within the limits of the forest reserve. Attached hereto is also a map upon which I have indicated the present parks, the proposed game preserves, and the Rocky Mountains forest reserve lying outside the limits of both.

WATERTON LAKES GAME PRESERVE.

This preserve will occupy the extreme southern end of the present Crowsnest forest lying immediately adjacent to the international boundary, and will have an area of approximately 138,000 acres or 217 square miles.

The proposed preserve should be bounded as follows:--

> Beginning at a point on the international boundary where it is crossed by the main summit of the Rocky mountains forming the continental divide and

constituting the interprovincial boundary line between Alberta and British Columbia, running thence in a northwesterly direction along the aforesaid Rocky Mountain summit or interprovincial boundary for approximately 15 miles to a point which lies approximately due west of the divide between the head of the North Fork of Blakiston brook and Castle river (formerly known also as Southfork river or the south fork of the Oldman river), thence easterly following the divide, or water-parting, between Blakiston brook and the Castle river to the peak called The Horn; thence northeasterly along the divide between the South Fork of Yarrow creek and Pine creek to the boundary of the Rocky Mountains forest reserve at the southwest corner of section 14, township 3, range 30, west of the 4th meridian; thence southeasterly following the east boundary of Rocky Mountain forest reserve to the southwest corner of section 3, township 2, range 29, west of the 4th meridian, thence in a southerly direction following the divide between the Waterton lakes to the west and the head waters of Crooked creek and branches of the Belly river to the east, to the international boundary; thence west along the international boundary to the point of beginning.

South of the international boundary, and immediately adjacent to this proposed preserve, the United States Government has established the Glacier national park in the state of Montana, and has constituted it a game preserve. The proposed Waterton Lakes preserve will supplement the game protection afforded by the Glacier national park, and because of certain topographical peculiarities, this preserve is necessary for the full accomplishment of the game preservation for which the Glacier national park was largely established. It will be noted that the Waterton lakes are partly south of the boundary line and that the headwaters of the Waterton river, which drains the entire area of the proposed preserve, are located in the Glacier national park. It is found that much of the game, particularly the mountain sheep, which ranges during the summer in the park south of the boundary line is forced by the winter storms to lower elevations, and therefore drifts northward out of the park into the proposed Waterton preserve. The result is that unless some provision is made for the protection of these animals on the Canadian side of the boundary, not only will the game permanently located in this portion of the forest reserve be exterminated, but also the beneficial influence of the Glacier park will be largely done away with. The final result will be that game, finding it unsafe to range in the Waterton drainage, will all retreat to the Flathead River side of the range and remain wholly within the Glacier park, and therefore be beyond the reach of the Canadian sportsmen. The establishment of this proposed Waterton game preserve, including, as it does, the headwaters of the Waterton river will make possible the protection and propagation on the Canadian side, not only of the sheep located there, but also of the overflow from the Glacier park, so that there will be a constant overow of the surplus northward into the unreserved portion of the Crowsnest forest.

The proposed preserve, while comparatively small in area, nevertheless contains practically all of the big-game animals of the East Slope, and affords satisfactory range for the bulk of them. It is best adapted for sheep and goat, affording ideal range for both these animals, but there is also an opportunity for the establishment within it of black- and white-tailed deer, elk, and a few moose. At the present time all these species are found in the park except elk. Moose are scarce and have come into the park only by migration from south of the boundary line where there are some located in the Glacier national park. Elk have not yet established themselves in the area of the proposed preserve, but are established in considerable numbers just north of the boundary in the valley of the Castle river, and there is every reason to believe that they will spread to the proposed preserve as soon as it is put under protection. The greater part of this preserve is high and mountainous, much of it being above timber-line and affording excellent range for sheep and goats, but

along the lakes and especially in the valley of the Blakiston brook and adjacent to the east boundary there is a considerable range consisting of open grassland, interspersed with small groves of pine where deer and elk would be at home. In the northeast corner there is about a quarter of a township of bare open foot-hill country which would afford excellent winter range for elk in case the higher mountain valleys were snowed in. The moose range within the preserve is comparatively limited, and it can hardly be anticipated that this animal will establish itself in any numbers within this Waterton preserve.

The area proposed is particularly fortunate as regards adverse interests. There are no mineral prospects of any kind within the preserve except oil development which took place a great many years ago in the extreme southwest corner. A great deal of work was put in on these prospects, and much money expended, but apparently the results were entirely unsatisfactory, as the proposition was abandoned and no work has been done for a great many years. Some of the preserve contains merchantable timber but there are no timber berths granted anywhere within its boundaries. Along the eastern edge there is some valuable grazing land immediately adjacent to the boundary line, but this use of the land has been more or less intermittent, and by the establishment of the preserve immediately, these users can be prevented from securing any rights in the grazing that will demand recognition, although the use might be permitted to continue on a temporary basis until such time as the range is needed for the game animals located within the park. It is not so needed at the present time, as it is not the kind of range necessary for the animals now most abundant.

A detailed consideration of the proposed boundaries will show that they are particularly well adapted to the purpose of game preservation. The west boundary is the summit of the main Rocky mountains, and is entirely inaccessible except at two points indicated on the map, where trails cross from the drainage of the Flathead river. The southern one is the more important, as it is the main pass by which communication is had from the Flathead to the Waterton, and a wagon road runs through it, which is, however, used but seldom. This road was originally built for the purpose of getting in oil-prospecting machinery from the Great Northern railway south of the boundary. Aside from these two passes, the west boundary cannot be crossed and affords complete protection against trespass. The north boundary is wholly inaccessible except at one point. This is the pass from the head of the North Fork of Blakiston brook to the Castle river. The pass is, of course, very high, being located just below timber-line, and entrance to the preserve from the north through this place can only be gained by parties which would have to pass two forest-reserve ranger stations, one located at the main fork of the Oldman river about 25 miles to the north, and the other immediately north of the pass itself at the Snowslide Meadows ranger station. As the game preserve would be operated under the charge of the forest supervisor, co-operation with the rangers outside the preserve would effectually prevent trespass through this pass. The rest of the north boundary cannot be crossed at all, owing to its precipitous nature. The east boundary, being a surveyed line along the edge of the mountains is, of course, more vulnerable, and for a distance of approximately 3 miles on each side of the Waterton river there is little or no obstacle to entering the preserve. Entrance, however, can thus be gained only to the quarter of a township lying east of the mouth of Blakiston brook, since the mountains come close together at the mouth of this brook, and to penetrate farther into this preserve it is necessary to go through a pass less than half a mile wide, where full control of the situation can be maintained by the game guardian. The area lying east of this point is so small that it can readily be watched by the patrol. The remainder of the east boundary, forming the divide between the Waterton river and the Belly river, is entirely inaccessible, and needs no further protection. The entire south boundary is, of course, adjacent to the Glacier national park and no special protection is required as this park extends many miles to the south and is fully protected by the park rangers, firearms being prohibited within the park boundaries.

For the purpose of protection I would propose that one game guardian be employed all year round and two others for a short period during the summer and early fall. The permanent guardian should be stationed at the main entrance to the preserve from the east, near the mouth of Blakiston brook, where he can control all entry from the Canadian side and have under his supervision probably 90 per cent of all persons entering the park. He can be so located that it will be practically impossible for any one to enter the game preserve along the east boundary without his being aware of such entrance. The other two men should be stationed so as to guard the pass leading in from the north and the two passes leading in from the west, and in connection with their duties in guarding these passes they could also patrol the valley of Blakiston brook and guard it against fire as well as possible trespass that may escape the notice of the chief guardian along the east boundary. These men would be needed only for a period of three to six months, as all of the north and west entrances to the game preserve are impassable, owing to snow, during half the year.

HIGHWOOD GAME PRESERVE.

The proposed Highwood game preserve includes the entire drainage of the middle fork of the Highwood river within the limits of the boundary of the Rocky Mountains forest reserve and will have an area of approximately 150,000 acres, or 234 square miles. Its boundaries are as follows:—

> Beginning at a point on the summit of the Rocky mountains forming the interprovincial boundary between British Columbia and Alberta on a line due west of the divide between the head of Oyster creek and the head of Cataract river; thence northward along the aforementioned continental divide or interprovincial boundary to a point approximately due south of the pass between the head of the Highwood river and the head of Pocaterra creek, the latter being a branch of the Kananaskis river; thence northward through the said pass following the divide between the Kananaskis and the Highwood rivers to mount Rae; thence southeastward following the divide between the Highwood river and the Sheep river along the summit of the Highwood range to mount Head; thence continuing southeastward to the forest-reserve boundary at the northwest corner of section 5, township 17, range 4, west of the 5th meridian; thence southward along the forest-reserve boundary to the southwest corner of section 28, township 16, range 4, west of the 5th meridian; thence westward approximately 2 miles to the summit of the divide between the waters draining into the Cataract river and those draining into Pekisko creek; thence southward along the said divide between the two creeks aforementioned to the interforest boundary between the Bow River and the Crowsnest forests, which is the divide separating the waters of the Highwood river from those of the Livingstone river; thence westward along this interforest boundary to the summit of the Rocky mountains at the place of the beginning.

The purpose of this proposed preserve is to provide for the protection and propagation of game within that portion of the Rocky Mountains forest reserve lying between the previously described Waterton game preserve and the present Rocky Mountains park. This is a distance of 108 miles along the East Slope, and it would seem highly desirable to make provision for adequate game protection somewhere in this region. It was a rather difficult problem to select an area within this portion of the East Slope that would be suited for game-preserve purposes by reason of the forage contained within it and would at the same time possess the necessary impassable boundaries and not interfere too seriously with commercial development. This portion of the mountains was examined with considerable care, and I believe that the proposed preserve meets these requirements better than any other area that might be selected anywhere between the Crowsnest pass and the Bow river.

It is a preserve that is particularly adapted to the propagation of mountain sheep and elk, but all other game of the East Slope will find suitable range in this preserve except moose and caribou. The preserve is at the present time well stocked with sheep, and contains a few elk and white-tailed deer. The elk do not number over ten or fifteen, and, as far as I can ascertain, do not remain all year round in the preserve but frequent it only during the summer returning for the winter to British Columbia. There is every reason to hope that two or three years of protection will find elk located all year long in this preserve in fairly considerable numbers. The preserve offers excellent game range of the three main types found on the East Slope; that is, high mountain grass slopes above timber-line, open coniferous forests at intermediate levels, and level park-like flats along the main streams with open south slopes adjoining them. Above timber-line there is excellent range for both sheep and goats, and the grassy flats along the rivers and the adjacent open coniferous stands are ideal for elk and mule deer. White-tailed deer will easily flourish in the timberlands, especially where these are thickest along some of the valley bottoms. The main grasslands are along the Highwood river itself and well up the valley of Cataract creek. It may be anticipated that elk will range largely during the summer around the headwaters of the Cataract, and drift northward to the main river during the winter, or else southward to the lower elevations along the Livingstone river, where there is abundant winter range for animals of this sort. Not far away to the west, in the valley of the Elk river, is located the so-called Hornaday park, which was created specifically as a range for sheep and goats by the British Columbia government.

The only adverse interests of any magnitude within the proposed preserve are the timber berths. All of the timberland in the valley of the main Highwood above the mouth of the Cataract is covered with timber limits, but the greater part of the merchantable timber was destroyed by fire in 1910. Camps are operated each winter by the Lineham Lumber Company, who own most of these limits, and it would probably be necessary to make special provision for guarding against trespass by these camps, although as a general proposition I consider that logging camps offer the least menace to game of any form of settlement within game preserves. It may be anticipated that as these berths are cut out they will be abandoned and so great was the fire damage in 1910 that the exhaustion of the berths will take place in a comparatively short period. The only disadvantage of their location at the present time arises from the increase in the fire hazard which is constantly taking place through the accumulation of slash resulting from their operations, as there are now no brush-disposal restrictions enforced. There are no other locations within the proposed preserve except a few coal claims that seem to be of very poor quality. Little or no development work has been done on these claims, and it appears from my examination of the situation that they are, if anything, the least likely to be developed of any located in the region which this preserve is designed to serve. Without more active development of these claims than seems to be probable, there will be no railway construction in or near this preserve.

Grazing interests have not yet established themselves in the preserve except that there is a very limited quantity of stock grazing adjacent to the boundary immediately along the Highwood river. It will be noted, however, that this preserve follows the forest-reserve boundary only for a distance of 4 or 5 miles, and that there is forest-reserve land east of the preserve throughout the remainder of its east boundary as well as part of the north boundary. The portion thus excluded is well stocked with cattle and horses under permit from the Forestry Branch, and its exclusion for this reason would be justified even if inclusion of this area would not involve wholly unsatisfactory boundaries. Some provision in the nature of drift fences will probably be necessary along parts of the east boundary in order to keep range stock out of the game preserve.

A detailed consideration of the boundaries will show their special advantages for the purpose in question. The entire west boundary up to the point where it swings

northward toward mount Rae is the summit of the main Rocky mountains, and is accessible in only one place. This is the pass leading from the Highwood river above the mouth of the Cataract across to the Elk river by way of the head of the Fording river. This is a very high summit, difficult of approach on both sides, and very seldom used. It is, of course, accessible only during a very few months of the year when it is free from snow. From the point where the boundary leaves the main Rocky mountains until it reaches mount Head at the northeast corner of the proposed preserve, the boundary line is wholly inaccessible except at two points. One of these is the pass leading from the head of the Stony Creek branch of the Highwood river across to the head of the Pocaterra Creek branch of the Kananaskis river. The other is the pass leading from the head of Mist creek across to the South Fork of Sheep creek. Both are very high summits above timber-line, very seldom used, and blocked with snow about eight months of the year. For a short distance east of mount Head to the forest-reserve boundary the divide is not so rugged, but is still high enough to offer quite an obstacle to ready access to the preserve. That portion of the east boundary which follows the forest-reserve boundary is, of course, quite accessible, although entrance can be had with teams only on the road on the north side of the Livingstone, and with horses only with difficulty at any other point. The main entrance is, of course, at the point where the Livingstone river flows out of the forest reserve, and this is the point that would have to be specially guarded so that a permanently employed guardian located there would be in a position to watch closely the 4 miles of section-line boundary adjacent to the Highwood river. Southward, in that portion of the boundary which follows the divide between Pekisko creek and the Cataract, the boundary is not inaccessible but is still clearly defined and may be readily guarded by patrol. There are one or two passes through this divide which should be barred off by means of drift fences so that cattle ranging to the east may not drift over into the Cataract valley. The south boundary is also well defined though not wholly inaccessible, but it has the great advantage that it borders on forest-reserve land the entire distance and that, in order to reach it, it is practically necessary to pass at least two forest-ranger stations, so that, through cooperation of the adjacent forest officers, trespass from this direction can be readily prevented.

For the purpose of protection, one game guardian employed all year round and two employed for a temporary period of four to six months would be amply sufficient. The permanent guardian should have his headquarters at the entrance to the preserve on the north side of the Highwood river at the east boundary, and would be in a position to keep watch over at least 90 per cent of the persons entering the preserve. One of the temporary men should be located near the forks of Stony creek and Mist creek, and should guard the pass leading to the South Fork of the Sheep river and to the Kananaskis river, and should also patrol the upper reaches of the Highwood. The other man should be located at the head of the Cataract river, where he can guard the east and south boundaries and patrol the Cataract valley. Neither of these men need be employed during the winter months unless one of them should have to be held over for the purpose of watching the logging camps. During at least seven months of the year this preserve cannot be entered at all except from the east, and then only with the greatest difficulty except along the main road on the north side of the Highwood river.

RED DEER-CLEARWATER PRESERVE.

The most important game preserve which I am recommending and the one which not only affords the greatest range for all kinds of wild game but probably contains the present largest stocking of game on the East Slope is that which adjoins the Rocky Mountains park on the north and includes the headwaters of the Red Deer, the Clearwater and the south fork of Ram creek. I have given perhaps more attention to the

Photo. W. N. Millar.

GOAT MOUNTAIN ON THE UPPER SIFFLEUR.
The high rocky cliffs near the top of the mountain are a favorite goat range.

Photo. W. N. Millar.

CHARACTERISTIC SHEEP RANGE.
Such range occurs frequently in shale regions in the Red Deer and Clearwater valleys.

laying out of this preserve than to any other, mainly because of its paramount importance to the subject of game preservation, and have carefully examined the entire area which it is proposed to include in the preserve, as well as the greater part of the boundary line. This preserve will not only supplement the game protection provided by the park, but will act as a great reservoir for the propagation of wild game of all kinds, which it may be anticipated will overflow to the north, west, and east from the preserve and afford excellent hunting in the adjacent regions of the forest reserve which surrounds the game preserve on all but the south side. The greater part of this proposed preserve lies within the area that was originally included in the Rocky Mountains park, so that by the Alberta Game Act it is already established as a game preserve and only needs re-description and extension to accomplish the objects aimed at in this report. Much of it has been protected for some time under the Park regulations and shows the results of this protection in the abundance of game of certain species. It is really divided into two parts by the high range forming the divide between the Red Deer and the Clearwater drainages, and both for the purpose of protection and description it will be necessary to consider these parts more or less independently. The boundary of the preserve as proposed and shown on the map accompanying this report is described as follows:—

> Beginning at the summit of the mountains east of Pipestone pass on the present boundary of the Rocky Mountains park of Canada, running thence northward and eastward through the pass between the Siffleur and the head of the Clearwater along the divide separating the waters of the Siffleur from those of the Clearwater to the head of the main south fork of Ram creek following this stream to its junction with the north fork of the same stream thence eastward along the main stream of Ram creek to a point in the Ram creek gap which is due northwest of the main summit of the Brazeau range through which this gap leads; thence southeastward following the main summit of the Brazeau range across Prairie creek, the Clearwater river and the various branches of these streams to a point south of the Clearwater on the summit of the Brazeau range where this range is joined by the divide between the Clearwater river on the north and the Wilson river and other branches of the James river on the south, which forms the boundary line between the Clearwater forest and the Bow River forest; thence westward along this divide or interforest boundary to the summit of the first principal range of the Rocky mountains at a point approximately seven miles southeast of the Clearwater gap; thence southeastward following the crest of the first principal range of the Rocky mountains through Eagle pass at the head of the James river and across the Red Deer river and the Panther river to the South Fork of the Ghost river which forms the northern boundary of the Rocky Mountains park; thence westward and northward along the boundary of this park to the place of beginning.

It will be seen that the proposed preserve is roughly triangular in shape, with the base or longest side to the east, and that it has an area of approximately 1,523 square miles, or 975,000 acres. This preserve contains in great abundance every kind of big-game range necessary for the year-long establishment of all kinds of big-game animals of the East Slope except caribou, and it is even possible that in restricted locations caribou might be established if they could be imported. It is entirely unlikely that they will establish themselves naturally by migration from their present location in British Columbia. This preserve contains immense areas of the finest sheep range in the Rocky mountains, since two of the largest shale belts found anywhere on the East Slope attain their greatest width on the surface in this portion of the mountains. Immediately west of the east boundary of the reserve, one of these belts having a width approximately of 8 miles on the horizontal traverses the preserve throughout the entire northwest and southeast dimension. About 8 miles west of this shale belt there

is a second, approximately 4 miles in thickness on the horizontal, which likewise traverses the preserve from boundary to boundary. Thousands of acres of the very best of sheep range exist throughout these shale regions. Adjacent to the shale there is an abundance of high rocky range adapted both for sheep and goats. Good range, however, especially adapted to this latter animal is found around the head of the Clearwater river and the head of the Red Deer and Panther rivers. All these places, especially the head of the Clearwater river, are abundantly stocked with goats at the present time. Sheep are found throughout the proposed preserve, but more abundantly towards the south around the head of the Panther river. They are also found commonly in the shale belts in the Clearwater valley, and more commonly northward along Ram creek. Perhaps the most abundant game in this preserve is mule deer. It would be difficult to estimate the number of this species ranging in the Red Deer river and Clearwater valleys, but certainly it must be several thousands. The upper waters of the south fork of Ram creek are also well stocked with mule deer, and on both Ram creek and the Clearwater a number of moose are at present located. The

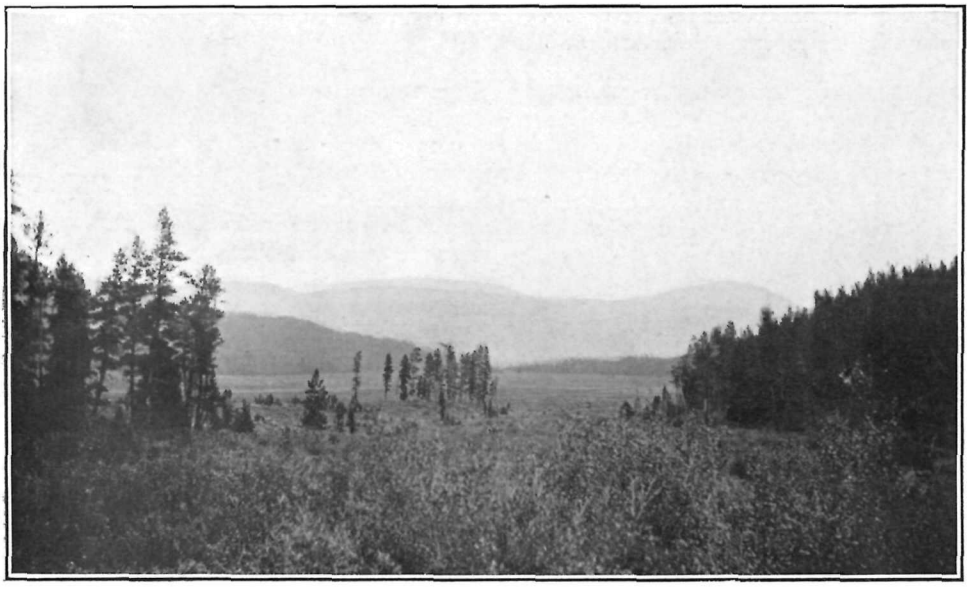


Photo W. N. Millar.

A CHARACTERISTIC VIEW OF MEADOWS SUCH AS OCCUR ALONG THE CLEARWATER RIVER.

moose are found mostly in that portion of the proposed preserve which lies east of the first principal range of the Rocky mountains between it and the Brazeau range, This constitutes about one-quarter of the total proposed preserve, and practically all of this is fairly good moose range. The remaining portion of the preserve is higher and more mountainous, and will not be stocked with this animal. Whether or not white-tailed deer are found anywhere within the limits of this preserve I am unable to say, as I have never seen any in this region. If not already established, however, it is only a matter of comparatively few years before they will become established, and there is abundance of suitable range for them throughout the preserve. In addition to the animals already mentioned, all of which may be looked to to take care of themselves and increase very rapidly under proper protection, it would be highly desirable to make this preserve the headquarters for the propagation of elk. To accomplish this it would probably be necessary to import elk from the outside in order to start the herd, but there would appear to be no unusual difficulty in the way of this. The valley of the Red Deer, but more especially the valley of the Clearwater, is excellently adapted

for elk range. Both of these valleys were once well stocked with elk, as is evidenced by the old horns found there at the present day. Both contain thousands of acres of dry meadowlands and mountain parks, interspersed with poplar groves, where mule deer at the present time are particularly abundant, and where elk would be entirely at home. Most of the proposed preserve has not been badly fire-damaged within the last thirty-five or forty years, and a great deal of it contains timber of merchantable size, although there is a portion of only one timber berth within the entire area, this being the large berth which is partly included within the preserve along the Clearwater river. All of the larger streams, including the Ghost, Panther, Red Deer and Clearwater and the headwaters of Ram creek are bordered by great open meadows, where grazing animals such as elk and mule deer would find abundance of range. If the releasing of buffalo was ever considered, this section would afford the range best adapted for this animal, and easiest to protect. It would be readily possible by a comparatively insignificant mileage of fence to inclose the entire preserve here recommended so that ingress and egress except for mountain sheep and goats would be wholly out of the question.

This game preserve is particularly fortunate in the matter of adverse interests. It contains only one ranch and only a portion of one timber berth and no other claims of any sort whatever except a few small coal claims near the head of the Panther which appear to be abandoned. Nowhere in this preserve is there any sign of mineral in commercial quantities, it being well known that the coal measures in that portion of the mountain between the Bow river and the Saskatchewan are covered to an immense depth with rock deposits. This fact, together with the many other advantages of the location, was kept in mind in the laying out of the proposed preserve boundaries. It may be anticipated that this preserve, in spite of its large area, will interfere less with commercial development than any similar area of land that could be selected anywhere in the Rocky mountains. The one ranch mentioned runs about three hundred head of horses on the Red Deer river just west of the proposed boundary line. The agreement under which this ranch was originally established will shortly terminate, and if it is decided to create this into a game preserve a renewal of the privilege should not be considered. The one timber berth is not being operated, and will probably not be operated for some time, but it would be to the advantage of the preserve if operations could be prevented by purchase of the rights of the owner. This, however, is not essential. There are no established grazing rights anywhere within the limits of the proposed preserve aside from the ranch aforementioned, and practically all of the forest-reserve range that is at all accessible or in any demand is located east of the boundaries of this preserve. It will be further noted that the preserve is entirely surrounded by forest-reserve or park territory, and that no portion of it adjoins unreserved lands or lands in any way open to settlement. This gives a strip of territory outside the preserve which is under the direct control of the Forestry Branch, and in which it will be possible to arrange for co-operation in the protection of the preserve itself. Even without this additional safeguard the preserve would be efficiently guarded by the character of its boundaries and by a very small force of rangers, as may be seen from the detailed consideration of the boundary as proposed.

The northwest boundary of the triangle is an inaccessible mountain range from the point where it leaves the park boundary just east of the Pipestone pass until the head of Ram creek is reached, except that there is one pass well above timberline leading across the boundary from the Pipestone pass eastward to the head of the Clearwater. This pass is over 8,000 feet in elevation, and is free of snow only during three or four months of the year. Furthermore, it can be reached only through park or forest-reserve territory and, in the latter case, only by passing at least one ranger station, and perhaps two or three. Northeastward from the head of Ram creek the boundary line follows the south fork of Ram creek. This boundary was selected because, as has already been described, it is especially adapted for this purpose. With the exception of the upper one-fourth, the south fork of Ram

creek lies in a deep, almost perpendicular-walled canyon which can be crossed only with difficulty in very few places There is at the present time only one trail leading across this canyon, and but one other place that I know of, where the canyon can be crossed, and there only with considerable risk and a great deal of trouble. The upper fourth of the stream does not present the same difficulties to crossing, but lies well back in the mountains, where, even though trespassers cross the boundary itself, they cannot possibly get back from the boundary line for more than a fraction of a mile except in two places, these being the two trails that lead across from Ram creek to the Clearwater. These trails cross Ram creek about 5 miles apart, so that it would not be difficult for one man stationed at the head of Ram creek to guard the entire boundary that is not itself impassable by nature. The rest of the river boundary would, of course, have to be patrolled, but the ranger charged with this duty could also cover a very large region that would need attention because of fire protection alone, and it would only need to be guarded during a portion of the year. The long east boundary, following as it does throughout its length the crest of a mountain range, presents few difficulties in the line of protection. It can be crossed by trail through the Brazeau range at the extreme northwest corner, at the gap formed by Prairie creek and at the Clearwater river. The Prairie Creek gap and the Clearwater gap are the most important, and it would be necessary to station a ranger at each of these entrances. Southward from the Clearwater the boundary can be crossed only at the gaps formed by the James river, the Red Deer river, and the Panther river, which all lie within a distance of 5 miles. At the extreme southern tip of the proposed preserve, entrance can be had along the south fork of the Ghost river which forms the boundary between the game preserve and the park. The rest of the boundary is common to the park and game preserve both, and would be taken care of by the park rangers and police stationed within the park itself. For the adequate protection of this preserve, therefore, it would be necessary to employ three men all year long, one man for a period of six months in co-operation with the park, and three men for a period of six months for duty in the higher portions of the reserve. With this force it would be possible to guarantee not only absolute game protection but protection from fire and the administration of all other activities within the game preserve. The man employed in co-operation with the park should be stationed on the Ghost river so as to prevent trespass up the valley of the South Fork of the Ghost. I believe that the park has already such a ranger to look after the adjacent region in the park, and his duties would not materially be increased by making him responsible for preventing the taking of guns into the game preserve by way of the Ghost valley. Northward from the Ghost to the Panther the boundary is inaccessible. The Panther, the Red Deer, and the James all form gaps through the range, all in a distance of about 5 miles. One man located permanently where the James River gap joins the Red Deer river would be able to take care of this protection. He should be charged also with the protection of the Panther gap, which he would handle in co-operation with the forest reserve ranger located on the Red Deer river just below the mouth of the Panther. Not only would he be able to reach the mouth of the Panther in a few hours, but there is also a trail leading south by which he could reach the Panther itself inside the gap in an equally short time, so that it would be practically impossible for any party to get into the preserve by way of either the Panther or Red Deer without this ranger seeing it. North from the Red Deer until the Clearwater is reached the boundary is again inaccessible. The Clearwater flows through the Brazeau range in a narrow gap where a permanent ranger should be stationed who would be in a position to see all parties entering the preserve by way of the Clearwater. He would also be in a position to range that portion of the preserve south and north of the Clearwater river as far up as the first range of the Rockies. This man should be located all year long at this station, and, if operations are started on the timber berth, should be charged with guarding the logging camps in addition to his other duties. North of the Clearwater to Ram creek there is only one pass leading through the range,

Photo. W. N. Millar.

ANOTHER VIEW OF THE RANGE EAST OF THE SUNWAPTA.
Suitable feed for big game animals is very scarce in this vicinity and bear and goats alone are found at the present time.

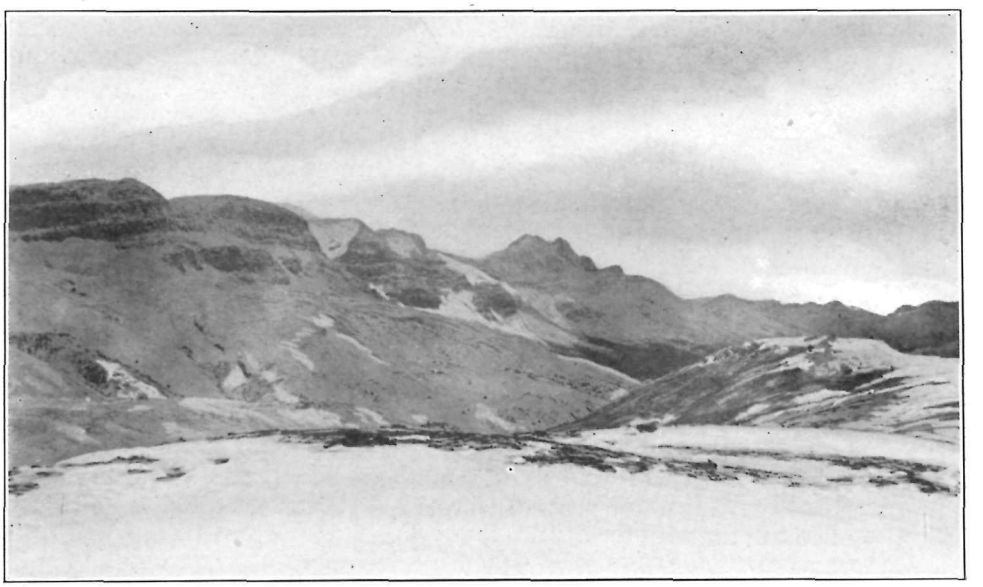


Photo. W. N. Millar.

A VIEW WESTWARD FROM POBOKTAN PASS SHOWING THE TYPICAL GOAT RANGE OF THIS REGION.

although the range itself is not absolutely impassable. This pass is at the head of Prairie creek, and a trail leads through it across to Ram Creek forks. Although it would not be possible, except with more men than conditions would seem to justify, to absolutely guarantee that no one would get into this portion of the reserve without encountering a ranger, yet two men stationed at the Ram creek forks would undoubtedly be in a position to reduce the trespass of this sort to an entirely negligible quantity. One of these men should be responsible for that portion of the boundary from Ram Creek forks south to the Clearwater, including the one gap on Prairie creek. The other man should be responsible for the entrance to the preserve at the Ram Creek forks from the north end and for that portion of the boundary formed by the south fork of Ram Creek upstream for a distance of about 10 miles. As far as is known, the Ram creek canyon cannot be crossed any place in that distance, so that guarding it would not be very difficult. Moreover, the canyon cannot even be reached in that distance because there is no trail or other route of travel that gives access to it. Only one of these men would need to be employed all year long, as the country is heavily snowed under during the winter, and it is even possible that it can be left entirely unguarded, as approach to it is very difficult. Two additional temporary men should be stationed on Ram creek. One of these should be located at the head of the river where he can guard the entrance by the two trails leading from the northwest, and range the wide extent of sheep country lying between Ram creek and the Clearwater. The other should be located outside the first principal range at the point where the main trail from the north crosses the Ram creek canyon, and should guard the boundary line up and down the stream to where he would meet the rangers above and below him and should also supplement the protection work on the upper Clearwater. The third temporary man should be stationed at the head of the Clearwater, where he could prevent trespass through the Clearwater pass by way of the Pipestone and guard the whole region of the Upper Clearwater and the sheep country lying between the Clearwater and the head of the Red Deer river. With a force such as this it would be wholly impossible to get into the preserve without encountering one or more of the game guardians, and even if this were accomplished there would still be six men who would have a part of their time available for patrol, and six or eight others outside the game preserve in the adjacent portions of the forest reserve and park who would be in a position to notify the game-preserve rangers of any parties heading in that direction, or any suspicious outfits that might be travelling in the mountain.

JASPER GAME PRESERVE.

The purpose of the proposed Jasper game preserve is to supplement the protection afforded game in the Jasper park as at present established. It has previously been explained in this report that the Jasper park has very unsatisfactory boundaries when viewed as a game preserve, and that it has the further disadvantage of being traversed by the main line of the Grand Trunk Pacific railway. On the other hand, it contains within its boundaries considerable range that is extremely valuable for winter range for game, but is very poorly stocked at the present time. In order to make adequate provision for game protection in this vicinity it is very desirable that the game-preserve boundary be extended to the south in order to inclose a natural topographical unit and also afford summer range at some distance from the railway. The proposed extension will have an area of approximately 1,600 square miles, or 1,000,000 acres, and will be roughly triangular in shape, the base of the triangle and the shortest side being towards the north, with the apex to the south.

The boundaries may be described as follows:—

> Commencing at the peak called The Dome, which is on the continental divide between the head of the west branch of the North Saskatchewan and the head of the west branch of the Athabaska, and running thence northwestward

along the crest of the continental divide forming the interprovincial boundary between Alberta and British Columbia to the southwest corner of Jasper park, being a point 10 miles south of the Grand Trunk Pacific on the crest of the divide, thence northeastward along the south boundary of the Jasper park, which is a line drawn 10 miles distant from the Grand Trunk Pacific railway, to the crest of the divide between the Maligne river and the Rocky river, thence southeastward following the mountain range forming the divide between Maligne river and Maligne lake on the west and the Rocky river on the east to mount Brazeau, thence southward following the divide between the headwaters of the east branch of the Athabaska on the west and the headwaters of the Brazeau river and the North Saskatchewan on the east to The Dome or place of beginning.

Photo. C. H. Morse.

FORKS OF THE ATHABASKA AND CHABA FROM THE DOWN-STREAM TIDE.

Although a very large area, the actual game range included within this proposed game preserve is not especially great. This is due to the fact that the entire area is extremely rough, and all of it except the narrow stream-valleys lies at a high elevation, mostly above timber-line, and that practically all the rock of the country is either limestone or quartzite. The result is that there is comparatively little development of rounded grass-covered hills and shaly summits where the bighorn sheep finds its favourite range. Further, in the stream valleys in that portion lying outside the present park there is almost a total absence of open flats or grassy meadows which would afford good pasture for deer or elk. There is practically nothing of this sort in the valley of the Maligne nor in any of the west forks of the Athabaska, and comparatively little along the main Athabaska except near the park boundary. As a range for goats, however, the proposed reserve is exceptionally suitable and is already well stocked with this animal. Goats are found not only around the headwaters of all the

east forks of the Athabaska, such as Poboktan creek, Jonas creek, and the Sunwapta, but are also found scattered in numerous places on the mountains both east and west of the main river, almost to the railway. They are particularly abundant on the slopes of mount Hardisty near the mouth of the Whirlpool. A few goats are also found in the Maligne valley, particularly on the east side of Maligne lake. The only sheep range of any extent lies between Poboktan creek and Maligne lake and around the head of the east fork of the Athabaska. Sheep, however, were once very abundant in the region of the present park, and will, no doubt, return there under protection, their disappearance being due to wholly unrestricted slaughter which took place during the period of the location and construction of the Grand Trunk Pacific railway, at which time many of the camps were practically supported by the meat brought in by the halfbreed hunters, most of which was sheep. There are no elk at all in this region, and it is very doubtful if they can be expected to establish themselves there naturally, although they might do well if introduced. They would not find the proposed preserve very suitable for range except small portions of it along the Athabaska river during the summer. By far the best range is all contained within the limits of the Jasper park.

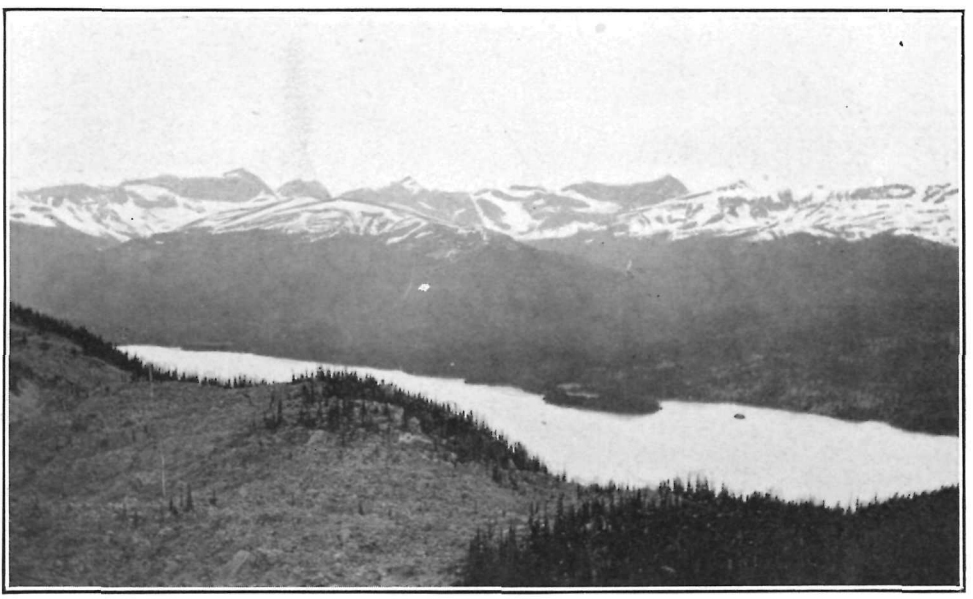


Photo. C. H. Morse.

MALIGNE LAKE FROM THE MOUNTAINS ON THE EAST SIDE.

Note the narrow valley and the ruggedness of the range lying between Maligne Lake and the Athabaska River as seen in the background.

That small portion of the proposed preserve lying west of the Athabaska river and north of the Chaba is the only portion of the east slope of the Rockies south of the Grand Trunk Pacific railway in which caribou are found at the present time. These caribou work across through the pass at Fortress lake from British Columbia, and also through the Athabaska pass at the head of the Whirlpool, and range during the spring, summer, and fall months in the neighbourhood of mount Geikie. They would undoubtedly establish themselves all year long in this locality if afforded protection, and might reasonably be expected to spread well up the west fork. There is also excellent range for mule deer in the lower portion of the Athabaska river within the proposed preserve, with an abundance of good range in the park, but I saw no evidence that this animal was at all common except in the valley of the Maligne river above Medicine lake.

The proposed preserve is very fortunately situated as regards adverse interests. There are no claims of any kind anywhere within its boundaries. Furthermore, there is not a head of domestic stock within the boundaries of this preserve, and nothing but a few pack-ponies anywhere in this vicinity, nor is there likely to be any demand for grazing privileges. There is no mineral wealth known to exist in the area, and no likelihood whatever of railway construction. Most of the timber has been burnt within the last fifty years, so that the greater part of the region is covered only with thrifty reproduction, and the only merchantable timber of any description is that located in the valley of the Whirlpool and the upper portion of the west fork north of Fortress lake. The boundaries as proposed do not correspond with the original east boundary of Jasper park, and this change is made after careful examination of the region, and for what are believed to be adequate reasons. The original boundary left the present park boundary in township 49, range 25, west of the 5th meridian and ran southeastward and southward along the divide between the Rocky river on the west and the head of the McLeod and Southesk and the Brazeau river on the east until it

Photo. W. N. Millar.

THE ROCKY RIVER VALLEY NEAR THE FORKS.

This is an excellent goat country but has been practically shot out. Note game trails across slide rock in foreground.

struck the present proposed boundary in the neighbourhood of mount Brazeau. It added to the preserve only the valley of the Rocky river, but in so doing it gave a boundary on the east for a distance of about 50 miles which can be very readily crossed at no less than four places, while the east boundary which I propose, lying west of the Rocky river between the park line and mount Brazeau, cannot be crossed at all. South of mount Brazeau the proposed boundary corresponds with the old boundary of the park, and may be crossed at two places.

A second reason for excluding the Rocky river is the fact that this valley is so narrow and trough-like and affords so little range for any kind of game that the results that might be secured would certainly not justify the expenditure necessary to secure them.

A third reason is that immediately east of the old boundary there is located the large Mountain Park mine, from which it is only a few hours trip to the Rocky river,

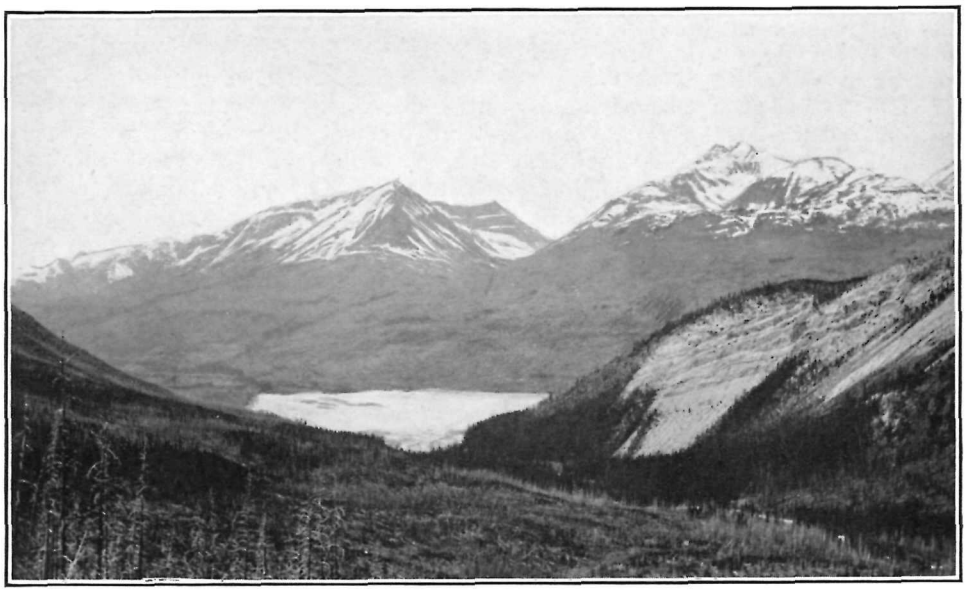


Photo. C. H. Morse.

VIEW OF THE HEAD OF MEDICINE LAKE.

Shovel Pass in the distant range. At this point all trails into the Maligne converge. Jack Lake Pass in the foreground.

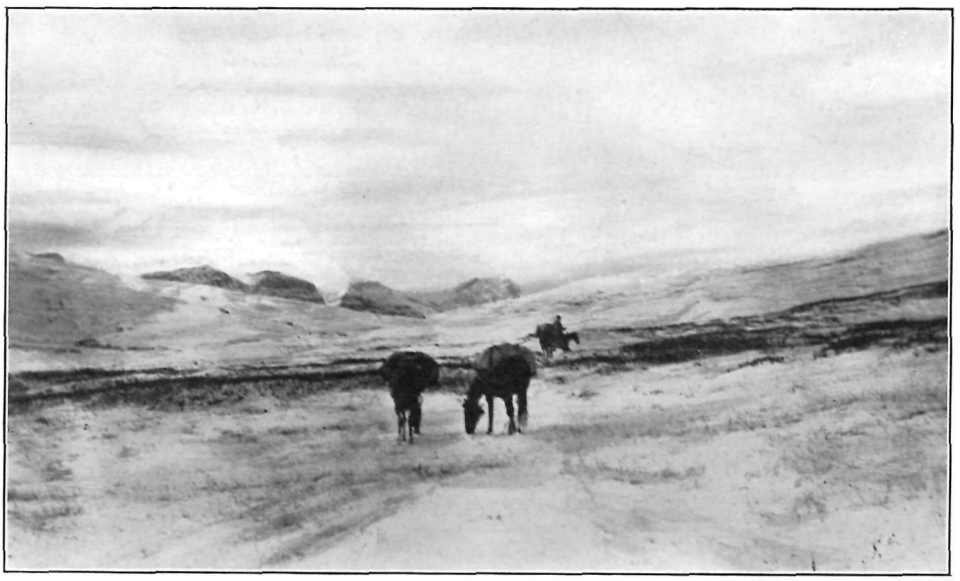


Photo. W. N. Millar.

SUMMIT OF POBOKTAN PASS BETWEEN THE BRAZEAU AND THE ATHABASKA, OCTOBER 3, 1913.

This is one of the very few entrances across the mountains to the Athabaska valley and is a range frequented by both sheep and goat.

where the miners are already accustomed to resort for fishing and hunting expeditions. The head of the Rocky is also very close to the British Collieries on the Southesk river, and there are numerous proposed developments just east of the old boundary that would introduce many complications in the protection of a game preserve, with a boundary corresponding to the old boundary of the park. The proposed boundary entirely avoids all these difficulties by following a mountain range that is wholly inaccessible throughout its entire length.

A detailed examination of the proposed boundary line will show how excellently it is adapted to the purpose. The west boundary following the main continental divide can be crossed at only two places, one being the pass at Fortress lake and the other the Athabaska pass. I find, however, that access to the west side of these passes at the present time is almost impossible, the old trail on the Wood river having been abandoned for many years and being now in an impassable condition. Regardless of this, however, it will be noted that these passes are both located at a very great distance from the nearest railway in British Columbia, this being the Canadian Pacific railway at Beavermouth, and the chances of parties crossing from the British Columbia side can be wholly disregarded. Furthermore, both passes lie at a very high elevation and are snowed up the greater part of the year. The north boundary, which is common with the south boundary of the park, of course, has the advantage of adjoining the park, and can share in the protection afforded by the park. Even without this protection, however, it would be a very satisfactory boundary for the reason that it can be crossed at only three places. It is possible to enter the preserve by going up the main Athabaska river, by going up the Maligne or by going diagonally across from the Athabaska to Maligne lake, in which case the boundary is crossed about halfway between the Athabaska and the Maligne at the summit of the mountains in Shovel Pass. To reach the Athabaska end of Shovel Pass trail it is necessary, of course, to come up the main river through the park Practically, these three entrances may be treated as two, or in case of necessity may be even treated as one, since access to the Athabaska or Maligne River trails can be gained only by crossing the Athabaska river, and the places of crossing are, of course, very limited in number. At the extreme northeast corner of the proposed preserve there is a very narrow pass leading in a canyon through the Colin range from the Rocky river to Medicine lake. This canyon leaves the Rocky near the park boundary and runs southward, striking Medicine lake at the upper end. It would have to be guarded for the reason that it may be reached either from the railway by way of Jack creek or by way of the Rocky river or from the headwaters of the Rocky. From this pass in the Colin range southward to the head of the Poboktan creek, a distance of 45 miles, the Colin range is wholly inaccessible and cannot be crossed by horses at all, and as far as I know has not been crossed on foot. This leaves on the east boundary only the passes leading from the Brazeau and North Saskatchewan to the east branch of the Athabaska. These may be considered as two, namely, Poboktan pass, leading from the Brazeau to the head of the Poboktan, and Jonas creek and Wilcox pass leading from the head of the North Saskatchewan to the head of the Sunwapta. Both are extremely high, being in the neighbourhood of 9,000 feet, and far above timber-line. They are open only about three months of the year.

For the purpose of control one man employed all year long, one man for a period of about nine months, and three men for a period of three to five months would be sufficient. The man permanently employed should be stationed on the Athabaska river near the park boundary. He should make his headquarters at Buffalo Prairie, where the Shovel Pass trail leaves the main Athabaska trail and at this point would be in a position to control at least 75 per cent of the traffic into and out of the preserve. Practically all of the parties at the present time going either to the Maligne valley or to the upper Athabaska pass this point. The nine-months man should have charge of the Maligne valley and be located at the head of Medicine lake or at the

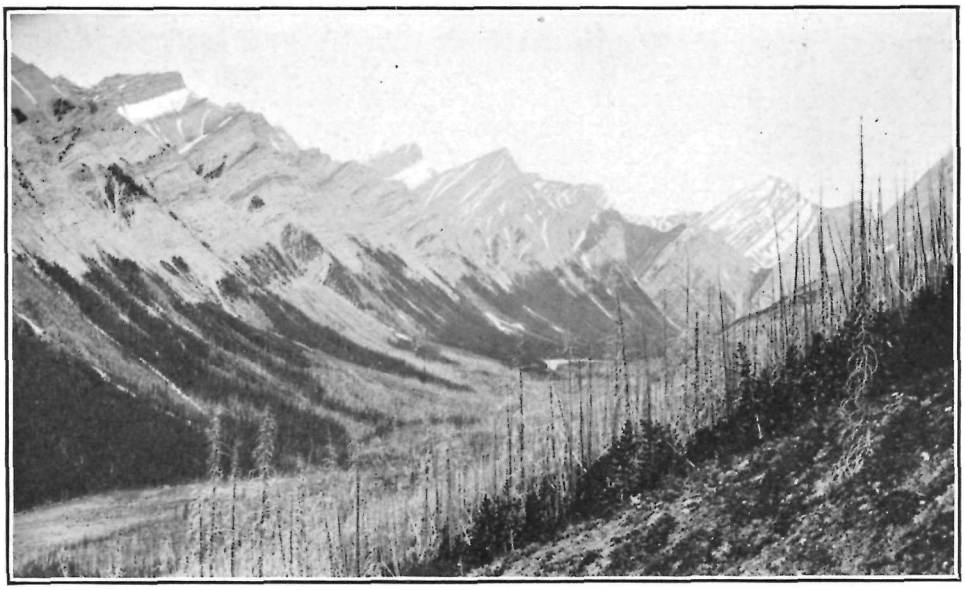


Photo. C. H. Morse.

JACK LAKE PASS FROM THE NORTH.

This is the only low-level pass through the Maligne range, proposed as the east boundary of the Jasper preserve. The ease with which this boundary may be guarded can readily be judged from the view of the pass shown here.

Photo. W. N. Millar.

A CLOSE VIEW OF A TYPICAL GOAT RANGE IN POBOKTAN PASS.

View shows Rocky Mountain goat killed in October, 1913. Note scarcity of vegetation.

lower end of Maligne lake. At this point he would be in a position to control all the traffic up the Maligne valley to the Athabaska and Medicine lake by Jack Lake pass and from the Athabaska by way of Shovel pass. This region snows up early, so that he would not be required the entire year. As he would not be located immediately on the boundary it would be necessary for him to do some patrol work through Jack Lake pass and he could also co-operate with the park rangers by patrolling down the Maligne river. One of the temporary or short-term men should be employed to patrol the Athabaska valley from the park boundary up as far as Fortress lake and Athabaska pass. His duties would consist almost entirely of patrol and be more in the nature of fire ranging than game guarding, as the chances of trespass through either Athabaska pass or Fortress Lake pass are practically negligible. The second short-term ranger should be located at the head of Poboktan creek, where he should guard the entrance to the preserve through Poboktan pass or Jonas creek pass. It should be explained that the mountain range for a distance here of 4 to 6 miles is largely composed of shale and there are several places in which it can be crossed, but all crossings finally converge either at the head of Poboktan or Jonas creeks, the two points being not over an hour's ride apart. One man could very easily take care of this entrance, especially as the period during which it may be entered is very short, and all parties heading for this pass must travel a very long distance through the forest reserve and encounter quite a number of forest rangers both in the Brazeau and Clearwater forests. The third short-time ranger should be stationed so as to guard Wilcox pass. Here, again, conditions are somewhat similar to those explained as applying to Poboktan pass, although there is only one way across the range, and chances of parties entering by this pass are very slight. On the whole, both of these men would act more as fire patrolmen than game guardians, and should be charged with fire-patrol work on both sides of the boundary so as to cover the headwaters of the North Saskatchewan and the Brazeau in co-operation with the forest rangers of the two adjacent reserves.

GAME PRESERVES NORTH OF THE GRAND TRUNK PACIFIC RAILWAY.

It is very probable that one or more preserves should be laid out in the Rocky mountains north of the Grand Trunk Pacific, but I have not yet been able to make an inspection of this region, and have been unable to secure any detailed or reliable information in regard to either the necessity for a preserve, or the animals which frequent this portion of the Rocky mountains, or boundaries that might be considered satisfactory. It would appear from what information I have that there are sheep, goats, and particularly caribou around the headwaters of the Smoky, and that the half-breed settlers at the Moberley settlement at Grande Cache are making very serious inroads, especially on caribou. The sheep are undoubedly Rocky Mountain bighorn (*Ovis canadensis*), but at the extreme north end of the Rocky Mountains reserve there is a possibility that either the black mountain sheep (*Ovis dalli*) or the white mountain sheep (*Ovis stonei*) may be found.

REGULATION AND ADMINISTRATION OF GAME PRESERVES.

In this report I have indicated the number of men necessary to make the regulations absolutely effective, together with the period of time during which they would have to be employed ,and the points at which they should be stationed. The supervision of all work on game preserves should be under the direct control of the forest supervisor within whose forest the preserve or part of the preserve is located. This means that all instructions issued to the game guardians would come from the supervisor. In order to thoroughly systematize the work, and especially to provide for full co-operation where preserves are located in more than one forest, as is the case with

the Red Deer-Clearwater preserve, I think it would be advisable to appoint an assistant district inspector whose duty would be to handle all matters in connection with game preserves. For the time being, this could probably be handled by the assistant district inspector having charge of grazing, although with the increase of work along both lines it would ultimately be necessary to assign the game supervision work to a man who would give his entire time to it. Such a man should be a practical biologist, and be well acquainted with the habits of all the game animals in the preserves. He would also have to be an experienced woodsman, and his time would largely be occupied inspecting the work of the game guardians and handling the administrative details in connection with this work. He would also be in charge of any co-operative work undertaken on the unprotected portions of the Rocky Mountains forest reserve in conjunction with the Provincial Government. He would not, however, issue instructions directly to the game guardian, who would be under the instructions of the forest supervisor of the reserve. In this way all possibilties of conflict between the forest rangers and the game guardians operating as they would be in the same regions, would be entirely avoided.

Wherever necessary the telephone system for the reserve would be planned not only to provide for the interests of the reserve protection and administration, but also to provide for the requirements of the game preserve. This would be of particular importance, as an efficient enforcement of the game-preserve regulations would very largely hinge upon the possibilities of immediate communications from one gateway to another.

As far as distinctive regulations are required to make the game preserve effective, these are very simple. The Alberta Game Act already prohibits the carrying of firearms within the game preserves established by it, and makes the possession of such firearms prima facie evidence of intent to violate the Act, and of course prohibits the killing of any game whatever within the limits of the game preserves. The penalty is fixed at not more than $200, nor less than $50, which would seem to be sufficient. There is, therefore, ample authority in the Act to support a regulation prohibiting the taking of guns into the preserves, or requiring that guns taken in shall be sealed by a game guardian, and a permit for carrying them be secured. Whether or not guns should be prohibited or may be permitted in under seal is an administrative question that should be left to the discretion of local officers. It would probably be necessary to place this discretionary power in the hands of each individual game guardian, as a decision in each case would depend largely upon the proposed route of travel of the party and the game guardian would have several choices open to him. Cases might arise in which parties would desire to cross the game preserve for the purpose of hunting beyond the limits of the preserves. This might occur in the case of any of the preserves recommended, although none of them are so placed that they bar off roads or trails of primary importance. In such cases the ranger at the gateway to the preserve would have to use his discretion as to whether he would allow the party to transport their guns through the preserve under seal or whether he would despatch them to the point of exit on his own responsibility. If the guns were allowed to be carried through the reserve the ranger should be empowered to require the party to make a statement of the gateway on the far side at which they intended to go out and the time they would be occupied in crossing the preserve, and the permit issued for the crossing should state the proposed route which would then be communicated to the officer guarding the exit point, who would remove the seals and take up the permits. Parties entering the preserves simply for the purpose of camping and intending to come out by the same or an adjacent entrance might reasonably be expected to deposit any firearms they might have with the ranger, who would hold them until after their return, or transmit them to the adjacent entrance at which the party intended to leave the preserve.

The whole aim of the regulations should be to prohibit entirely the taking of firearms into the preserve except where such an absolute prohibition would be entirely un-

reasonable, and where the guns are admitted to the preserve they should be allowed in only under rigid restrictions that would ensure that they would not be used while inside the preserve. To accomplish this, discretionary power to deal with firearms of persons desiring to enter or cross the preserve should be given to the game guardians, and the administrative organization must be such that provision is made for keeping accurate check on all guns allowed to go into the preserve and for the transportation of guns through or around the preserve in the custody of the Government. The first would require considerable telephone construction so that the various game guardians might be in constant telephone communication with each other, and, as has already been stated, this is one of the arguments for administering the game preserve as part of the forest reserve, for the reason that forest protection and administration requires extensive telephone building, and this can be readjusted where necessary to serve the purpose of the game preserve as well. For the accomplishment of the second object, where the mail or other transportation facilities are inadequate, the several rangers whose time is partly given to patrol in each preserve may be called upon to convoy or transport firearms from one gateway to another, and for this purpose all temporary game guardians should be under the instruction of a chief game guardian on each preserve, who should himself be responsible directly to the supervisor of the forest reserve. The working out of the various administrative details in connection with this work would, of course, be in the hands of the assistant district inspector in charge of game protection.

It will, of course, be noted that a separate and distinct force is contemplated for the protection of the game preserves in addition to the force of forest rangers needed for the administration and protection of the forest reserves within which the game preserves are located, although this force would be under the direction of the forest supervisors and the district inspector. I think that a little consideration will show the absolute necessity for making game preservation a distinct occupation. Not only are the forest rangers on the forest reserves charged with protection of the reserves against fire and trespass, but a very much greater part of their time is occupied in administrative duties and in the supervision of construction work. The administrative duties consist in the enforcement and administration of the regulations by which the forest reserve resources are made available, and are a very great tax on the time of the rangers, and as they bring them in contact with most of the local population it is impossible to count upon using forest rangers in positions such as game-guardian work, where many of them will be required to maintain more or less stationary headquarters. Furthermore, the type of man best suited for forest-ranger work is not always well adapted to the work of handling game protection. A great many men are not at all in sympathy with game-protective work, and the selection of forest rangers is already sufficiently difficult without making it necessary to add to it the requirement that they be in complete sympathy with the work of game protection. It would be very much easier as a practical proposition to secure men of this type alone without having to consider the numerous other factors which go to make up a satisfactory forest ranger. The theory that forest rangers may just as readily act as game guardians because they are already located in the region is never found to work in practice because of the numerous outside duties which a ranger has to deal with, most of which are entirely antagonistic to the performance of game-protection duties. One point that is of particular importance is the necessity for immediately following up any infringement of the game laws or regulations which is noted. Unless quick action is taken, in most cases it is practically useless to do anything at all, and this would greatly interfere with the proper performance of their administrative duties were the responsibility for game-law enforcement placed upon the forest rangers direct. My conclusion, therefore, is that adequate protection can only be obtained by a specially organized force of game guardians whose primary duty is game protection within the preserves, and who are selected primarily for their qualifications for work of this character in co-operation with the

forest rangers having charge of the same and adjacent portions of the forest reserve. On the other hand, the forest rangers outside the game preserves could co-operate with the game guardians and can greatly assist them by notifying them of the approach of parties of travellers or hunters, and in many other ways supplementing the game protection within the preserve. Having both forces under the same supervisor would make this co-operation between the two a very simple matter, while if they are directed by different superior officers, especially if they are attached to different branches of the government service, anything in the nature of effective co-operation is practically an administrative impossibility.

The total area of game preserves recommended is approximately 2,265,000 acres. For the purpose of providing complete protection for the game in the preserves, protection that can be guaranteed to be as nearly perfect as it is possible to obtain, a total of $16,000 per annum for patrolmen would be required. This is approximately seven-tenths of a cent per acre, which is a very small sum considering the nature of the country and the fact that the game guardians would practically ensure complete fire protection if aided by a lookout system for the detection of fires to be inaugurated under the administration of the Forestry Branch. The distribution of this sum should be as follows:—

Inspector of game protection		$2,000 00
Waterton Preserve—		
1 Game guardian	$1,200 00	
2 Assistant game guardians (six months)	1,200 00	
		2,400 00
Highwood Preserve—		
1 Game guardian	$1,200 00	
2 Assistant game guardians (six months)	1,200 00	
		2,400 00
Red Deer—Clearwater Preserve—		
3 Game guardians	$3,600 00	
4 Assistant game guardians (six months)	2,400 00	
		6,000 00
Jasper Preserve—		
1 Game guardian	$1,200 00	
1 Assistant game guardian (nine months)	900 00	
1 Assistant game guardian (five months)	500 00	
2 Assistant game guardians (three months)	600 00	
		3 200 00
Grand total		$16,000 00

The effectiveness of the protective force will very largely depend upon the character and qualifications of the men secured as guardians. It is recognized that men of the type necessary for this work are difficult to secure, and in laying out a game preserve an effort has been made to establish such boundaries that, in so far as it is possible, the perfection of the organization of the force will make up for any deficiencies of individual members that may be unavoidably present. At the same time, every possible effort should be made in the selection of these men to ensure their entire sympathy with the work and their freedom from outside influence that might affect the impartiality or thoroughness of their enforcement of the law. Naturally the men should be appointed only as a result of a civil service examination. This examination should be entirely practical in character, designed only to show the men's general intelligence and their ability to travel and take care of themselves in the regions to which they will be assigned. Some knowledge of the habits of game animals should be required, and also of the game laws and the regulations of the province and the Dominion branches having authority in game protection. For adequate supervision of the work of these rangers a close inspection should be maintained by the inspector, and also continuous supervision by means of the telephone, either direct or through the supervisors' offices. A telephone system connecting all game-guardian stations both with each other and with the headquarters of the various reserves is essential for the complete protection of game in the preserves, and would be provided in co-operation with the adjacent forest reserves in which similar telephone construction for protective and administrative purposes is also necessary.

CONCLUSION.

The following is a summary of the main points brought out in the foregoing report:—

1. The game animals most in need of protection on the East Slope in the order of the urgency of such need are elk, bighorn sheep, mule deer, and moose. Caribou, goats, and white-tailed deer are of less importance.

2. The most effective method open to the Dominion Government for assisting in game preservation is through the establishment and administration of definitely defined game preserves within which game animals are protected at all seasons of the year.

3. The means open to the Dominion Government for carrying out this policy are the creation of parks which automatically become game preserves under the Alberta Game Act, and the creation of special game preserves under its Act. Both methods should be used, a park game-preserve being confined to those areas which are primarily valuable for recreation, and the others being constituted game preserves within the existing forest reserves.

4. A game preserve to be effective must exhibit the following qualifications:—

(*a*) Suitable range for all the animals it is designed to preserve.

(*b*) Natural boundaries as nearly impassable as can be obtained.

(*c*) A minimum of commercial assets on the one hand, and, on the other, regulations which, while safeguarding the game, interfere as little as possible with the exploitation of such commercial assets as are unavoidably included within the preserve.

5. Effective game protection within a game preserve requires strict enforcement of a rule prohibiting the carrying of guns in the preserve. Where unusual hardship would be involved, the transportation of guns through the reserve under seal or in bond might be permitted in special cases. The organization of the protective force should have the enforcement of this regulation as its basis.

6. The members of the protective force must be specially selected and organized for this purpose and have as few other duties as it is possible to place upon them. The force must be entirely distinct from that of the forest rangers on game preserves located within forest reserves, but should be supervised by the same superior officers in order to ensure co-operation between the two forces. This force should be selected on a basis of fitness as a result of suitable competitive tests, and should not be composed of local men, but should be made up of non-residents having no local affiliations.

MAP OF THE

ROCKY MOUNTAINS FOREST RESERVE

Showing

PROPOSED GAME PRESERVES

Scale 35 Miles = 1 inch

0 5 10 15 20 25 50 75 100

Legend

Proposed game preserves .....

Dominion parks boundaries .....

Forest reserve boundaries .....

Interforest boundaries .....

Chief Geographer's Office

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Annual Reports—Director of Forestry—1905-6-7-8 and 1913.

Bulletin 1. Tree Planting on the Prairies (includes also Circular 5).
" 8. Forest Products of Canada, 1908.
" 10. The Farmer's Plantation.
" 11. Forest Products of Canada, 1909: Lumber, Square Timber, Lath and Shingles.
" 12. Forest Products of Canada, 1909: Pulpwood.
" 14. Forest Products of Canada, 1909: Cross-ties Purchased.
" 15. Forest Products of Canada, 1909.
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" 35. Forest Products of Canada, 1911: Poles and Cross-ties.
" 36. Wood-using Industries of Ontario.
" 37. Forest Products of Canada, 1911.
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" 39. Forest Products of Canada, 1912: Poles and Ties.
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" 49. Treated Wood-block Paving.
" 50. Wood-using Industries of the Prairie Provinces.

Circular 5. Planning a Tree Plantation for a Prairie Homestead.
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