

Fox farming is receiving attention in various parts of Alaska and is concerned with the blue fox and the various color phases of the red fox. The rearing of blue foxes is confined chiefly to the coastal islands, where the animals may have considerable liberty. It is understood that attempts to breed blue foxes within limited inclosures in Alaska have been generally unsuccessful if not altogether so.^a On the mainland of Alaska attention is given to the choicer color phases of the red fox. Both species are utilized in the Kodiak-Afognak region.

In reference to the color phases of the red fox the following extract is taken from a pamphlet prepared by Dr. Ned Dearborn, of the Bureau of Biological Survey, Department of Agriculture (Bulletin 301), on silver-fox farming in eastern North America.

The name "silver fox," as commonly used by furriers, includes the dark phases of the ordinary red fox (genus *Vulpes*), variously called silver, silver gray, silver black, or black. It should not be confused with the gray, or tree, fox (genus *Urocyon*) of the United States, the fur of which is of comparatively little value. The color of the red fox of the northeastern States and of its allies of the colder parts of North America varies from red to black, and these extremes, with their gradations, form four more or less distinct phases, known respectively as red, cross (or patch), silver, and black. In the red phase the fur is entirely rich fulvous, except for restricted black markings on the feet and ears, a white area at the end of the tail, and certain white-tipped hairs on the back and rump. Grading into the next phase the black increases in extent until, in the typical cross fox, the black predominates on the feet, legs, and underparts, while fulvous overlaying black covers most of the head, shoulders, and back. A gradual increase of the black and elimination of the fulvous, or its replacement by white, results in the next phase, the silver (or silver gray) fox, in which the entire pelage is dark at the base and heavily or lightly overlaid with grayish white. The color of silver foxes varies from grizzly to pure black, except for a few white-tipped hairs on the back and rump. Finally, in the black phase, the white is absent from all parts except the tip of the tail, which is white in all four phases. The red phase is much more abundant than the others, but all four interbreed freely, and wherever one occurs occasional examples of the others may be expected. In general the cross fox is fairly common, the silver gray scarce, and the pure black very rare.

^a In this connection it may be stated that the superintendent of the National Zoological Park, Washington, D. C., has advised that some young blue foxes were received by the park in November, 1899, as a loan from the Semidi Propagating Co. It was understood that the foxes were shipped from the Semidi Islands, Alaska. Young were born each year from 1901 to 1906. Several litters were raised, but many of the animals died while quite young from uncinariasis, enteritis, nephritis, and anemia. There were also some losses from accidents and other causes.

It will readily be seen that a fox exhibiting one of these phases might be differently classified by different persons, and it should be borne in mind that the classifications of animals in this report have been furnished by various persons.

The Bureau regrets that many people have gone into the business of fox farming without much knowledge of its requirements, no facilities for caring for their stock, and apparently with no serious intention to pursue the business to any end. Dry-goods boxes, chicken pens, and old cabins do not make suitable retaining pens or breeding inclosures. The lack of a proper supply of water and the use of improper food further insure failure. A fox corral in the eastern part of the Territory, which was visited by a warden, consisted of an inclosure, 20 feet by 35 feet, made from logs set on end. No shelter of any kind was provided for the seven foxes on hand. The only seclusion which the foxes had was the holes which they themselves dug. No utensils for holding food or water were visible. Dried whitefish was the sole food supplied. The warden noticed that one fox was tied, asked for the reason, and was informed that it was sick. It is difficult to see how the owner, if he had any sincere intention of engaging in fox farming, could expect any degree of success. In some instances it is realized that a pretense of fox farming is made for the purpose of concealing illegitimate operations which could not well be carried on otherwise.

KODIAK-AFOGNAK REGION.

KODIAK FOX FARM

In 1914 the Kodiak Fox Farm, a copartnership, was organized at Kodiak for the purpose of propagating foxes. It was realized that fox farming in Alaska was largely undeveloped, and the organizers were fully prepared to conduct such experiments in the way of breeding, feeding, and caring for foxes as would assist in developing the industry in Alaska.

The copartnership consisted of Karl Armstrong, W. J. Erskine, N. Gray, and P. D. Blodgett. Mr. Erskine in behalf of the organization has furnished the department with an exhaustive account of their plans and work, and in the interest of the industry it is deemed desirable to reproduce the report in part, as follows:

SELECTION OF LOCATION.—The selection of a proper location for a fur farm is, of course, a matter that should be given the most careful consideration by one who contemplates undertaking this business. While a well-situated island, of the right size, and having the necessary natural facilities for economically conducting a ranch—of which there are many unoccupied along the coast of Alaska—is by far the better sort of a location for a fur farm; still there are thousands upon thousands of acres on the mainland of Alaska that are well adapted for this purpose and that probably could not be utilized for any other business. Where a ranch is located on the mainland the

foxes must of necessity be kept in captivity; but if an island is chosen, one can either keep the animals in corrals or permit them to run at large, or both methods could be resorted to at the same time. An island ranch also has the advantage of furnishing more complete isolation against outside interference with the foxes, and there is better assurance against total loss if an animal escapes from the inclosure.

Long Island, situated about 7 miles from Kodiak, was selected as the location of the Kodiak Fox Farm. This island is an ideal one for the purposes intended, and is near enough to Kodiak—the home of the four members of the firm—so that the management of the ranch can be given the personal supervision of those interested. Long Island contains about three square miles of low rolling hills, is partially timbered with spruce, affording some most excellent locations for corrals, and is bountifully supplied with water from numerous small lakes and streams. The waters surrounding the island abound with fish, such as cod, halibut, flounders, salmon, etc. There are several beaches where clams and mussels may be secured at every low tide, and in the spring of the year large quantities of eggs can be gathered from the adjacent rocks where sea birds nest in numbers. With all these at hand a cheap supply of excellent food for the foxes is assured. Wild berries also grow on this island in great quantities, and our experience has taught us that these can be fed to advantage.

METHOD OF FOX RANCHING.—Fox ranching in Alaska is not a new industry by any means, but the methods under which it has been conducted were such that most of those who attempted it have met with but indifferent success. In fact, but very few have made better than mere wages for the time and effort devoted to it, and still fewer have succeeded in reaping a profit in keeping with the capital invested and energy expended in the care of their ranches.

In selecting a method of fox farming the choice must be between two systems—that of breeding the animals in captivity, which has been proved so successful by the Canadian farmers with black foxes, and that of allowing them to run at large on islands, the practice most in vogue among Alaskans with blue foxes. While we are in favor of the former method as offering far more possibilities, still there are certain advantages to the latter, and where a ranch is situated on an island both systems might be resorted to simultaneously.

The chief advantage in permitting the foxes to run at large is that the initial cost of establishing a ranch is materially less than the investment necessary for the construction of corrals and inclosures; and for this reason it is possible for some who can not afford to undertake the business of raising foxes in captivity, to liberate a few animals on a suitable island. By giving such a ranch careful attention, the profits accruing—especially with blue foxes at present prices—should be in keeping with the capital invested and cost of operation; still, the mere fact that the percentage of loss of young foxes on the islands in Alaska has been so great, is a strong argument against this method. Mr. Samuel Applegate, who has had a great deal of experience propagating blue foxes liberated on islands in the Aleutian group, and who has given the subject very careful study, has clearly demonstrated that the blue fox can be successfully raised under the system that has been generally adopted, provided proper intelligence and care are exercised in handling the business. Even with the remarkable results he has been able to accomplish, however, he states that under this system only a small percentage of the pups born are raised to maturity, and places the average mortality among the young animals at 75 per cent. (Alaska fisheries and fur industries in 1913, Bureau of Fisheries document 797.) If this statement is correct—and we have every reason to believe the estimate is a conservative one—it means that only two pups of every eight born reach maturity, or an age where they are of any value. Such an enormous loss may eventually mean failure, and the only way we see that it can be avoided, or reduced to a minimum, is by breeding and caring for the animals in captivity. On Prince Edward Island, for instance, where all fox ranchers rear their

animals in corrals, the mortality seldom exceeds 25 per cent; and in some cases, even on large ranches, as high as 100 per cent of the pups born have been successfully raised. In our short experience in this business we can testify that we have raised every fox that was born on our ranch this year. It is true that we had but five pups born; still it is a fact that three of these certainly would have died if they had been at large, and could not have been given the extreme care necessary when they were sick. The value of these three foxes saved, we figure, repays us to a considerable extent for the cost of our corrals.

If foxes are to be bred and reared according to scientific principles, and with any hope of improving the stock and quality of fur produced, then the animals must be raised in captivity. This system permits of selective breeding, a thing that can not be accomplished if the foxes are allowed to run at large, and also provides a means of eliminating undesirable animals from the breeding stock. It also furnishes an opportunity of giving the foxes individual care and attention at all times, and reduces to a minimum the chances of loss from the many causes that are known to exist on the islands where foxes are given their liberty.

All the members of the Kodiak Fox Farm have had many years of experience in Alaska and excellent opportunities to observe the methods practiced by the fox ranchers and to note wherein mistakes have been made. Aside from their knowledge of local conditions, they have investigated as fully as possible the results of fur farming ventures in the United States and Canada, and from the data gathered on the subject, decided upon the system of fox propagation that is now in use on Long Island.

LITERATURE ON FOX FARMING.—Much information was obtained on the subject of raising foxes in captivity from the excellent report of the Canadian Commission of Conservation, entitled, "Fur Farming in Canada," by J. Walter Jones. This book is by far the best work we have seen on this interesting subject, and should prove of inestimable value to those engaged in fur farming, or who contemplate undertaking this business. Farmers' Bulletin No. 328, of the United States Department of Agriculture, entitled, "Silver Fox Farming," by Wilfred H. Osgood, also contains much valuable information, but the work does not treat the subject as exhaustively as does the Canadian report. The Silver Black Fox, a monthly magazine published in St. John, New Brunswick, and devoted exclusively to this industry, contains many valuable and interesting articles.^a

CARETAKER.—Since the primary object in raising foxes in captivity is to be able to give them exceptional care, then the selection of a proper caretaker becomes an important consideration. We have been most fortunate in securing the services of Durrell Finch, and we believe that if any man of his capabilities attempts this business, success is bound to result. Mr. Finch was formerly a stockman in the Middle West, and seems to have a natural intuition as to how animals should be handled. For about 20 years he has been in Alaska, and for a good part of that time was in charge of a station belonging to the Alaska Commercial Co. where a great deal of fur was handled. Mr. Finch is responsible for a breed of sled dogs among which are found some of the most hardy and intelligent in the country. This he accomplished by crossing the St. Bernard with the Husky, and then carefully selecting his breeders from the resulting pups. With this experience, and being naturally fond of animals, he is particularly well fitted for the work of caretaker.

One of the partners of the firm, Karl Armstrong, who acts as manager, is also of valuable assistance in conducting the ranch. He was also formerly a stockman, and the breeding of a thoroughbred line of field dogs has been for years his hobby. The services of a veterinary surgeon may be entirely dispensed with when Mr. Armstrong

^a In this connection the Bureau invites attention to Department of Agriculture Bulletin no. 301, Silver Fox Farming in eastern North America, by Dr. Ned Dearborn. The bulletin is a contribution from the Bureau of Biological Survey.

is available, for he can amputate the leg of a fox, administer a dose of medicine, and handle a wild animal as well as anyone.

In order to succeed in the breeding of wild animals, one of the first aims should be to induce them to become as gentle as possible. One of the partners has remarked that, "it takes a gentle man to rear a gentle animal," and in this we are particularly fortunate in having the services of Mr. Armstrong and Mr. Finch.

CORRALS.—Considerable time was spent in prospecting the various possible locations on Long Island before a final selection of a site was made, and this is a thing that should always be given thoughtful consideration when establishing a ranch. The ground we finally decided upon is on the top of a low ridge in the thick spruce timber and has a slate bed rock lying from 2 to 3 or 4 feet below the surface. This location assures us of a well-drained place for the corrals, and even in the season of heaviest rain there is no mud under foot. The timber affords the necessary shade in summer and protection against the severe weather of winter, and the fact that the bedrock is so near the surface makes us doubly secure against the chances of having the foxes escape by burrowing.

In 1914, when the Kodiak Fox Farm was established, the inclosure built for the foxes consisted of 12 breeding corrals and 12 male pens. The breeding corrals are 23 feet wide by 50 feet long, and the male pens are 4 feet wide, placed between the corrals, and extending the full length of 50 feet. The plan showing the arrangement is illustrated on page 117.

The fences were built 8 feet above the ground, and it was intended simply to run a 2-foot strip of heavy netting around the top to prevent escape of the foxes. Upon an inspection of the corrals, however, after the completion of the fence on this plan and before the overhang wire was put on, it was decided to cover them completely with netting, for it seemed to us that a fox would have but little trouble in escaping from corrals constructed as ours were. Consequently, before the animals were put in the inclosure, netting of no. 20 wire, 2-inch mesh, was ordered, and the corrals completely covered with it. Our fears were well founded, for the first day that foxes were put into the corrals one of them escaped by climbing the fence and working a hole through the light covering wire. We then ran a strip of heavy wire netting, 2 feet wide, around all the corrals, on top of the covering wire and laced to it, and since doing so have had no further difficulty. Our mistake was in using too light a wire for this purpose, and in the new corrals built this year the fault has been remedied.

As stated previously, the bedrock where these corrals were built is not more than 4 feet below the surface. In constructing the corrals, therefore, ditches were dug to bedrock, following the lines of the fences, and the posts set so they would extend 8 feet above the surface. In order to prevent the foxes escaping by burrowing under the fence, a strip of heavy wire netting, no. 14 gauge, 2-inch mesh and 3 feet wide is securely fastened to the sill that lies on the surface of the ground, and allowed to extend to bedrock. In cases where the netting was not quite wide enough to reach the bedrock, a log was placed in the bottom of the trench and the lower side of the wire was fastened to this.

For the fences, above ground, two strips of wire netting were used, each 4 feet wide and 2-inch mesh. The lower strip is no. 14 gauge and the upper no. 15, and the two are joined by being stapled to a center rail of the fence.

IMPROVED CORRALS BUILT IN 1915.—In the construction of our new corrals, built in 1915, a number of improvements have been made. (See detailed plan of these corrals on p. 116.) Instead of using logs and rails from the woods, sawed timbers have been utilized in the construction of these corrals, the result being a considerable saving in the cost of labor and a great improvement in the appearance of the ranch.

An important feature of these corrals is that double-wire fences have been used throughout; this as an additional precaution against escape, and also to prevent the foxes from being injured by fighting through the wire netting. For the same reason

double ground wires have been resorted to. As a further protection against the possibility of foxes liberated on the island coming in contact with those in the corrals, the lower half of the inside of the outer fence is covered with netting of 1-inch mesh,

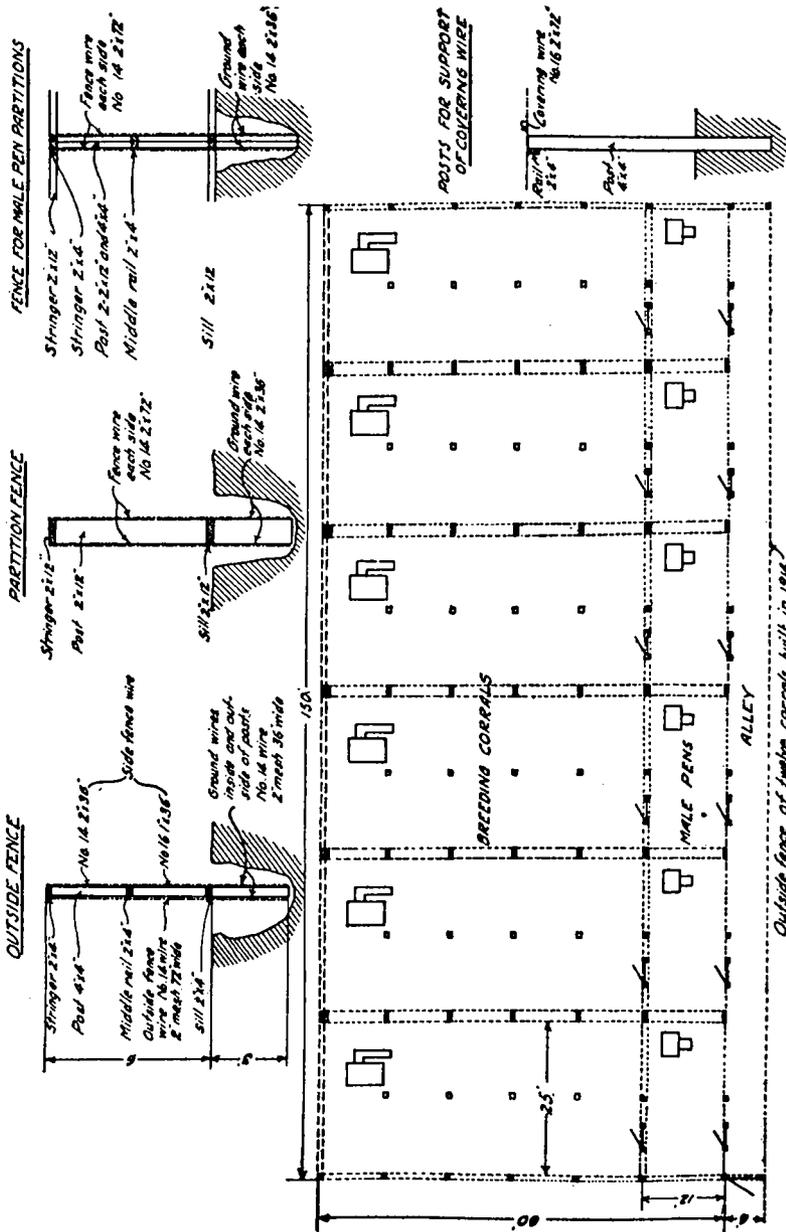


FIG. 1.—Plan of improved fox corrals built by the Kodiak Fox Farm during season of 1915.

no. 16 gauge. The entire structure is covered with wire netting, 2-inch mesh, and no. 16 gauge.

The location of the male pens has also been changed in the new corrals. Instead of placing them between the breeding corrals, as was formerly done, we have parti-

tioned off 12 feet of the front end of the latter, thus affording a pen of better proportions. A door or gate connects the breeding corral with the male pen, and except

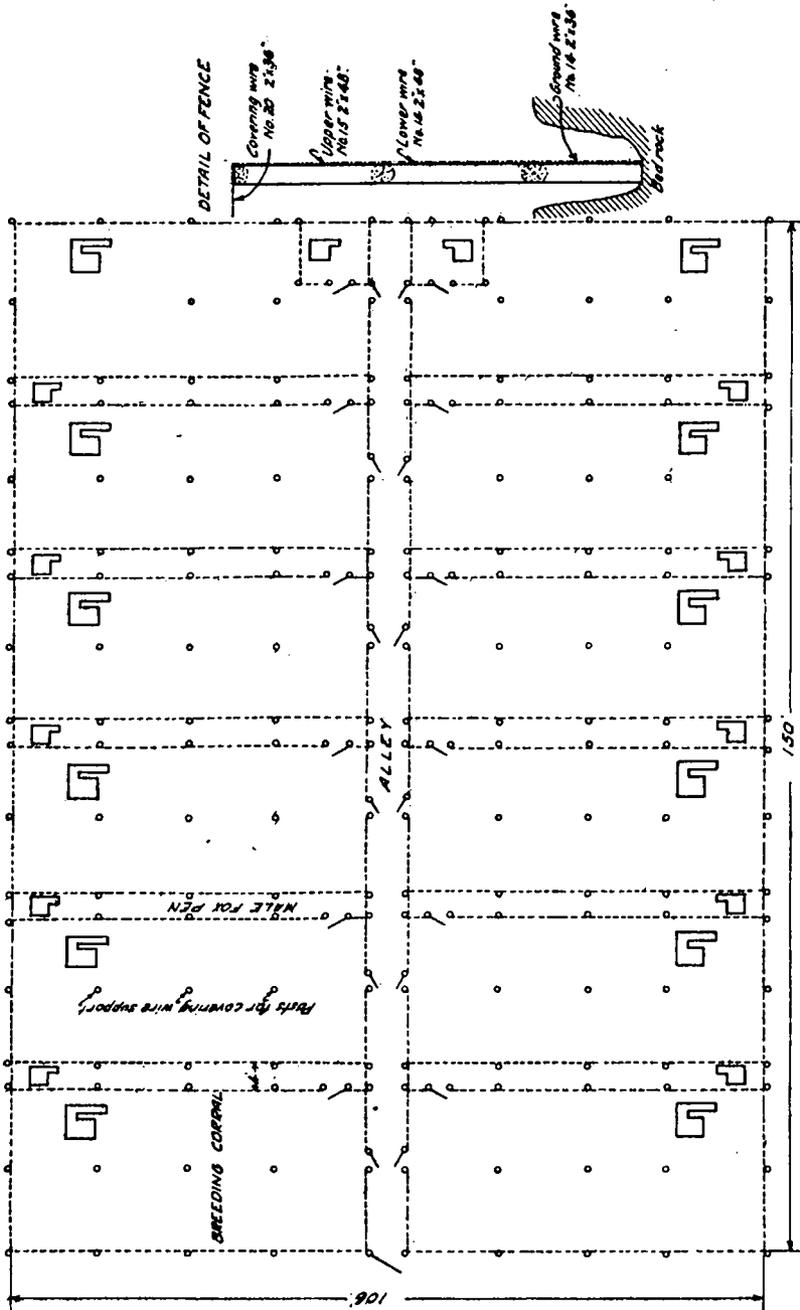


FIG. 2.—Plan of twelve corrals built by the Kodiak Fox Farm in 1914.

during the period when the male is separated from the female, the pair may have the run of the entire inclosure, an area of 1,500 square feet.

It will be noted that the fences of the new corrals are but 6 feet in height, which we have demonstrated is sufficient height in this country, where the snowfall is light. In a district where the snow is apt to exceed 2 feet in depth, the height of the fence should be increased accordingly; also, if no covering wire is used, the fence should be at least 10 feet high. Aside from the fact that a considerable saving in construction cost is effected by building low fences, the danger of the foxes being injured by falls is greatly lessened. Foxes are great climbers, and it often happens that they are seriously injured by falling from high fences.

Many of the fox ranchers have constructed their corrals so as to allow a passageway around each one. This plan, of course, acts as a safeguard against the foxes fighting through the wire, but we think there are objectionable features in this method of building the inclosures, and that the general scheme we have followed will better serve the purpose. The nest houses in our corrals are placed at the end farthest from the entrance, so it is not necessary for the keeper, when feeding and otherwise caring for the foxes, to approach nearer to the nests than just inside the entrance gate of the corral. This is an important matter, for during the period of gestation, and until the pups are weaned, extreme caution must be exercised not to disturb or excite the female. With passageways completely surrounding the breeding corrals, there is apt to be a tendency to disturb the foxes at a time when they should be left entirely alone, and for this reason the plan of construction should be given careful consideration. By following our plan of construction the chances of accident from the animals fighting through the fences will surely be eliminated, and then the cost of construction will be considerably lessened. Fewer posts will be required for the corrals; and in case the ranch is situated where an outer inclosure is necessary, considerable expense can be avoided from the fact that a smaller area will have to be surrounded.

Care must be exercised in the selection of wire netting, and this should be the grade that is galvanized after weaving. Nothing lighter than no. 14 wire should be placed under ground, and we would recommend, when it is possible to secure a heavier weight, the use of no. 12. For the fence wire we believe that nothing lighter than no. 14 should be used; some of the foxes are large and very strong, and by continually biting and pulling at one place in the fence a hole might easily be made if the wire is not of sufficient weight. For the covering wire no. 16 is heavy enough, but we think it would be dangerous to use anything lighter. Two-inch mesh might be used with safety for all the netting, although the use of 1-inch mesh wire for the lower half of the fences has its advantages. Any netting with larger mesh than 2 inches, however, should not be used in the construction of fox corrals.

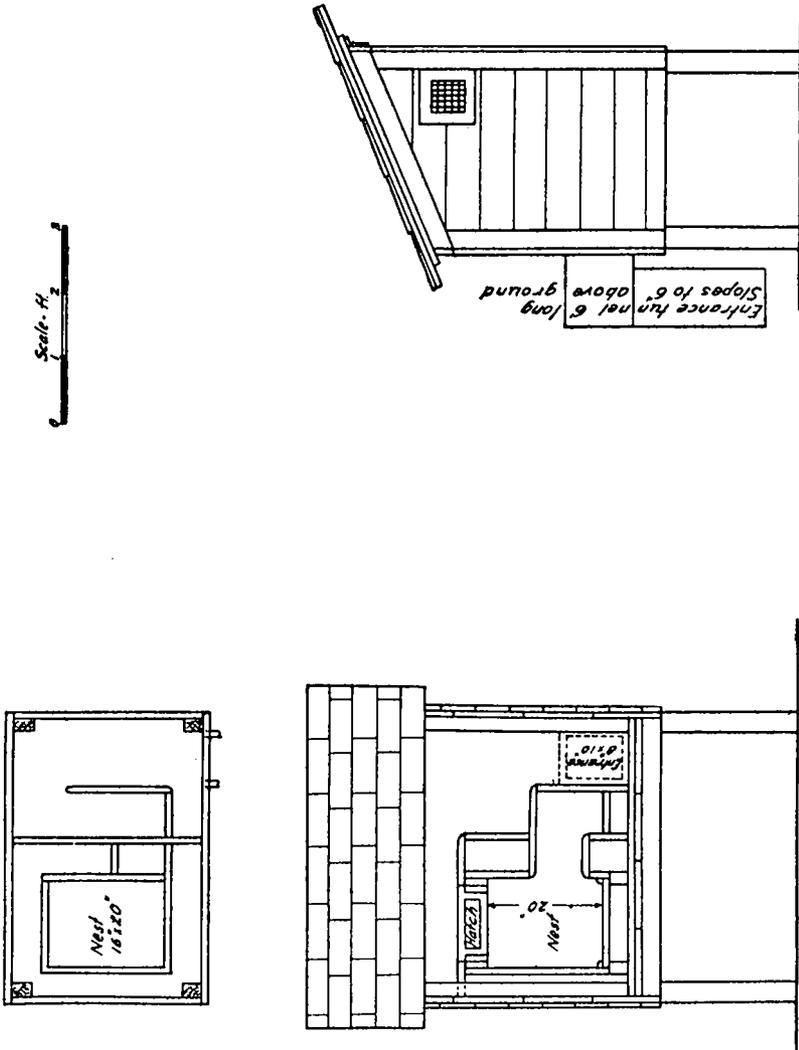
In fastening the wire netting to the posts and stringers a liberal supply of staples should be used. We recommend galvanized staples, $1\frac{1}{2}$ inches long and of no. 9 gauge.

Instead of using a lacing wire for connecting the strips of netting, as is done generally in constructing fox corrals, we have found that galvanized hog rings make a much better, cheaper, and neater job. These are used by fishermen on the Pacific coast for building fish traps of wire netting, and can be secured from any house that deals in salmon cannery supplies. The rings are easily and quickly applied by the use of a hog ringer.

Our advice generally, to those who contemplate going into the fur-farming business, is not to attempt to economize on the material that goes into their corrals. Only the best material and workmanship should be considered, for the fox is a valuable animal, and the loss of a single animal through improperly constructed inclosures might represent a sum greater than the entire cost of the structures.

NEST HOUSES.—In the construction of the nest houses, or artificial burrows, in which the male and female are to live for a good part of the year, and where the female is to whelp and rear her young to the weaning stage, the greatest care should be exercised. Our nest houses have been built on the lines suggested by J. Walter Jones in his Canadian report, but the plan has been somewhat altered through information gained by conversation and correspondence with parties who have had vast experience

in breeding foxes. These are, we believe, thoroughly suited to the purposes intended. In fact, the results obtained during the past season in the use of these houses have been so satisfactory that the structures now being put into the new corrals are identical, except that the nests have been made 18 by 22 inches instead of 16 by 20 inches. This change was made to accommodate some of the exceptionally large foxes, as it was feared the nest might be somewhat crowded during the whelping season if made in



the smaller size. These houses have been built with the idea of furnishing a shelter as nearly as possible like the natural burrows, and at the same time adding features that would improve the sanitary conditions and make the nests accessible for inspection, cleaning, etc.

Above is a drawing of these houses showing general method of construction and arrangement. The hatch, which is the nest cover, is easily removed in order to get at the interior of the nest, and for the purpose of facilitating this operation three auger holes are bored through the top and bottom boards of the hatch. By placing one's fingers in the top holes the hatch can easily be lifted, and at the same time these holes

serve as a means of ventilation for the nest. The hinged roof makes the interior of the house very easy of access.

The nest, in order to assure warmth, is completely surrounded by a dead air space, accomplished by the use of double walls and covering the air space side of the nest walls with building paper. In an extremely cold climate it would probably be well to insulate the nest further by filling the air space with planer shavings, sawdust, or some other such material. In this section, however, the air space affords sufficient protection against the cold.

The interior of the house is finished entirely with dressed lumber, and all sharp corners are rounded off to prevent injury to the fur. Great care is also taken to be sure that no nails are left protruding that might injure the fox or his fur.

The floors are of 1-inch boards, doubled, and with building paper between. The walls are of 1-inch lumber, covered with building paper, and then with either shingles or weather boards. The roof is shingled over 1-inch lumber, and is hinged at the upper side.

To afford ventilation in warm weather, two small windows are provided, one at each end of the house near the roof. These are 5 inches square and are filled with wire netting. A wooden cover is arranged to button over the windows in cold weather, or whenever it is desired to close them. A favorite place of refuge for the foxes is the space on top of the nest, where they can keep safely out of sight, but at the same time watch what is going on by peering out of the windows.

To protect these houses against the weather we have painted them with two coats of good paint.

MALE FOX SHELTERS.—The male fox is taken away from the female shortly before the pups are due, and for this reason it is necessary to provide a suitable shelter for him in the male pen. At first we built small houses, 2 by 3 feet inside measurements, with a shed roof and a tunnel entrance having an opening 8 by 10 inches. The house was completely covered with three-ply roofing paper. In the new corrals, however, lard tierces have been used for the male-fox shelters. The tierce is laid on the ground and a board is fitted in the lower side to serve as a floor. The bottom is left in, but the head is removed, and over the opening is tacked a piece of heavy sail canvas, the lower side being left loose and a slit being cut down the center. This makes an easy means for the fox to enter or leave the shelter, and at the same time provides ample protection against the weather. In the side of the tierce, and under the flat floor, a small auger hole is bored in order to drain any moisture.

CAPITAL REQUIRED.—We estimate that each corral, complete, with nest house and male fox shelter, costs about \$200. There might be a slight variation from this figure, depending upon locality, cost of labor and of material, manner of construction, etc.; but in estimating the capital required for raising foxes in captivity one should figure on at least \$200 per pair to cover the actual cost of building proper inclosures and shelters. A person of limited means, who might contemplate raising foxes in captivity, should bear in mind the cost of a properly equipped ranch, and should gauge the number of foxes he can afford to care for accordingly. We believe there is a far better chance of success for one to attempt this business on a small scale to begin with, and be certain that the animals are well corralled and housed, than to start with a large number of foxes that can not be properly cared for on account of lack of capital.

Adequately to equip a ranch for 10 pairs of foxes, in Alaska, one must figure on a fixed investment about as follows:

Ten corrals, complete, at \$200.....	\$2,000
Dwelling for keeper, together with the necessary outbuildings, say.....	1,500
Boats, tools, implements, household furniture and fixtures, say.....	500
Total.....	4,000

of the production, then the natural inclination will be to capitalize such ventures with some degree of moderation. In the meantime, of course, those companies which have been capitalized at such excessive amounts will naturally feel keenly the effect of a materially reduced earning power. Undoubtedly a live fox of known pedigree and breeding qualities is worth considerably more than his pelt would bring in the market; still, there should not be such a vast difference between the fur value and the value of the live animal as has existed during the past few years. Such excessive values, necessitating overcapitalization, tend to detract from the stability of the industry at large, and it is hoped that in Alaska the inclination will be not to fall into this error, but to hold the price of breeding stock down to something like the pelt value.

Alaska seems to offer particular advantages for the business of fox propagation, and the fact that it can be undertaken here with so much less capital than is required elsewhere should be a strong factor in building up this remunerative industry.

RECORDS.—In order to attain the points desirable in ranch-bred foxes, most careful attention must be given the recording of the animals, and in such a way that pedigrees can be easily and accurately traced. We are working on the theory that, by selective breeding, these qualities can be achieved, and the record forms we are using for this purpose seem to meet our requirements in this respect. On page 121 we illustrate the forms used for our Fox Register and Breeding Record.

The Prince Edward Island fox ranchers have organized a breeders' association through which black foxes, under certain restrictions, will be registered, and all foxes so recorded are branded by indelible tattoo marks in one ear. The branding is probably necessary where so many owners are represented on the register; but in our case, where only our own animals are to be recorded, we think the plan we have adopted for keeping track of the various breeding foxes is adequate for all purposes.

All our breeding corrals are numbered, and a note is made on the Breeding Record of the register number of each fox placed in the corral. In case a pair is changed from one corral to another, this fact is noted; and in the event that for any reason the mates are changed, a new Breeding Record is opened. No attempt is made to register the pups until they are sufficiently mature to enable us to choose intelligently those which are best suited for breeding purposes. The breeders are then registered, and those selected for fur are entered in the Fur Record in proper time.

When the pups are taken away from the mothers each litter is placed in a separate rearing pen. These pens are also numbered and a record of this number is noted on the Breeding Record. With this method there is no chance of getting the foxes mixed in any way, and the necessity of relying upon tags or brands is entirely obviated.

In the Fur Record is entered a complete description of each skin taken from the ranch. It further shows the market fluctuations, as determined by the London sales and others, and thus serves as a guide in placing valuations on furs.

A further record is kept which is called the Ranch Log. In this the keeper records memoranda of daily occurrences on the ranch, making special note of characteristics of foxes, habits, kind and quantity of food given, etc. A copy of this log is kept in the office for reference and it is found of great value in many ways. This book makes very interesting reading for one in any way connected with the raising of foxes and really furnishes a continuous narrative of the daily operations of the ranch.

The principal points at which we aim in our breeding operations are color, texture of fur, size, disposition, and prolificacy. By carefully maintaining the records described above, we believe our efforts along these lines will be greatly facilitated.

FEEDING.—The proper feeding of foxes is, of course, one of the most important matters to be considered in this business. We have tried many experiments along these lines, and are convinced that fish can safely be made the chief item of diet.

While the foxes relish almost any kind of fish, still it has been noticed that an occasional change in variety is desirable. The coast of Alaska, together with the adjacent islands, offers excellent opportunities to secure an abundance of fish, and probably at much less cost than the same quality of food could be secured in any other locality where it might be possible to raise foxes successfully.

Codfish, halibut, sculpins, rockfish, and flounders are to be had in quantities throughout the year, and the foxes are very fond of all these. The fish are cleaned carefully, then chopped in pieces weighing from 1 to 3 or 4 ounces and fed raw. The healthy livers from the codfish are also saved and fed. Dog salmon, pink salmon, silver salmon, and fresh red salmon heads from the cannery are fed during the season when these fish are obtainable.

Probably the article of fish diet most relished by the foxes, however, is the salmon head, and these can be obtained in almost unlimited quantities if the ranch is situated near a salmon cannery. We discovered the liking the foxes have for salmon heads when feeding fresh salmon during the past summer. It was noticed that, without exception, the pieces of the heads were always the first eaten. We therefore made arrangements with the cannery of the Kadiak Fisheries Co., situated at Kodiak, to take such fish heads as we might require, and they gladly gave us these without charge. As an experiment we mild-salted about 15 barrels of heads and these serve as an excellent food for winter. Before feeding the salted heads, however, they are taken out of the brine and soaked in running water for 60 or 70 hours, when they are sufficiently freshened to be fed without danger. Our keeper, fearing that these salted heads might be injurious to the animals, was at first rather reluctant about feeding many of them, so we decided to experiment on one fox. A cross fox of little value was selected for this; he was put in a pen alone and was fed nothing but pickled salmon heads, freshened first by soaking, and as many of them as he would eat. The result was that he thrived on this diet, grew fat, and his coat became as sleek as any other fox on the ranch. The blue foxes at large on the island also relish the fish heads. They are fed once a day on a platform built for the purpose near the keeper's residence, and here is placed an assortment of food, including a supply of salmon heads. Often some of the food is left, but it is a noticeable fact that the heads are always cleaned up.

It might be in order to make a suggestion here. We understand considerable difficulty is at times experienced on the Pribilof Islands in securing sufficient food for the blue foxes, and this could be overcome, we believe, by the use of salmon heads. The heads could be secured from the canneries in Bristol Bay, where hundreds of tons of them are thrown away each year; the cost would be far less than for any other kind of food that might be shipped to the islands, and we are certain the results of feeding them to the foxes would be most satisfactory.

Another fish food which has been found to be excellent for foxes is dried salmon backs, or "ukula," as prepared by the natives. The salmon is dried in the sun and wind until it is quite hard and tough and is given to the foxes in this condition. It is particularly good for the young animals while teething, for it affords something substantial for them to chew on, a thing that is quite necessary during this period.

Canned salmon is used to quite an extent by a number of the fox ranchers, including ourselves. Short-weight cans are obtained direct from the canneries at nominal prices; the foxes eat this very readily and it is generally considered a good food to give occasionally. In fact, several of the ranchers in this vicinity feed canned salmon almost exclusively, especially during the winter months, and all reports we have received regarding this practice have been satisfactory.

As a further variety in the fish diet, we make it a point to take advantage of the extreme low tides in order to secure a supply of clams and mussels, both of which are usually very plentiful. The foxes are very fond of these and relish an occasional meal of them.

Such birds as sea ducks, cormorants, magpies, crows, etc., are very plentiful along the coast of Alaska, and when given to the foxes they are always devoured ravenously. The keeper, in order to secure these birds, is supplied with a shotgun and ammunition.

As a further source of food supply, and in order to furnish still more variety in the regular diet, we have propagated Belgian hares on Long Island. These are very prolific breeders, are cheaply and easily raised, and make excellent food for the foxes.

We make it a point, when a beef is slaughtered at Kodiak, to secure the scraps, legs, head, etc., and send them to the ranch for the foxes. While the animals all seem to prefer the fish, still they will eat the beef scraps and gnaw at the bones. The bones are very good for the young teething foxes.

A few cases of Spratt's Patent Fox Cakes are kept on hand. These cakes, similar to the dog cakes manufactured by Spratt's Patent (Ltd.), have been extensively fed by some of the Canadian fox ranchers, and from reports we have received are considered a very satisfactory food. We feed these occasionally with very good results.

The fox is also very fond of fruit, and we see to it that he has his regular ration of fresh apples, stewed dried peaches, figs, etc. During the summer, when wild berries are plentiful, these go to make up a part of the daily ration.

The fox is a dainty animal in his feeding and at times rather erratic. The same diet will not always do for every animal, and for this reason the keeper must study their individual tastes. Occasionally a fox will become sulky and refuse to eat, so it then becomes necessary to endeavor to tempt his appetite. For this purpose the table scraps from the keeper's house, such as meat, bones, potatoes, rice, mush, etc., are saved and offered to those foxes that do not take readily to the regular diet. In at least two cases we have had foxes actually starve themselves to death.

The quantity of food given must also be regulated in accordance with the particular needs of each animal, and in this the keeper must be a keen observer and exercise good judgment. The fox should be fed once a day, in the evening, and given just enough food to keep him in good condition, neither too fat nor too poor. With a little care, and by intelligent observation, one can soon learn from experience the peculiarities of the foxes, and govern his method of handling and feeding them thereby. Often, when there are two foxes in a corral, one will endeavor to secure the lion's share of the food, so the keeper must be watchful in order to see that each gets its share.

During the period of gestation, and while the females are nursing their young, they are fed very liberally. In fact, their appetites are tempted with such delicacies as eggs, milk, bread dipped in soup stock or gravy, etc. A good milch cow would be a valuable adjunct to any fox ranch, but where this is impracticable a supply of canned evaporated milk will answer, but it should not be fed without first reducing it with water to the consistency of cow's milk. As a rule our foxes took to milk readily and relished it; but in one instance a female fox that was expected to whelp, and for that reason we were very anxious that she should receive the very best food, positively refused to touch milk that was put before her in a pan. As it happened, however, this animal was particularly fond of clams which had been fed to her in the shells. Our keeper finally hit upon the idea of putting milk in clam shells, and in this way he was able to induce her to drink all the milk that was offered.

The young pups, when about 2 months old, are taken away from the mothers and, of course, must be fed very carefully for several months. Food should be given them several times a day in small quantities, but one should be sure that while growing they get all they want to eat. A liberal supply of milk is very necessary, especially when the pups are first weaned; but in a short time they can be fed about the same variety of food that is given the mature animals. It is best to leave the pups with the mother as long as she will properly care for them; but as soon as she shows signs of annoyance the young should be taken away. A pamphlet on the care of puppies, issued by Spratt's Patent (Ltd.), contains some very good advice and suggestions that would apply to young foxes as well as dogs.

In selecting a site for a fox ranch one should keep in mind the absolute necessity of an adequate supply of good pure water. The foxes do not drink a great deal, especially during the winter when snow is on the ground, but what is given them should be pure, and the vessels in which it is given should be cleaned out at least once a day. Foxes are inclined to soil the water, and in order to avoid sickness it should be changed as often as practicable.

SANITATION.—We make it a point to take every precaution to guard against insanitary conditions on the ranch, and particularly in and about the corrals and pens. All refuse is cleaned up regularly; only enamel-ware pans and basins are used for food and water, and these are carefully washed every day with hot water.

The foxes do not soil their houses badly except during the whelping season, but at this time the nests are apt to become quite foul. For this reason, and as soon as the pups are weaned and removed from the breeding corral, the nest houses are thoroughly cleansed and sprayed with a disinfectant. What we consider a good formula for this purpose is $1\frac{1}{2}$ pounds of lime and one-fourth pound of carbolic acid to a gallon of water. Our nest houses are so arranged that they can be thoroughly ventilated, and it is well to open them up for a day or two after spraying, so as to allow the air to circulate freely. The foxes, of course, should be removed to other quarters while this is being done.

It is well also to spray the ground, fences, and outside of the houses occasionally in order to kill any germs that might be present. This is particularly necessary when the corrals have contained sick foxes, and in the spring of the year when the ground is thawing. In fact, it is a good plan to do this at least once a month during the summer months.

DISPOSITION OF FOXES.—To understand the dispositions of the foxes under his care is probably one of the most difficult problems a keeper has to meet, and at the same time one of the most essential considerations in breeding the animals in captivity. We hope, by making a desirable disposition one of the chief points to be attained in our breeding operations, to secure eventually this much-needed feature. In order to accomplish this, however, a great amount of patience will be required, together with intelligent observation of the various characteristics exhibited and gentle treatment of the animals. Those animals which show vicious tendencies, together with their progeny, will very likely have to be eliminated entirely from the breeding stock.

Even with our short experience, we believe we have fully demonstrated that foxes, and particularly the blacks, if properly handled, can soon be brought to a stage of domestication that will greatly simplify their propagation in captivity. With a few exceptions all our animals were captured from the wild, and probably 50 per cent of these were mature foxes, used to the habits of wild animals, and therefore less tractable than the young ones; but, regardless of this fact, most of them are so tame that they will take food from the keeper's hand, and in some instances they will permit being handled. Our keeper makes a strong point of getting the foxes as tame as possible, and he is always careful when going about the corrals to do nothing that will frighten or excite them. Invariably he has some morsel of food in his pocket when going among the foxes, such as dried salmon, to offer to those that show signs of friendliness, and in this way he seems to have gained their confidence to a large extent. Perfection in this direction probably can not be attained with the animals now on the ranch, but by following our present tactics we believe we can eventually produce a thoroughly domesticated fox, and one lacking many of the objectionable features of the wild animals.

Cannibalism seems to be the common trait that offers the most serious obstacle, but no doubt this can be largely overcome in time. However, even thoroughly domesticated animals, such as cats and dogs, often show this tendency, so probably the safest plan would be to kill off foxes so inclined.

We have had three instances of cannibalism among our blue foxes, but thus far have experienced no difficulty with the blacks or crosses. One of our female blues

has killed and partly devoured two mates; and in another case the male killed and ate the female. Regarding the latter instance, the pair had been corralled together before coming into our possession for three years, and during that time the female had killed two entire litters of pups when they were 2 months old. We know that this female was carelessly handled at a critical time, and that strangers were permitted to approach the nest when the pups were small, so that fact may account for her having turned cannibal. But for the male to have attacked his mate, after the two had been together in captivity for so long a time, is a thing we are unable to account for. These foxes were all having the best of care and attention, each was getting its full ration of food regularly, and they were all apparently contented. The first intimation our keeper had that anything was wrong was when he found the carcasses in the corrals. It is needless to say that the animals that committed these depredations will soon have their skins on the fur stretcher.

A problem now facing us, and which might properly come under the head of "Disposition of foxes," is the difficulty experienced by ranchers in rearing blue foxes in captivity. While but few attempts have as yet been made in Alaska in this direction, still the experiences of all have been about the same, and to date we know of no instance where a blue fox has been successfully raised to maturity in captivity on any of the ranches in Alaska. We have information of at least four litters of blue pups having been born, but in each instance they were destroyed by the parents before reaching an age of over 2 months. This must be attributable to some peculiarity in disposition that is probably not possessed by the black fox, and therefore is a problem that must be worked out by patience and careful observation.

The experience of some of the Canadian fox ranchers who exported blue foxes from Alaska two or three years ago has also been unsatisfactory, although it is reported that some have been successful in rearing a few pups, and one rancher reports having raised an entire litter of 12. We have also been told that the National Zoological Park, in Washington, succeeded in rearing at least two litters of blue-fox pups from parents taken from the Pribilof Islands. If this is a fact, some valuable information might be gained on the subject by an investigation of the manner in which the animals were handled.

Aside from the difficulty experienced in rearing the pups, the animals seem to be disinclined to breed when in captivity. In the wild state, or when they are at liberty on island ranches, the blues are more prolific breeders than the blacks, but when confined they are certainly less inclined to increase than are the blacks. There must be some logical reason for this, and it is hoped that investigation will soon offer some solution to the problem.

Since it has been proved that blue foxes will, even occasionally, breed and have young in captivity, then it seems unreasonable to believe that at least a few of such pups can not be raised to maturity. Time may show that only a small percentage of the blue foxes taken from islands, where they have had their liberty, will ever breed when placed in confinement; but even so, we believe that by carefully propagating the few pups that might result from breeding these animals, and by eliminating from the breeding stock all barren foxes and those that might have a tendency to destroy their young, a good and prolific breeding stock can eventually be built up. All the experiments in this line that have come to our notice have been conducted under most unfavorable conditions, so the results of these trials really can not be accepted as a criterion as to the future possibilities in this business.

We believe that the Government might well afford to investigate this subject and conduct experiments in breeding blue foxes in captivity. The Pribilof Islands, it seems to us, offer an excellent opportunity for this work, for an organization is now maintained there that could conduct such experiments along scientific lines. Furthermore, blue foxes are probably more numerous on these islands than any other place in the world, so breeding stock could be selected from a large number of animals.

Such experiments would prove of inestimable value to those engaged in the propagation of blue foxes, and if successful, as we firmly believe they would be, an important step will have been made toward the establishment of a remunerative industry in Alaska. Even a small percentage of the money accruing from the sale of fox pelts taken off the Pribilof Islands would go a long way toward furnishing the necessary funds for a proper and thorough investigation of this subject. As for ourselves, we are more than willing to inform those who are interested exactly what methods we have pursued in our attempts at breeding blue foxes, and we invite an inspection of our ranch by any who might desire to investigate our methods.

STOCK OF THE KODIAK FOX FARM.—In starting the ranch of the Kodiak Fox Farm it was the plan to devote most of our attention to the propagation of blue foxes, for we did not then believe it would be possible to secure enough black foxes from the wild to stock a ranch of the size we had decided upon. However, through circumstances, our plan has been considerably altered in this respect, and the foxes we now have in captivity consist mostly of blacks.

On August 24, 1914, we received at Kodiak 11 pairs of blue foxes, old and young, from the Semidi Propagating Co.'s ranch on Ukamok Island. Our corrals were not built at this time, and we were not ready to take the foxes to Long Island, so they were kept in a warehouse at Kodiak until December 18, almost four months. Desiring, however, to experiment with a few blacks and crosses, we notified the native hunters who left Kodiak on the opening of the fur season that we would pay better than fur prices for any good live animals they might bring in. The result was that we secured, in addition to our blues, 5 cross foxes and 3 blacks. Since we had accommodations for but 12 pairs of foxes, and owing to the fact that it was too late in the season to attempt to build more corrals, we turned loose on the island all but 8 pairs of the blues. We therefore retained in the corrals the following stock during the winter of 1914-15: 8 pairs blue foxes, 1 pair black foxes, 1 pair black female and cross male, 2 pairs cross foxes.

The blacks and crosses were brought to us, one at a time, from December to the middle of February of this year, and this fact made it necessary to disturb the foxes, more or less, until the breeding season was almost at hand. On this account, and also for the reason that many of the animals were 1914 pups, we did not figure on much of an increase. In fact, when no pups had been born by June 1 of this year [1915] we had about given up hopes of securing any.

On June 6, however, the female black with the black mate whelped. She had three black pups, one female and two males, and these have now been reared to maturity. On June 12 two pups, one red female and one black female, were born to the pair of cross foxes, and both of these have also been raised. Since both of these mothers were but 1 year old when their pups were born, we believe we can safely depend on getting larger litters from both another season.

Our stock of blue foxes has been considerably increased this year by the following purchases:

From Chas. Pajoman, Afognak, we purchased six pairs. These originally came from Dry Island, Abrams Island, Alfs Island, and Hog Island. From Ingwald Loe's ranch, on Raspberry Island, we secured three pairs, originally from Dry Island. We have also purchased two pairs from the Semidi Propagating Co.'s North Semidi Island ranch. All the above, except those from the Semidi Propagating Co., had been in corrals from one to three years; but the owners, Messrs. Loe and Pajoman, had become discouraged through failure in their efforts to raise blue foxes in captivity, so disposed of their entire stocks of this variety.

We have also purchased a number of black and cross foxes from the wild this season, and three black pups, born in captivity last spring, were secured from Carlson & Smith, Uyak. Our stock now consists of the following:

In corrals.—Twelve pairs black foxes (in two of the corrals containing black foxes we have put a female cross as an experiment to see if the males show any tendencies to mate with more than one female); six pairs blue foxes; and one pair consisting of a cross male and a red female. (In respect to the last pair the female was born in captivity and the male was taken from the wild. Both were particularly tame and were mated as an experiment along the lines of breeding for disposition.)

At large on the island.—Fifteen pairs blue foxes, together with whatever increase occurred last spring.

The uncertainty of results likely to be attained from attempts to raise blue foxes in captivity has prompted us to turn so many loose on the island, retaining only a sufficient number of selected animals in corrals for experimental purposes. We know from past experience of the Semidi Propagating Co. that the foxes will thrive when at large, and then the expense that would be required for constructing inclosures to accommodate them is obviated. Should our experiments prove satisfactory, however, we will naturally increase our stock of this variety and provide additional corrals.

LEGISLATION.—Legislation covering the fur industry in Alaska is sadly lacking, and it is hoped that laws will soon be passed that will remedy the present conditions.

The law now in force, the act approved April 21, 1910, being "An act to protect the seal fisheries of Alaska, and for other purposes," together with the various regulations promulgated by virtue of this law, has had a beneficial effect; but with changed conditions, demanding the hunting of fur-bearing animals for breeding purposes, legislation should be enacted to extend the authority now given the Secretary of Commerce. The act referred to grants permission to the Secretary of Commerce to promulgate certain regulations, but in order to protect this industry fully, a law should be passed giving him power to regulate every phase of it, and especially as regards the taking and shipping of live animals for breeding purposes. We think the following points should be carefully considered when enacting new laws or regulations governing the fur industry in Alaska:

Season for killing.—We believe in a number of instances the open season provided in Department Circular No. 246, May 24, 1915, covers too long a period. No doubt districts should be established, according to their varied climatic conditions, but this should be done only after careful and intelligent field observations and an actual study of the condition of furs taken during the various months. Our recommendation for an open season for foxes in this section, including Kodiak Island and all territory that lies south of it, and also possibly the Alaska Peninsula, is from December 1 to February 1, a period of two months. Fox skins in this section positively are not at their prime before December 1, and if the open season extends beyond February 1 the hunting of foxes will most likely interfere with the breeding season. Furthermore, the fur has already commenced to decline by the latter date, and for this reason alone the animals should not be hunted later.

Trapping for breeding purposes.—The trapping of wild fur-bearing animals for breeding purposes should be permitted in order that fur farms may be stocked, but this practice should be regulated by the strictest measures. Undoubtedly this privilege has been grossly abused, and we see in it, unless properly regulated, a means whereby the wild foxes, particularly of Kodiak Island, are likely soon to be exterminated. The method of trapping has also been anything but humane, and this is an important matter that should be given due consideration. In the promulgation of regulations governing the taking of wild fur-bearing animals for breeding purposes we think the following points should be considered:

Season for trapping breeding stock.—The trapping of foxes for breeding purposes might safely be permitted from August 1 to December 1, and, of course, throughout the open season. If trappers are permitted to take foxes earlier than August 1, however, there is going to be a great temptation to dig the pups from the burrows, and this is a thing that should be absolutely prohibited. As a rule the foxes here whelp

during the month of May, but as we know from experience, this might be as late as the 12th of June. The pups are usually about 2 months old before they leave the burrows, so the reason for preventing trapping before August 1 is obvious.

Method of trapping breeding stock.—Our experience this year in purchasing foxes which had been caught in steel traps convinces us that this means of capturing animals for breeding purposes should be strictly prohibited. In almost every instance the foxes brought to us have been so badly injured by broken legs and lacerated flesh that a surgical operation has been necessary. In several instances the animals had been in the traps so long—owing, no doubt, to the fact that the trapper had neglected to go over his trap line for a number of days at a time—that the flesh of the injured legs had commenced to decompose before we could have the opportunity of giving them proper attention. Aside from the cruelty in this practice, the vitality of an animal that has undergone such suffering must have become greatly impaired, a thing that should be avoided when the fox is to be depended upon for breeding purposes. A person who constantly handles these animals soon becomes as attached to them as he would to a pet dog; they show many signs of affection when kindly treated, and such cruelty as has been exhibited to us naturally becomes repulsive.

Again, we are firmly of the belief that trapping for live foxes with steel traps is most destructive to the species at large. While we have no positive evidence, we are reasonably sure that many of the foxes caught in this manner during the past season have died, or have been so maimed that they will ultimately die of their injuries. In making it known that we were in the market for foxes for stocking our ranch, we agreed to take only blacks; so this is the only variety, with the exception of a few crosses, that was brought to us. Surely many reds and crosses must have been caught, and if we can judge their condition when liberated by that of the foxes we bought, they must have been in a sorry plight indeed. One native hunter who brought us a single black fox told us that he had trapped no less than 24 reds and crosses during the month of August, but had liberated them all; but from another native we learned that at least 6 of these foxes were dead when found in the traps, and that others were badly crippled when turned loose. Judging from the percentage of black, red, and cross fox skins usually collected at Kodiak, and taking into consideration the number of live black foxes brought to us this year, we think we are safe in saying that at least 100 red and cross foxes were either killed or maimed by reason of the trapping operations since the close of the last fur season. Our recommendation is that regulations on this point should be very strict, and we beg to offer the following suggestions:

1. Any regulation governing the method of trapping wild foxes for breeding purposes should provide that no steel spring traps be used. We have repeatedly advised the trappers that the jaws of their steel traps should be wrapped with cloth to prevent so much injury, but to no avail; so we recommend that the use of steel traps in this connection be absolutely abolished. A regulation covering this point should provide that only humane methods be used, and no traps that might kill or injure the animals should be permitted except during the open fur season. We think that some kind of a box trap, made either of wood or metal—such as is used, for instance, by many of the blue-fox ranchers for capturing foxes liberated on islands—could be effectively contrived so as to answer all purposes. It is probably true that fewer foxes would be caught in this manner than with the use of steel traps, still the animals would be in far better condition, and for that reason of more value. Then, again, during the season recommended for the trapping of live foxes there are a great many young animals not so cunning as the mature ones, and these could most likely be caught as easily by one method as another.

2. Persons should not be permitted to trap for live foxes during the period from August 1 to December 1 without first securing a license. In order to facilitate the

process of securing such license, an arrangement might be made whereby same could be issued by a deputy marshal, United States commissioner, or even a postmaster in districts that are remote or where there is no fur warden or other representative of the Department of Commerce. Such licenses should be numbered and should be issued for a given number of traps. It is also suggested, in order that a fur warden in the field might recognize or identify traps found, to have all traps tagged. It should further be provided that any person receiving such license must make returns, showing the number and variety of animals caught, where and to whom disposed of; also, that persons purchasing live foxes caught in the wild must make returns stating from whom purchased and the number of the license under which caught.

3. If the fox ranchers, the trappers, and fur dealers of Alaska are to be fully protected, then the exportation of breeding stock taken from the wild must be stopped, especially to foreign countries. Only ranch-bred stock should be allowed to leave the Territory and then only under permits issued to legitimate fox ranchers. The privilege granted to certain parties in the past to ship wild foxes from Alaska has been greatly abused, we think, and to the detriment of the fur business in the Territory. Many of the foxes shipped out have been bought by Canadian speculators, who have paid comparatively low prices, but who have used the animals to further the interests of some of the companies that have been organized for excessive amounts. This traffic has been greatly remunerative to the Canadian fox-ranching interests; but very little benefit has been derived for Alaska and, as a matter of fact, the furs produced in Canada from this stock come into direct competition with Alaskan furs. We are firmly of the belief that, if the fur business of Alaska is to be fostered, the exportation of breeding stock should be so regulated as to discourage it to a large extent.

Another matter of vital importance to the fox ranchers of Alaska is the lack of laws that will permit those engaged in the business to acquire title to the islands along the coast that are suited to the business. This lack, we believe, will greatly retard large-scale ventures, for people will be unwilling to invest the amounts necessary to make fox ranching an important industry unless they have assurance that their titles will be secure. The system of leasing the islands for a short term of years is entirely inadequate. It has already been shown that a considerable amount of capital is required to establish a ranch, and this fact is going to make it necessary to raise money through incorporation where the business is undertaken on a large scale. Without full protection as to property rights, however, it will not be possible to get capital to invest.

OTHER FOX FARMS IN KODIAK-AFOGNAK REGION.

The following information in regard to various fox-farming operations has been furnished the office:

Carlson & Smith, of Uyak, have a ranch at Uyak Bay, Kodiak Island. In 1914 three corrals were built. The stock consists of black and cross foxes.

Peter J. Petrovsky, of Uyak, has a ranch on Amok Island, Uyak Bay. In 1914 eight pairs of cross foxes, caught in the winter of 1913-14, were liberated on this island. There are also two pairs of black foxes in corrals on this ranch, caught from wild stock in 1914.

Alex Friedolin, of Afognak, has a blue-fox ranch on Hog Island, a small wooded island near Afognak. The foxes are permitted to run at large. This island was stocked with cross foxes by Johansen & Christensen in 1897, and a few years later some black foxes were introduced. Shortly afterwards all the foxes on the island disap-

peared. The island was again stocked by Johansen & Christensen, this time with blue foxes, and in 1904 Mr. Friedolin became the owner.

Charles Peterson and Charles Eckstrom stocked Dry Island, situated between Kodiak and Afognak Islands, with black foxes in 1894. About the year 1904, after a long period of experimenting with black foxes with but indifferent success, all the animals were killed off and the island restocked with blue foxes. Since the introduction of blue foxes considerable success has been attained, owing, most likely, to the exceptional care and attention given the business. The foxes have been allowed to run at large on the island, but have become very tame, and in several instances litters have been found under the ranch buildings. The quality of the fur produced has been above the average. A large stock of dried salmon has been prepared each summer, to be used for winter feeding, and fresh fish such as cod, halibut, etc., have been fed whenever obtainable. In the early part of 1915 Charles Eckstrom's interests were transferred to Charles Pajoman.

Ingwald Loe, of Afognak, established a fox ranch on Raspberry Island in 1911. It is understood that the work was limited in character, and in 1915 the entire stock was sold to the Kodiak Fox Farm. It is said that Mr. Loe proposes to stock his ranch with black foxes in the near future.

Charles Pajoman, of Afognak, stocked a ranch on Raspberry Island, near the Loe ranch, in 1912. Twelve corrals were built and four pairs of blue foxes were introduced the first year. The stock of blue foxes was increased later and a few black foxes were also added. Little or no success was had with the blue foxes, and in 1915 the stock was sold to the Kodiak Fox Farm. It is understood that Mr. Pajoman proposes to continue work with the black foxes and to move his corrals for breeding these animals to Dry Island.

Frank Lowell, of Kodiak, stocked Ugaiushak Island with three female and two male blue foxes from North Semidi Island in 1915. It is understood that the foxes were liberated but that an attempt will be made to breed them in corrals.

John Tashwak, a native of Afognak, captured in 1914-15 a number of foxes which he liberated on a small island in Marmot Bay, near Afognak. He reports having a stock of 4 red, 9 cross, and 4 silver-gray foxes. No young were born in 1915.

I. P. Chichenoff, of Kodiak, purchased a pair of foxes, one red and one cross, about January 1, 1915, and liberated them on a small island about 2 miles from Kodiak. The island is bare and contains only a few acres. The only fresh-water supply is from rain which accumulates among the rocks.

M. D. Snodgrass, of Kodiak, recently liberated on Kalsin Island, about 12 miles from Kodiak, a number of cross foxes. This island was formerly occupied as a blue-fox ranch.

Frank Peterson, Uyak, has a fox ranch on a small island near the mouth of Red River. In 1911 Mr. Peterson turned loose one pair of black foxes on the island. It is said that he has had a good increase and that several animals have been sold for breeding stock. In one instance he sold a pair of pups for about \$600.

August Olson, Kodiak, has a fox ranch on Ugak Island, near the entrance to Ugak Bay, Kodiak Island. This island was first stocked by Oliver Smith in 1891. Black foxes were first placed on the island, and about 3 years later a few pairs of blue foxes were added. As appears to be always the case when black and blue foxes are placed together, the blue foxes were soon exterminated. O. B. Anderson came into possession of this island about 1901, and he operated it until 1912, when his interest was transferred to Mr. Olson. During the period that Mr. Anderson owned the ranch there were probably 100 black fox skins taken, and as a rule the quality of fur produced was above the average.

Abraham Gregoroff, Uzinki, Kodiak post office, about 10 years ago stocked a small wooded island, known locally as Abrams Island, near the northern end of Spruce Island, with a few blue foxes. Owing to the rocky shore line of the island the natural supply of food is limited and the ranch has not been very productive. In 1898 Gregoroff also stocked Noonjak Island, another small island near Spruce Island. The original stock consisted of one pair of blue foxes, and probably a total of 40 in skins and live animals have been taken.

Albert Johnson, Uyak, stocked a ranch on Amook Island in 1912 with 6 pairs of blue foxes, all of which were placed in corrals. About April 15, 1914, having had no increase from the foxes after two seasons, Mr. Johnson abandoned the Amook Island ranch and liberated all his foxes on Harvester Island, at the entrance to Uyak Bay. Three weeks after this one of the females gave birth to a litter of young.

In 1915 three natives of Uzinki put some stock on small islands adjacent to Spruce Island, as follows:

Nick Michael placed 4 black foxes on a small island near Nelsons Island.

John Katelnikoff placed 2 black and 4 cross foxes on a small island known as Low Island.

Fred Squartsoff placed 1 pair of cross foxes on a small unnamed island near Uzinki.

EARLY FOX FARMING IN THIS REGION.

The following account of earlier fox-farming operations in the Kodiak-Afognak region, included in Mr. Erskine's report of the Kodiak Fox Farm, is of so much interest that its publication seems desirable.

Remarks under this head will refer to a history of fox farming in the vicinity of Kodiak and Afognak Islands. Information has been gathered from those old-time residents in this section who have had to do with the fox ranches, and reference has been made to the chapter touching this subject as contained in Bureau of Fisheries document no. 797. While we believe the following information is fairly correct, especially as regards essential points, still we must reserve the right to rectify any inaccuracies that might occur. Consideration must be given the fact that the Semidi Propagating Co. was probably the only concern that kept any kind of record regarding fox-breeding operations, so we are of necessity forced to rely to a large extent upon the memories of those now residing in Kodiak and who are familiar with the subject.

The earliest reliable record we have of fox farming in this vicinity was on Long Island, the island now occupied by the Kodiak Fox Farm. This island was first taken up by Capt. F. F. Feeney in 1880, and two pairs of black foxes were placed on it, the animals having been secured from Knik, Cook Inlet. A few sheep and some cattle were also introduced; a dwelling and several outbuildings were constructed, and farming in the way of raising garden truck and hay was done. During the winter of 1881-82 the natives raided the island and killed off all the foxes, some 12 or 14, and no further attempt was made to raise foxes for some years. The island was still maintained, however, as a stock ranch. In 1889 Capt. Feeney secured two pairs of Kodiak black foxes with which he again stocked Long Island, and in 1895 he sold the ranch, together with all stock, to the Semidi Propagating Co. for the sum of \$8,000. The stock at this time consisted of 8 black foxes, 45 head of cattle, and a number of sheep. The number of fox skins produced from 1889 until the island was sold is not known, but there could not have been many. The native hunters were inclined to poach on the ranch and their raids kept the stock of foxes down to a minimum. The operations on Long Island under the management of the Semidi Propagating Co. will be taken up elsewhere in this report.

Fox farming to a limited extent was probably carried on by the Russians before the American occupation, although reliable information on this matter is lacking. We doubt if any intensive efforts were exerted along these lines; but it is possible some black foxes were introduced from the Cook Inlet country and liberated on a few of the islands in the vicinity of Kodiak. Reports to this effect are current, but if such was the case, the animals were most likely killed off many years ago, and probably before the Americans took possession of the Territory.

SEMDI PROPAGATING CO.—The Semidi Propagating Co., a corporation, was the first large concern to undertake the raising of foxes in Alaska. Aside from their operations in Alaska, this concern purchased an island on the Maine coast and stocked it with blue foxes. This venture, however, was not a success. Their chief efforts were exerted in Alaska, and at different times they stocked North Semidi, South Semidi, Ukamok (Cherikoff), Long, Whale, and Marmot Islands. We will take up the operations on each of these islands as follows:

NORTH SEMIDI ISLAND.—This was the first attempt on the part of the Semidi Propagating Co. to stock a fox ranch, and in 1885 some 8 or 10 pairs of blue foxes were liberated on this island. Additional stock was placed on the island on several different occasions, and in a very few years this ranch proved quite productive. In 1907 the stock had become so reduced that no killing was done by the company for several years,

although during that period probably 50 skins were taken by poachers. It is also believed that poison was used by the trespassers, for evidence of this was found when the island was visited last year. In 1914-15, 35 animals were taken, 26 skins, and 9 live foxes for breeding purposes.

SOUTH SEMIDI ISLAND.—About 1886 or 1887 this island was first stocked. Three or four pairs of blue foxes from North Semidi were introduced, and one black male fox was also liberated as an experiment to ascertain if these two species would cross. Within a few months, however, the black fox had exterminated all the blues on the island, so this animal was finally hunted down and killed. South Semidi was again stocked about the year 1891 with about 18 pairs of blue foxes. Most of these came from North Semidi, but we believe a few were also brought from one of the Pribilof Islands. The original lot of foxes put on North Semidi came from the Pribilofs, and we believe the company made several shipments of blue foxes from these islands to furnish stock for their ranches. About 1896 black foxes again caused havoc among the blues. The previous year a small island adjacent to South Semidi was stocked with a few black foxes taken from Long Island. These animals soon found a way to cross the narrow strip of water separating the two islands, and they immediately started their depredations on the foxes of South Semidi. This was discovered, however, before a great deal of damage had been done, the black foxes were all hunted down and killed, and the island eventually became a large producer of blue-fox skins.

UKAMOK (CHERIKOFF) ISLAND.—This island was first stocked about 1891, when 6 or 8 pairs of blue foxes from North Semidi were liberated here. Other stock was added on several occasions, and probably some blue foxes were brought from the Pribilof Islands. Ukamok eventually became the largest producer of blue-fox skins of any of the islands stocked by the Semidi Propagating Co. This island is 15 miles long by about 3 miles wide, and is so situated as regards ocean currents that a large quantity of drift is deposited upon the beaches, thus insuring an ample supply of sea food. From 1902 to 1913, both years inclusive, 866 blue-fox skins were taken from this island. Probably no less than 100 pairs of breeding animals were sold during that period, and in 1914, 11 pairs of live foxes were taken to stock the ranch of the Kodiak Fox Farm. This makes a total of 1,088 foxes taken during the 13 years accounted for, or an average of 83 per year. Under present market conditions for blue-fox skins the results of catches from this island would have shown a handsome profit to the owners; but it so happened, during the years when the large catches of foxes were made, that the prices were particularly low. For instance, in 1903, when 149 blue-fox skins were taken from Ukamok, the average net price realized was only \$8.70 per skin. Under present conditions these should have netted the Semidi Propagating Co. no less than \$8,000, instead of the small sum of \$1,296.30.

LONG ISLAND.—This island was purchased from F. F. Feeney, as previously stated, and the foxes on it at the time the Semidi Propagating Co. acquired title, 8 black foxes, were put on a small island near South Semidi. (See remarks under South Semidi.) Shortly after its purchase, Long Island was stocked with blue foxes, about 30 pairs having been taken off North Semidi for this purpose. Long Island became very productive, and the quality of the fur was probably superior to that secured from any of the other islands belonging to the Semidi Propagating Co. The largest number of foxes killed during a single season from any of the islands was on Long Island in 1903, when 209 blue-fox skins were taken. This was the year, however, when prices were exceptionally low for all kinds of fur, so the result of the sale of these skins was quite a disappointment to those interested.

WHALE ISLAND.—This island was stocked about 1899 with blue foxes from Long Island. The largest catch ever made on this island in a single season was in 1908, when 45 skins were taken. This is a large island, and its natural conditions should have made it an excellent one for raising foxes. Unfortunately, however, Whale Island is situated too close to a large native village, and is too large for one man to watch.

Undoubtedly this island was constantly raided, and this fact probably accounts for the small production of fur. The last time the company secured any skins from Whale Island was about three years ago, when two hunters were sent from Kodiak with instructions to shoot or trap all the foxes possible. At this time only 3 pelts were obtained, but the hunters reported finding no less than 13 carcasses of young foxes in steel traps. The company did not use steel traps, so those discovered must have been set by poachers. Also, the fact that the traps were put out in a season when young foxes would be caught is conclusive evidence that an attempt was being made to secure live animals for breeding stock, for the furs taken at this time of year would have been worthless.

MARMOT ISLAND.—We have no information that blue foxes were ever placed on this island; but at some time during the period of operations of the Semidi Propagating Co. black foxes were introduced. The venture, however, was not a success, and Marmot Island was abandoned by the company some years ago.

While the Semidi Propagating Co. has been an important factor in the development of fur farming in Alaska, to the extent that their experience has been of value to others who have attempted this business, still their operations from the standpoint of an investor have not been a success. Little was known of the best methods to follow when this company first undertook the raising of foxes, and naturally many mistakes were made. The prices of blue-fox skins during the years of their greatest production were but a small fraction of their present values, so returns, even in the best seasons, were small. Operating costs were also very high; much expensive food, such as corn meal, was fed, and several of the islands being situated so far from the base of supplies made the cost of transportation quite excessive. The only islands upon which the company now have foxes are Ukamok, North Semidi, and South Semidi, and the numbers have been so reduced on these that it will be several years before any quantity of furs can be taken.

Of a number of cattle which the Semidi Propagating Co. introduced on several of their islands, some are still to be found on Whale and Ukamok Islands.

Following we give a list, by years, of the blue-fox skins produced by the various islands operated by this company from 1890 to 1914, both years inclusive. We are unable to give the figures from each ranch separately, but the list includes all fox skins taken from the islands mentioned above, with the exception, of course, of Marmot Island:

	Number.		Number.		Number.
1890.....	73	1900.....	300	1909.....	145
1891.....	60	1901.....	373	1910.....	15
1892.....	92	1902.....	357	1911.....	None.
1893.....	119	1903.....	714	1912.....	3
1894.....	115	1904.....	401	1913.....	85
1895.....	158	1905.....	441	1914.....	73
1896.....	166	1906.....	261		a 31
1897.....	165	1907.....	310		
1898.....	327	1908.....	74	Total.....	5,101
1899.....	243				

^a Live foxes.

In addition to the above there were at least 200 pairs of live foxes sold for breeding stock, so the total number of animals taken from these islands is not less than 5,501.

FOX FARMS IN THE COPPER RIVER DISTRICT.

The Bureau has obtained a record of a considerable number of persons who are interested in the fox business in this region. It is apparent that in many cases the operations are carried on not pri-

marily for the purpose of breeding and rearing foxes but rather for the purpose of trafficking in foxes.

Among those who are really interested in the breeding and rearing of foxes are the following:

1. The Alaska Fur & Silver Fox Co., with headquarters at Seattle, Wash., has operated a fox farm at Dry Creek since June, 1910. Notwithstanding the fact that the company had men in charge of their farm who were well qualified to handle stock and were interested in their work, but little success attended their efforts to breed foxes in 1915, only one litter of pups being raised. It is reported that the company intends to start another farm near South Bend, Wash.

2. C. L. Hoyt, of Gulkana, has a fox farm at that place. While Mr. Hoyt has studied the matter seriously and has endeavored to employ improved methods in his operations, the results obtained have been far from successful. It is estimated that he has spent approximately \$10,000 in building suitable corrals.

3. Mrs. Nellie Yager has started a fox farm at Sourdough. Three wire pens, 25 feet by 25 feet by 10 feet, with covered wire tops, were built in October, 1915. Her start is being made with two pairs of silver foxes obtained by purchase.

It is understood that the Copper River Valley produces excellent furs and that the section is a favorite one among fur buyers.

FOX FARMS ON THE TANANA RIVER.

Fox farming is practiced to some extent along the Tanana River. The operations of George L. Morrison, Hot Springs; Sam Brown, Hot Springs; and the Vachon farm, Tolovana, are noted. Mr. Morrison has gone into the business on a comparatively large scale and has attained a considerable degree of success in the matter of breeding. He has probably one of the best equipped farms in Alaska and his investment is large. The Brown farm appears to have been, from the report received, of a rather improvised character. Details in regard to the Vachon farm are not at hand.

FOX FARMS ON THE YUKON RIVER.

A number of operators were reported from along the Yukon, including George Rouse and Fred Stock, Tanana; Alfred's farm, E. B. Clark, and Williams & Brown, at Ruby; D. W. Lewis, Yukokakat; A. Noller and A. J. Stockman, Loudon; J. W. Evans, Koyukuk; Los Feger, Nulato; Shepherd & Edwards, Old Hamilton.

Roy L. King and Ernest King have a fox farm on the Koyukuk River, a tributary of the Yukon, at a point 20 miles above Bettles. Their farm has been located there since 1914, and in April, 1916, the stock consisted 11 cross foxes and 5 silver foxes.

At Rampart there is a fox farm which was established in 1913. This farm is owned by Clem Anderson, and the results which he obtained from a very medium grade of foxes are worth noting. In the year 1914 a pair of cross foxes produced a litter of 3 crosses, 1 silver, and 2 reds. From the same pair in 1915 he obtained 5 crosses and 3 reds. Another pair of crosses in their first litter in 1915 produced 5 crosses and 1 black. Also in 1915 he obtained from a pair of red foxes a litter of 6 red foxes and 1 silver. His foxes are very tame and he feeds them on a diet of fish and rabbits. His farm is located on a high, dry bank of the Yukon and has cost him about \$5,000.

MISCELLANEOUS FUR FARMING.

Fox farming is carried on to some extent on the islands westward of the Kodiak-Afognak group, though the Bureau does not have complete information in regard to individual operations. The Department of Agriculture has jurisdiction over matters pertaining to the propagation of fur-bearing animals within the Aleutian Islands Reservation and is endeavoring to assist the natives in work of this kind.

Andrew Grosvold, of Sand Point, Alaska, has been interested in blue foxes for a number of years. He states that he has placed foxes on Caton, Sarana, and Omla Islands, of the Sannak group; Chernabura and Big Goose Islands, of the Sandman Reefs; and Andronica, Bird, and Chernabura Islands, of the Shumagin group. Mr. Grosvold also has a lease from the Department of Commerce for the use of Little Koniuji Island, Shumagin group, for fur-farming purposes. J. C. Smith, of Sand Point, Alaska, has a similar lease for Simeonof Island. It is understood that 10 pairs of blue foxes were placed on Simeonof Island in 1895; that no trapping was done until in 1901, when 50 skins were taken, 125 in 1902, 80 in 1903, 34 in 1904, 62 in 1906, 46 in 1908, 34 in 1910, 14 in 1911, 10 in 1912, and 12 in 1914.

Joseph Voelkl and Ben Waiczunas, Eighteen Mile Post, Haines, reported having a stock of 1 black, 16 cross, and 2 red foxes, and 9 minks.

Thomas Steffensen and Wm. V. Perry, of Eureka, reported a stock of 4 foxes and 11 minks.

John Fanning, of Wrangell, reported a stock of 3 martens and 3 minks.

L. G. Michael, of Franklin, had in his possession a number of foxes in 1915. One litter was born in that year.

Alex. A. Seaholm, of Hot Springs, reported a stock of 6 cross foxes and 4 martens.

Isaac Fisher, of Anvik, reported a stock of 6 foxes.