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OFFICE OF EXPERIMENT STATIONS,
A. C. TRUE, DIRECTOR.

ANNUAL REPORT OF THE ALASKA AGRICULTURAL
EXPERIMENT STATIONS FOR 1902.

BY

C. C. GEORGESON,
Special Agent in Charge.

[Reprint from Annual Report of the Office of Experiment Stations for
the year ended June 30, 1902.]

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The agricultural work during the current year at the Alaska experiment stations may be briefly summarized as follows:

At the headquarters station we have grown experimentally all the leading hardy grains, grasses, and vegetables. We have made a start toward the establishment of a nursery by the propagation of a number of currant, gooseberry, and raspberry plants; by procuring a small collection of hardy fruit trees, hardy ornamental bushes, and perennials, and also a collection of some 10 varieties of strawberries.

The headquarters building has been partially completed in that the stone foundation, which the plans called for, has been filled in between the piers on which the building was erected, the porch has been completed, the stairs built, and two rooms have been finished upstairs. Besides this, a heating plant should be put in the building and the other two rooms in the second story should be finished, and arrangements are being made to have this work done during the winter.

On the farm, a kitchen and a porch have been added to the cottage, a blacksmith shop has been built, the roof of the barn has been extended so as to cover the silo, and the silo itself has been enlarged by building it 8 feet higher.

In the way of improvement of new land comparatively little has been done on account of the unceasing rains. We have cleared about half an acre and finished the under drainage of the 2 acres of marsh land referred to in former reports.

Seed has been distributed to about 750 residents in all parts of the Territory, and Bulletin No. 1, entitled "Suggestions to Pioneer Farmers in Alaska" has been issued.

At the Kenai Station experimental crops of all the hardy grains and vegetables have been grown. About 8 acres of new land have been cleared and made ready for the plow, and a beginning has been made in animal husbandry by the acquisition of a cow and a calf.

At the Rampart Station small patches of winter rye, spring wheat, barley, and oats have been grown to perfect maturity by one of the residents of the town. We have no one regularly employed at this station.

Perhaps the most important work of the season has been the establishment of an experiment station in the Copper River Valley. A competent and experienced man has been placed in charge of this new station. Some patches of ground have been dug up by hand and seeded to winter grain, and 8 acres more have been cleared and made ready for the plow as soon as spring opens. A team of horses has been acquired for this station, and the necessary agricultural implements with which to begin work have been purchased.

We have, in addition, as in former years, maintained meteorological and soil temperature observations at our several stations, and the writer has had supervision of all the voluntary observers of the Weather Bureau in Alaska, and, as a matter of course, the constantly increasing volume of correspondence has been maintained.

WORK AT SITKA STATION.

WEATHER CONDITIONS.

For the first time during the five seasons these investigations have been in progress, I have to report unsuccessful efforts in grain growing, owing to excessive rains. The early part of the season was promising. During April, May, and June we had more than the usual amount of sunshine. The soil dried out well for spring planting and all the crops were put in under auspicious conditions. They made an excellent start and until the end of June there were prospects for the best crops yet produced, but then the good weather ceased. During July we had but 4 clear days, and during August and September together only 1 clear day, or to be more exact, we did not have a single clear day between July 9 and September 18. That is, for a period of 69 days in succession, during the time when growing crops need sunshine the most, we did not have a full clear day. The sun would come out for an hour or two occasionally, but seldom enough to dry the rain off vegetation and never enough to dry the surface of the ground. It rained on 74 days out of the 92 days in July, August, and September, and the precipitation amounted to nearly 3 feet, lacking but one-quarter of an inch. The result was that the grain continued to grow abnormally late and when it finally matured it was almost impossible to save it. We had to adopt methods which would not be practicable where farming operations are carried out on a moderately large scale. We had to set the grain up against fences and other artificial supports to drain the water off, and when the wind had partially dried out the heads we had to watch our chance to put it under shelter. Some of it was tied in small bunches and hung up in the barn and elsewhere, where air currents could dry it out. By these means we have succeeded in saving all of our rye and wheat and part of the barley and oats, but, of course, such methods are not to be recommended for any but small farms.

It is to be noted that there was no crop failure. Vegetation was most luxuriant. Wheat stood between 4 and 5 feet high and rye over 6 feet. Nor was there any detrimental cold weather. As a matter of fact, the growing season has been very long and the temperature favorable throughout. The temperature did not fall to 32° F. between April 26 and October 18. The unfavorable conditions were due wholly to an abnormally heavy rainfall. Similar conditions are of course constantly occurring in the States also. It is often the case in Washington and Oregon west of the mountains, and in other places and over vast areas even more disastrous results are occasioned by the lack of rain. This instance should therefore not be considered as disqualifying Alaska for successful agriculture. Moreover, only the coast region has been affected. In the interior grain has been successfully brought to maturity at several widely separated places. This explanation is pertinent before we take up the crops in detail.

FIELD CROPS.

As former tests have narrowed down the number of varieties which do well here, the list selected for the present year's experiments is not a lengthy one.

WINTER RYE.

Ereksior.—This variety of winter rye was seeded on a small patch September 7, 1901. It came up well and made a fine start, but it suffered somewhat from too much wet during the winter. It began to grow early in the spring. By May 15 it was 16 inches high. It began to head May 24. On June 2 the average height of the patch was 42 inches, and three-fourths of it was headed. June 16 it was fully headed, and 5 feet 8 inches in height. June 23 it was in full bloom. July 1 it had passed the blooming stage and was forming grain. It then averaged 6 feet in height. July 15 some of the grain was in the milk and the crop stood 6½ feet high. August 1 the heads were heavy with grain, much of which was in the dough, and the straw had begun to color. August 15 it was far enough advanced to be harvested had the weather permitted; but as it had a strong, elastic straw, which stood up well during the storms, it did not suffer. September 1 it was fully ripe, but still left standing to await favorable weather. September 9 it had begun to break down and was therefore cut and placed in a drafty place on the barn floor to dry, by setting it up against improvised supports.

The heads of this variety are rather short and the grain is not large. The writer does not consider it quite as good as the Swedish winter rye reported on last year. Its ability to stand up during stormy weather is an important qualification for Alaska, and it may be added to the list of varieties which can be grown successfully in the Territory.

WHEAT-RYE.

Carman wheat-rye.—The late Mr. E. S. Carman, proprietor of the Rural New Yorker, originated a hybrid between wheat and rye, and we succeeded in securing a small amount of the seed from J. M. Thorburn & Co., seedsmen, in New York. This grain was seeded on a small plat adjacent to the rye just mentioned and on the same date, September 7. It made a fair start and grew slowly during the fall. During the winter many of the plants were killed out by wet weather. Those which remained started to grow early in the spring, but the growth was slow. June 2 it was 2 inches high and the stand thin. June 16 it was 26 inches high and considerably improved. June 23 it was heading and beginning to bloom. July 1 it was fully headed and in full bloom. July 15 the grain had formed. It stood up well, measuring $4\frac{1}{2}$ feet, and seemed more promising than spring wheat. August 1 the grain was passing from milk to dough. The heads were short, but well filled, and on August 15 it was beginning to ripen. A few plants seemed to be earlier than the rest. September 1 it was ripe, but not harvested on account of the weather. September 9 the grain had started to sprout in a large percentage of the heads, although the straw stood upright. It was then cut and dried under shelter. Most of the grain raised was seeded at once in order to perpetuate the strain.

This variety, although an alleged hybrid between wheat and rye, resembles wheat. Its appearance does not give the slightest suspicion of rye, excepting, perhaps, the quality of a more than ordinarily strong and elastic straw. But the straw is thick and yellow in color, not slender and pale, as in the rye straw. The heads are brown, mostly smooth, though a few have beards of moderate length; the spikelets are broad and rather far apart, and the grain resembles plump white wheat. It is hoped that in another year we may get grain enough to test it in different places and on a larger scale.

SPRING WHEAT.

We grew two patches of wheat the past season, one on old ground and the other on new ground. Both were seeded with the same variety, namely, the Romanow, which previous tests have proved to be the variety best adapted to Alaska.

Romanow (on old ground).—Seeded on May 2, by May 10 it showed a fine stand. June 2 it was 8 inches high and growing rapidly. June 16 it showed a magnificent stand and growth. It was then but 6 weeks from the time of seeding, yet it was on an average 18 inches high, and the best was 2 feet high. July 1 it was 27 inches high and had tillered so as to make it rather thick in places. July 15 it was headed. The rain storms had set in and caused it to lodge in places. If it should all lodge, the crop would be a total failure, so to save it we



FIG. 1.—ALASKA STATIONS—OAT FIELD, SITKA.



FIG. 2.—ALASKA STATIONS—STATION BUILDING, SITKA.

stretched strings at intervals to support it. It was then passing out of bloom. August 1 the crop stood 4 to 5 feet high and the grain was mostly in the milk. August 15 the grain was passing from milk to dough and the straw measured upward of 5 feet. September 1 most of it was still in the dough, though some was beginning to harden. At this date many new heads were appearing from young shoots, which were, of course, too late to mature grain. This was caused by the persistent rain. September 15 it was ripe enough to cut, if it had been dry, but it was left standing to await fair weather. It was finally cut September 23 and hung under shelter October 1. At this date some of the grain had started to grow in the heads.

Romanow (on new ground).—Seeded May 12. June 2 it was 3 inches high and showed a fair stand. June 16 it was 6 inches high and looked well. July 1 it was 15 inches high. July 15 the best was 2½ feet high, but the average not more than 2 feet. It had not begun to head at this date. August 1 it had headed and was in bloom and 3 feet high. August 15 most of it was still in bloom, though the grain was half grown in the earliest heads. At this date it ranged from 4 to 4½ feet in height and stood up well in spite of the storms. September 1 the earliest heads were in the milk and most of the grain was only half grown. September 15 the grain was full grown, but still green. October 1 it was beginning to ripen, and it was harvested October 15. It did not lodge badly.

OATS.

Sixty-day.—This variety was imported by the United States Department of Agriculture from Finland. It was seeded May 8, germinated rather slowly, and did not make much of a show above ground until May 24. June 2 it was 2 inches high and stand uneven. June 16 grass and weeds began to crowd the crop, which averaged about 6 inches high. July 1 the average height was 12 inches, though the best of it was 1½ feet and heads beginning to show. July 15 it was all headed and in bloom; height, about 18 inches. August 1 the grain about half grown; height, 2 feet 4 inches. August 15 the grain was passing from milk to dough. It had lodged in spots. September 1 it was ripe and could have been harvested if weather had permitted. It was finally cut September 11, and suffered much from the wet. Part of the crop was saved for seed by drying it in the barn. Like other varieties of oats, it is not a heavy yielder, and the straw is slender, so that it does not stand up well. The grain is small and yellow. Its earliness is its chief recommendation.

North Finnish Black (on new ground) (Pl. IX, fig. 1).—Seed grown at Sitka Station in 1901. Seeded May 28. June 16, 3 inches high. July 1, 8 inches high; stand somewhat uneven. July 15, the best is 18 inches high; growth still uneven. August 1, 4 feet high.

It makes a fine showing and at this date it is the most promising variety of oats at the station. August 15, the earliest seed is in the milk. The crop is not advancing evenly; there are many young shoots in various stages of growth. September 1, the earliest panicles are ripe, but the crop as a whole is still green and it is lodging in places. September 15, ripe, and could be harvested if the weather permitted. October 1, still awaiting dry weather. October 23, harvested but in poor condition. The straw was beaten down by the rain and the grain was very largely spoiled.

Burt Extra Early (on new ground).—Seeded May 27. June 16, it was 3 inches high and showed a good stand. July 1, the growth was uneven, average height 10 inches. July 15, growth irregular, the best 16 inches high; a few heads showing. August 1, 3½ feet high, headed and beginning to bloom. August 15, the earliest of the grain is half grown, but some panicles still in bloom; growth uneven. September 1, it has thrown out suckers from the roots, which are later than the earlier panicles. As a whole the crop is still green and it has lodged in places. The best is 4 feet tall. September 15, the crop is ripe and would be harvested if the weather permitted. October 1, the whole plat flat on the ground and being spoiled by wet weather. It was cut for feed.

Swedish Select (on new ground).—Seed obtained from the Montana Experiment Station. Seeded May 28. June 16, 3 inches high and a good stand. July 1, average height 8 inches, and the crop looks promising. August 1, 3 feet high, fairly even in growth, heading out, but not in bloom yet. August 15, in bloom and seed beginning to form; 4 feet high. September 1, grain in the milk. It has a good straw and stands up well under the strain of severe storms. Best, 4½ feet high. September 15, the crop is ripe and could be harvested if the weather permitted. October 23, cut; harvest has been delayed on account of the rain. This variety has suffered comparatively little. The grain is large and plump.

White Russian (on new ground).—Seeded May 27. June 16, 2 inches high and a good stand. July 1, the growth is uneven. It looks well only in spots; 6 inches high. July 15, growth continues irregular, the best 20 inches high; not heading yet. August 1, it varies in height from 6 inches to 4 feet, headed out. August 15, has made but little progress in the last two weeks. September 1, in bloom and grain forming. The irregular growth is due to the soil. The crop will be useful only as feed. This variety has been grown very successfully at this station in former years.

Improved Ligova (on new ground).—Seeded May 27. June 16, 2 inches high and a fine stand. July 1, only one-half of the plat looks well; the other half is stunted, the best 6 inches high. July 15, growth irregular, the best 16 inches high, not heading yet. August 1, 3½ feet

high, headed, but not in bloom. August 15, in bloom, but otherwise no improvement. September 1, grain forming, crop fit for feed only. This variety has been grown successfully at this station in former years. The uneven growth is due to the soil.

BARLEY.

Mansbury (on new ground).—Seed obtained from Minnesota Experiment Station. Seeded May 15. Came up May 27. June 2 it was 3 inches high and showed a fine stand. June 16, 5 inches high, a little irregular in growth. July 1, the best is 15 inches high. July 15, heading out, height 2 feet. August 1, 3 feet in height and the earliest grain in milk. August 15, most of it still in the milk and crop looks well. September 1, beginning to turn yellow. September 15, ripe, and harvested September 18.

Lapland.—Two patches were sown in this variety, one with Sitka-grown seed of last year's crop, and one with imported seed from Lapland. The two patches behaved alike in all particulars and it was impossible to detect any difference in growth. The two are therefore treated here as one. Seeded May 12. Came up May 26. June 2, 3 inches high, stand fair. June 16, 5 inches high, growing nicely. July 1, 15 inches high, looks promising. July 15, beginning to show some irregularity in growth; the best is $2\frac{1}{2}$ feet high and heading. August 1, in milk, from $2\frac{1}{2}$ to 3 feet high. New shoots are coming from the roots. August 15, the earliest heads are passing from milk to dough, but many young shoots are in all stages of growth, for which reason the crop can not be harvested. September 1, the earliest is fully ripe, but new shoots continue to spring from the roots. September 15, flat on the ground, beaten down by the rain; much of it is still too green to harvest. October 1, it can now be harvested, but no prospect of drying the crop. October 9, harvested.

Sisolsk.—Seed grown at the Sitka Station in 1901. Seeded May 12. Came up May 27. June 2, 3 inches in height, stand fair. June 16, 5 inches high. July 1, looks very promising, 15 inches high. July 15, heading out, 2 feet 5 inches high. August 1, 3 feet high, grain in the milk, a very fine crop. August 15, developing somewhat unevenly; some of the grain has advanced to the dough state, while most of it is still less than half grown. The grain is unevenly developed in the same head in some cases. September 1, the earliest heads are ripe, but much of it is too green to harvest. September 15, ripe, but rain prevents harvesting. October 8, cut, but badly damaged.

Black Hullless.—Seeded May 12. Came up May 27. June 2, 2 inches high. June 16, 4 inches high. July 1, the crop is becoming uneven in growth, the best 15 inches in height. July 15, heading, 2 feet high. August 1, $2\frac{1}{2}$ feet high, the earliest in the milk. August 15, most of it still in the milk. September 1, ripe, but too wet to cut. Septem-

ber 15, the whole crop beaten down flat on the ground. October 1, the continuous wet weather has spoiled the grain. This variety is very early and may be depended upon to mature grain every year in Alaska, but the heads are short, and it is a poor yielder. The writer has recommended it for culture by the natives because, being hullless, it can be boiled and eaten without being ground.

FLAX.

A patch of Riga flax was seeded thickly May 23 for fiber. The following notes were taken on its growth: June 2, just appearing above ground. June 16, the crop showed a fine stand, plants 1 inch high. July 1, 6 inches high. July 15, uniform crop 2 feet high and beginning to bloom. The rains have caused it to lodge in places. August 1, from 30 inches to 3 feet high. August 15, passing out of bloom; the growth is heavy, but three-fourths of the crop has lodged badly. September 1, it has changed but little during the past two weeks; as yet no ripe seeds. September 15, about 5 per cent of the seed is ripe. October 8, crop pulled. That portion which has not lodged will make a fine quality of flax.

HEMP.

Common Hemp.—Seeded May 23. June 16, showed a poor, scattering stand. The seed apparently was not good, and part of it was eaten by the chickens and pigeons. July 1, only a few plants to be seen. July 15, condition fair, averages about 18 inches high. August 1, 3 feet high, no bloom showing. August 15, 4 feet high. September 1, in bloom, growing slowly. September 15, average height about 5 feet. October 8, the crop was cut and produced a fairly tough fiber. This experiment, however, can not be considered a fair test, as the soil was very poor.

FURZE (*Ulex europæus*).

Seeded May 10. The seed had been tested and only 3.75 per cent was found to germinate. It was therefore steeped in hot water before seeding, and the result was that apparently every seed grew. June 16, $\frac{1}{2}$ inch high. July 15, 2 inches high. August 1, 4 inches high. September 1, 7 inches high. This plant is used to some extent as a forage plant in Scotland, and it is for this purpose that it was tested here. Being a shrub, it grows but slowly the first year.

BUCKWHEAT.

Seed from Berlin, Conn. June 16, just coming up, fair stand showing. June 26, 2 inches high; the stand is good, but the color is poor. July 1, 4 inches high, beginning to bloom. July 15, the best 1 foot high and in bloom. August 1, continues uneven in growth, due to

the soil; best $1\frac{1}{2}$ feet high, all in full bloom, and grain forming. August 15, going out of bloom, the earliest grain fully developed, but owing to the rainy weather a large percentage of the flowers failed to set seed. September 1, ripe and harvested. It was grown on new ground.

GRASSES.

The following grasses were seeded broadcast May 14 on rather poor new ground. In a few cases the seed was not good and in two instances it failed to grow altogether; but on the whole the plats show a very satisfactory growth. The conditions noted on August 1 were as follows:

Water grass (Poa aquatica).—Failed to grow.

Meadow foxtail.—This grass showed a good stand, but the height was only about 6 inches.

Tall meadow oat grass.—This grass showed a splendid stand, and on August 1 was about 2 feet tall. It had made the best growth of all of the varieties seeded.

Kentucky blue grass.—On August 1 this plat showed a fine stand, but the growth was light, being not over 6 inches.

Tall meadow fescue.—On August 1 the stand was fairly good, but the height was only 5 inches.

Redtop.—This grass made a good stand and a fair growth; somewhat uneven. On August 1 it was 6 inches to 1 foot high.

Timothy.—This grass, so highly esteemed in the East, made a fine stand, but was uneven in growth. On August 1 it measured 6 inches to 18 inches tall, and some of it was heading. At the same date volunteer timothy in its second year was $4\frac{1}{2}$ feet high and seeding.

Orchard grass.—This and the following were seeded with Dwarf Essex rape, which choked it partly, or at least retarded the growth. On August 1 it was but 3 inches high, but the stand was good.

Smooth brome grass.—This, too, was partly choked by the rape, but on August 1 it was 4 inches high.

Perennial rye grass.—This grass showed a splendid stand, but was likewise retarded by the rape. It was but 3 inches high August 1.

Red clover and white clover were likewise seeded on new ground. They made a light and rather unsatisfactory growth. On old ground, however, as I have heretofore reported, these clovers will make a vigorous growth and produce as much forage to the acre as anywhere. Some volunteer plants of red clover in their second year measured 3 feet high, and matured seed by the last of August.

VEGETABLES.

The common hardy vegetables were again grown at the Sitka Station the past season, partly on old ground and partly on new ground. The

varieties grown on old ground developed rapidly and attained a large size, while the varieties grown on new ground were not quite so successful. This bears out the experience, which is almost universal in Alaska, and which has been emphasized in former reports, that new ground is comparatively unproductive, and that the best results are obtained when the soil has been in cultivation for several years. The varieties grown may be briefly enumerated as follows:

Cabbage—Early Jersey Wakefield; cauliflower—Early Snowball, Extra Early Erfurt, and Broccoli; kale—Scotch Curled; Brussels sprouts—Improved Dwarf. All of these were seeded in a hotbed April 15 and the plants set out in the open May 25. By August 1 the earliest heads of both cabbage and cauliflower could be used for the table. The largest heads raised measured a foot in diameter. It should be noted in this connection that a market gardener at Juneau had cauliflower on the market July 4. The plants were raised in a hotbed and planted in the open the middle of May. The kale and Brussels sprouts developed normally.

Two varieties of peas, American Wonder and Alaska, were planted on new ground in the middle of May and produced marketable peas by the middle of July. Golden Wax beans were planted on new ground the last of May. They produced a small amount of marketable pods by the last of August.

Carrots—Early Forcing, and parsnips—Hollow Crown, were seeded on new ground in the middle of April and produced marketable roots by the middle of August.

In some private gardens, on old, rich soil, the results were very much better than on the station ground, both parsnips and carrots attaining the size of 3 inches in diameter in some cases.

Onions—Red Wethersfield were not a success on new ground, the onions not being much larger than marbles, but on old ground they attained a size of from 2½ to 3 inches in diameter.

Beets—Early Egyptian were quite successful the past season, both on old and new ground, some beet roots measuring upward of 4 inches in diameter.

Turnips, ruta-bagas, radishes, and lettuce were all grown successfully.

Asparagus—Conover Colossal. Several short rows of this variety were seeded early in May, and a number of young plants were raised. It remains to be seen how well they will winter.

NURSERY STOCK.

A small beginning was made at the Sitka Station in establishing a nursery. Some 500 currant bushes have been raised from cuttings. A few dozen gooseberry and several hundred red raspberry plants were set out the past season. All of these are doing well.

The following varieties of grapes, about 25 plants of each, were sent to the station from the Department of Agriculture and planted out in nursery rows, and all made a moderate growth during the summer: Cottage, Catawba, Moyer, Salem, Martha, and Hartford. Of the blackberries, Snyder and Taylor were also received from the Department, and they likewise made a moderate growth during the summer.

A small collection of hardy ornamental shrubs were obtained from Nelson, Manitoba, and all of these have done well. The list includes the following: *Rosa rugosa*, Virginia creeper, English ivy, Boston ivy (*Vitis veitchii*), *Lonicera alba rosea*, *Lonicera splendens*, *Lonicera gracilis*, Siberian wild olive, and sand cherry; also a few small trees of *Pyrus baccata*, and of apples, Hyslop, Transcendent, and Hibernial.

Of strawberries, from 25 to 50 plants of each of the following varieties were sent to the station from the Department of Agriculture: Saunders, Haverland, Enhance, Excelsior, Bismarck, Lady Thompson, Bubach, New York, Gladstone, and Brandywine. Many of the plants were dead when they arrived, owing to the length of time they had been in transit, but a few were saved of each variety. One hundred and fifty native Alaska strawberry plants were obtained from Yakutat, where they grow in great abundance. These have been set out with a view to use them for experimentation. This native strawberry is very hardy, and it produces, under favorable conditions, berries as large as the end of one's thumb. Doubtless these can be used to cross-fertilize other varieties, with a view to producing new varieties from the seed.

It is contemplated to procure a small collection of hardy fruit trees the coming spring.

FLOWERS.

A number of hardy annuals were seeded, nearly all of which grew well and bloomed profusely. It is an interesting commentary on the climate of southeastern Alaska to note that the following were in bloom October 25 of the present year, viz: Asters, pansies, wallflowers, mignonette, sweet alyssum, candytuft, marigold, collinsia, sweet peas, dwarf german stock, leptosiphon, *Linum grandiflorum*, *Phlox drummondii*, and nasturtiums. Carnation plants were raised from seed, sown in the open.

Among the sweet herbs, mint and sage grow luxuriantly in southeastern Alaska.

WORK ON BUILDINGS.

As already intimated, the headquarters building is in a fair way to be completed this winter. The accompanying illustration (Pl. IX, fig. 2) shows the appearance of the building after the porch was completed and the stone foundation put under the house. The work which has been done inside consists in building the stairway from the first to

second story and finishing the two rooms facing the front on the second story, the laying of the floor in the attic, and cutting away a portion of the solid rock under the house so as to enlarge the cellar for a heating plant. There still remain two rooms to be finished on the second floor, a railing to be put on top of the house, and a roof to be built over the tank in which is collected the rain water which supplies the house, and also the installation of a heating plant. All this will be done the coming winter and the building will then be completed. It is a substantial structure well adapted for the purpose for which it is esigned.

The cottage on the farm (Pl. X, fig. 1) has been improved since the last report was written by the addition of a porch in the front and a small kitchen at the rear. When it is papered inside and the open space underneath boarded up this little building will also be completed.

A blacksmith shop (shown to the left in Pl. X, fig. 1) has been built since the last report was issued. It is a much-needed addition to the station equipment, as there is no blacksmith shop in the town, and we have had to do all repairs ourselves.

The station barn (Pl. X, fig. 2) has been improved by the addition of a seed room, the extension of the roof so as to cover the silo, and by enlarging the silo itself, so as to increase its capacity by about 40 per cent. A floor has also been laid in the attic of the barn, which increases the room for storage materially. When the structure is painted, the barnyard graded, and the immediate surroundings made more presentable this part of the equipment will also be completed.

CLEARING OF LAND AND DRAINAGE.

It rained so persistently nearly the entire summer that it was impossible to grub stumps to advantage. Only about one-half an acre has been cleared, but considerable work has been done in the way of draining the land already cleared. Unless the ground is thoroughly underdrained it can not be cultivated successfully. Pl. XI, fig. 1, shows a view of a portion of a tract of swamp land which has been cleared and drained. The process which we have adopted for underdraining the land on the Sitka Station was described with some detail in my last report. Briefly, it consists of building a conduit of slabs (the outer cuts from saw logs) in the bottom of the ditch in the form of a capital letter "A," and on the top of this conduit we pack brush and finally sod and then fill up the ditch with earth. Another year's experience with these drains has demonstrated their value. They work as satisfactorily as tile drains, and they are built of material which the pioneer can procure at little or no cost except that represented by his labor.

The entire reservation on which the Sitka Station is located was once a dense spruce forest. The timber was cut down by the Russians perhaps seventy-five years ago, but the stumps remain and in many places



FIG. 1.—ALASKA STATIONS—COTTAGE AND BLACKSMITH SHOP, STATION FARM, SITKA.



FIG. 2.—ALASKA STATIONS—STATION BARN (ROOF COVERING THE SILO), SITKA.



FIG. 1.—ALASKA STATIONS—CLEARED AND DRAINED SWAMP LAND, SITKA.

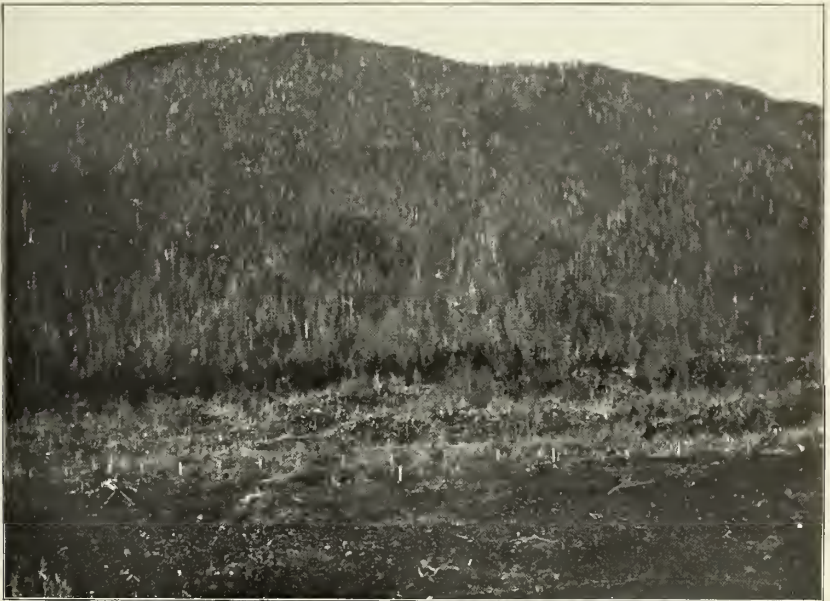


FIG. 2.—ALASKA STATIONS—PROPOSED EXTENSION OF SITKA STATION TO BASE OF MOUNTAIN.

also a more or less dense second growth. These stumps are thick on the ground, and the time and labor required to move them make clearing a formidable task. It is not proposed to clear a large area all at once, but rather to extend the clearing from year to year as the funds will permit and as more and more ground will be required by the growth of the work. Pl. XI, fig. 2, shows a view of a portion of the station reservation which it is proposed to clear in the near future. It comprises a succession of knolls and low ridges which it is believed can be made into good farm land when cleared and drained. The tract slopes toward the south, so that it is well exposed to the sun.

PRISON LABOR.

Since the law went into effect which permits prisoners in Alaska to be employed for a portion of their time on Government work, squads of from 2 to 8 or 10 prisoners have been detailed to work on the experiment station farm from time to time. While this labor has been a help, it can, of course, not be compared in efficiency to hired labor. A large proportion of the prisoners thus assigned have been Indians, who have never had any experience at farm work, and the same is true also of a portion of the white prisoners. Deducting time taken up in going to and from the prison morning and evening and at noon in going home to lunch, they rarely put in more than five hours' work a day.

It is, of course, not to be expected that compulsory labor of this character should be as effective as labor paid \$2 per day. Such as it is, the assistance to the station of this prison labor has its value. What is done by the prisoners in this way saves a certain amount of hired labor.

WORK AT KENAI STATION.

Mr. H. P. Nielsen, superintendent of the Kenai Station, deserves much credit for the large amount of work he has accomplished. In addition to the cultivation of about 7 acres in many kinds of experimental crops and vegetables, he has cleared, broken, and put in condition for spring seeding about 8 acres of new land. For all this work he has only had one man hired by the month, and for a few days occasionally one or two native laborers. The timber he has cleared was not heavy, the trees running from 6 inches to 1 foot in diameter, but they stood thick on the ground. He works hard, faithfully, and intelligently.

The results at Kenai Station for the current season are, on the whole, quite satisfactory. Especially is this true of the vegetables. Cabbage, cauliflower, turnips, ruta-bagas, and in short all the leading hardy vegetables did well. Of the grains, barley and oats matured. The spring wheat did not mature this year, and rye and winter wheat seeded in the fall of 1901 were winterkilled.

A small beginning has been made with experiments in the line of animal husbandry by the purchase of a cow and a heifer calf. This cow has been fed exclusively on native feed, without grain of any kind; still her milk yield has been so large as to be creditable to a good dairy cow anywhere in the States. The yield is given in detail in Mr. Nielsen's report (see page 254).

The log house which constitutes the station building has been completed. A small log barn, which was built in 1899 to furnish shelter for the oxen and the few implements we then had, is now too small for our needs and additional barn room must be provided. I have authorized Mr. Nielsen to purchase the lumber in a building belonging to a cannery at Kenai, which is now closed. It can be bought for \$100, and as the lumber it contains is sound and ample for our needs, I authorized him to close the bargain. The building was 75 feet long and 25 feet wide, and had a shingle roof in good condition.

The coming year we shall have 15 acres under culture at this station. This will enable us to gradually extend the area seeded to grain and also to experiment with forage crops on a more extensive scale than heretofore.

I respectfully recommend that as soon as it may be practicable a few more head of cattle be procured for this station and that our experiments then be extended on the lines of dairying and the production of beef.

It is the plan to continue the clearing of land each season until the cultivated land shall approach 100 acres in extent. But until the stations at Copper Center and Rampart are put on a working basis, it will scarcely be practicable to make large expenditures at Kenai.

A detailed report by Mr. Nielsen follows.

REPORT OF H. P. NIELSEN, SUPERINTENDENT OF KENAI EXPERIMENT STATION.

KENAI, ALASKA, *October 16, 1902.*

DEAR SIR: I herewith submit the report of the season's work for 1902.

CLEARING.

In addition to work with the experimental crops on the 7 acres previously broken, 8 acres have been cleared of trees, stumps, and brush, broken, and put in condition for seeding next spring, and the whole clearing has been fenced.

GENERAL IMPROVEMENTS.

Several improvements have been made, mostly in the line of additions to equipment. A 10-shoe press drill was added last spring, and was used in seeding all the field grains. Drilling is a great improvement over broadcasting, owing to the loose character of the soil. A

seed cleaner has been added this fall, and will be used in cleaning this season's crops. The log house on the station has been completed and is now quite comfortable. A milch cow and a calf were added to the station herd in July. The cattle now belonging to the station consist of 2 work oxen, 1 yearling steer, 1 cow, and 1 4½-months old heifer calf. The stable has been rebuilt to accommodate all of the stock. A corral has been built adjoining the stable.

About 5 tons of native grass was cut and cured and stacked in July and about half of it has been brought home.

A small orchard was set out last spring, consisting of several varieties of apple, cherry, and plum trees, raspberry, blackberry, gooseberry, and currant bushes, and 100 strawberry plants. Six of the 8 apple trees set out have done fairly well. Three of the 8 plum trees are now alive. Seven of the 10 cherry trees have made some growth, and 2 of these have done very well. Of one variety of raspberries all of the 6 plants set out have grown, and 2 of them ripened several berries. Of the Superlative raspberries 2 of the 6 plants grew, but did not bear. Six plants each of 2 varieties of blackberries were set out, and there is 1 survivor of each variety. About one-third of the strawberry plants grew, and have done remarkably well. That so many of the trees planted failed to grow I think was due to the length of their transportation, many of them being quite dry when they arrived.

The gram has been hauled off the field, and the portion which was dry enough to stack has been stacked up and the rest set in shocks to dry in the stack yard. The stubble has been plowed and disked and is in condition for seeding next spring.

NOTES ON VEGETABLES.

A cold frame was prepared and seeded April 26 to the following vegetables, viz, cabbage, cauliflower, Brussels sprouts, celery, lettuce, parsley, onions, and radishes.

Cabbage—Early Jersey Wakefield.—Came up in 6 days, and the plants were transplanted to the open ground June 5. The ground was prepared in the same manner as for the grain. It was given a dressing of fish guano at the rate of 400 pounds to the acre and worked with the disk and smoothing harrow. They were watered frequently during June, and did very well, many of the heads weighing from 3 to 5 pounds. The first head was cut about the middle of August.

Cauliflower—Early Snowball and Extra Early Paris.—Both varieties came up in the cold frame in from 7 to 8 days, and were transplanted to the open ground June 5 and 6. They were watered frequently during the month of June, but did not do very well. Only a few attained an average size. They seemed to need richer ground.

Brussels sprouts—Improved Dwarf.—Came up in the cold frame in 6 days and were transplanted to the open ground June 14. All the

plants have done well, but only about 10 per cent have set any sprouts.

Celery—Fin de siècle.—Began to show above ground in about 5 weeks, but did not get large enough to transplant. The largest plants only grew to be 2 inches high.

Lettuce—Large Boston Market and Early Curled Simpson.—Both kinds came up in the cold frame in from 10 to 12 days, and some plants of each kind were transplanted to the open ground June 7. They were watered frequently during the month of June, and made fine heads, especially the Boston Market.

Pursley—Extra Curled.—Began to show above ground in the cold frame in about 3 weeks, and as the other plants were taken out, it had plenty of room, and was left in the cold frame. It grew remarkably well and is about 10 inches high, green, and handsome.

Onions—Red Wethersfield.—The plants came up in the cold frame in about 2 weeks, and some of them were transplanted to the open ground June 21. The largest reached a size of about 1 inch in diameter, while others did not get larger than marbles.

Planted in the open ground May 13, the following: Peas, beets, carrots, and parsnips.

Peas.—The Alaska peas came up in from 16 to 18 days. On July 15 they were from 8 to 10 inches high and in bloom. We had our first mess of peas from them August 10, but might have had them a week earlier. The vines grew to a length of 3 feet, and kept blooming and setting pods till the last of September. American Wonder came up in from 16 to 18 days. On July 1 they were 4 to 6 inches high and in bloom. They had eatable peas on them August 1. Some of the vines reached a height of 15 to 18 inches, but most of them only averaged 10 inches, and were covered with pods.

Beets—Egyptian. did not come up for a month and made little growth. None of them reached an eatable size. They were a failure this year.

Carrots—Half-long Chantenay. came up in about 3 weeks and did well, some of the largest roots being 4 inches long and 2½ inches in diameter.

Parsnips—Hollow Crown. came up in 3 weeks and did fairly well, some of the largest being 6 inches long and an inch in diameter.

Mustard—White London. planted May 26, came up in a few days, and on July 1 was 10 inches high. We began using the leaves for greens soon after that. It began blooming about the middle of the month, but none of it was allowed to go to seed.

Spinach—Savoy. was planted May 26, came up in two weeks, and went to seed. It did not grow any leaves at all.

Garden Cress was planted May 26, came up in ten days, and made excellent greens all summer.

Asparagus—Conover Colossal.—A small bed was liberally manured and spaded deep and planted to asparagus seed May 26. The plants

have made a growth of from 4 to 6 inches, but I can not say whether they will winter.

Rhubarb—Linnaeus and Victoria.—No rhubarb was planted this year, as all the plants from last year wintered over and did wonderfully well this season. We used all we could and supplied half the village with rhubarb all summer from two dozen plants.

Ruta-bagas were seeded in rows 18 inches apart on May 22, and cultivated frequently during the summer. None of the roots grew exceptionally large, but quite a number weighed 3 to 4 pounds each.

Turnips—White Dutch.—Sowed broadcast June 2 and covered with the garden rake. They did remarkably well. Some of them weighed 8 pounds each.

Potatoes—Early Rose, planted May 23 and 24. On July 1 they were from 3 to 5 inches high; stand good. On July 15 they were 6 to 12 inches high and growing very fast. On August 1 they were 12 to 18 inches high and beginning to bloom. August 15, tops about the same and in full bloom. The tops were still green up to September 24, when they were killed by the frost. They were dug soon after. About 80 per cent were marketable and many of them weighed a pound each.

NOTES ON FIELD CROPS.

WINTER GRAIN AND FORAGE PLANTS.

Excelsior Winter Rye, seeded August 2, 1901; Hybrid Wheat, from Minnesota Experiment Station, seeded August 2, 1901; Sandomer and Yarasloff Winter Wheat, seeded August 15, all winterkilled.

The Red and Alsike clover, seeded May 23, 1901, winterkilled. The flat pea seeded May 30, 1900, winterkilled last year.

SPRING CROPS.

WHEAT.

Romanow wheat was seeded on old ground May 29 and on new ground June 2. Both plats came up in about ten days. On July 1 its condition on old ground was as follows: Stand and color good, 5 inches in height. On new ground stand good, but growth spindling, 5 inches high. July 15, on old ground growth uniform, 12 inches high; on new ground stand good, 12 inches high. August 1, on old ground 2½ feet high, fully headed, stand uniform; on new ground fully headed, 27 to 30 inches high. August 15, on old ground 3 feet high and in bloom; on new ground 3½ to 4 feet high and in bloom. September 1, on old ground about 30 per cent of heads filling, the rest still in bloom, a few heads with chaff turning brown, straw still green, shows no signs of ripening; on new ground the same conditions existing. September 15, on old ground straw still green, a few heads turning brown, will not mature any seed; on new ground large heads and rank

straw, but no grain; straw green, chaff turning brown. Both plats were cut October 4. The frost turned the chaff brown and the straw white, but there was practically no grain in the heads.

BARLEY.

Mansbury.—Seeded 1 acre May 28 on old ground. A small plat seeded on new ground June 2. July 1, conditions on old ground, stand good and uniform, color good, 4 inches high; on new ground the same. July 15, on old ground spotted, average height 9 inches, no heads; on new ground uniform stand, 16 inches, no heads. August 1, on old ground fully headed, 50 per cent in bloom, average height 30 inches; on new ground headed, in bloom, 3 feet high, excellent stand. August 15, on old ground average height 3½ feet, past the bloom, about 50 per cent in the milk; on new ground 5 feet high, about 50 per cent in dough, promising well. September 1, on old ground most of it in the dough, about 10 per cent of heads and straw turning yellow; on new ground 50 per cent of straw and heads turning yellow, the rest green, with grain in dough. September 15, on old ground half of it practically ripe, straw green, the rest with grain in the dough. The grain in the ripe heads still soft owing to the persistent wet weather. Half the plat on the new ground was cradled, bundled, and shocked September 22; the rest was cut October 4. It is thoroughly ripe, and has fine large heads and grain. The plat on old ground was cut October 3, and there was some green straw in patches, but about 90 per cent of it is ripe.

OATS.

Burt Extra Early.—Seeded on old ground May 29, and on new ground June 2. On July 1 its condition on old ground was as follows: Stand good, 3 inches high. On new ground stand good, and uniform, 3 to 4 inches high. July 15, on old ground 10 inches high. On new ground 14 inches high. August 1, on old ground, in bloom, 27 inches high, very promising. On new ground, fully headed, 30 inches high. August 15, on old ground 30 inches high, about 50 per cent in the milk. On new ground 40 inches high, 50 per cent in the milk. September 1, on old ground chaff on about 10 per cent of heads, turning yellow, straw green, and the rest in milk. On new ground few heads with grain in the dough, straw green, most of it in the milk. September 15, on old ground about 20 per cent of heads turning yellow, straw green, ripening very slowly. On new ground 10 per cent of heads turned yellow, straw green. Both plats were cut October 6. When cut there was about 30 per cent of it with firm grain. Some of the straw had turned yellow, but the field looked green at a distance.

Tobolsk.—Seeded May 29 on old ground. It came up in 10 days. July 1, stand and color good, looks promising, 4 inches high. July

15, 10 inches high, stand excellent. August 1, fully headed, uniformly 26 inches high. August 15, 75 per cent in milk, 3 feet high. September 1, a few heads with grain in the dough. September 15, about 10 per cent of heads turning yellow, straw all green, the grain in milk and dough. When cut October 7 the chaff on all the heads was turned white from frost, most of the straw green. Will make a little seed.

St. Petersburg.—Seeded May 29. On July 1 it was 4 inches high, with a good uniform stand. July 15, 10 inches high. August 1, about 75 per cent headed, 27 inches high. August 15, 3 feet high, past the bloom. September 1, in the milk. September 15, green yet, grain in the milk and dough. When cut, October 7, grain still soft and straw green. Will not make any seed.

Banner.—Seeded May 29. On July 1 it was noted there was an excellent stand 4 inches high. July 15, 9 inches high. August 1, just heading, 2 feet high. August 15, 3 feet high, some in bloom and some just past. September 1, straw dark green, grain in the milk. September 15, straw green, grain in the milk and dough. When cut, October 4, the straw was green and no seed ripe. It evidently will not mature here.

Common field oats.—Sown for hay at the rate of 2½ bushels per acre on June 14. On July 1, stand good, 3 inches high. July 15, 6 inches high. August 1, stand excellent, 1 foot high. August 15, 18 inches high, heading out. September 1, 3 feet high, fully headed and some in bloom. September 15, some headed, with grain in the milk; most containing no seed. It was cradled and bound in small bundles. October 3 and 4, straw and leaves still green. In places it was beaten down badly by wind and rain. Some of it in the milk, but most of the heads were empty.

BUCKWHEAT.

Orenburg.—Seeded May 28. On July 1 it was 2 to 3 inches high, with a fair stand. July 15, growth uneven, 2 to 8 inches high, rank stalks, coming into bloom. August 1, still growing, uneven, average height 18 inches, in full bloom. August 15, average height 2 feet, forming seed and blooming. September 1, in all stages from bloom to ripe seed. September 15, showed about 40 per cent ripe seed, a few blossoms yet. It was killed by the frost September 24. It was cut September 25, gathered up and spread out in the shed to dry. It showed about 50 per cent ripe seed.

FLAX.

Riga.—Sowed thick for fiber. Seeded on June 2 on new ground. July 1, stand good, 2 to 3 inches high. July 15, stand excellent, 8 to 10 inches high. August 1, average height 16 inches, about 10 per cent in bloom. August 15, average height 2 feet, almost through

blooming, well set with seed pods. September 1, a few blossoms still present, about 10 per cent of seed pods turning black. September 15, gone out of bloom, still green, seed pods turning black. The frost of September 23, 24, and 25 turned it all black. Pulled October 8. Only about 15 per cent of the seed ripe.

GRASSES.

Perennial rye grass.—Seeded June 4, in rows about 8 inches apart, and seed covered about 1 inch deep. August 1, stand good, 4 inches high. August 15, stand excellent, 6 inches high. September 1, 10 inches high, and showing a few seed stalks. September 15, spreading out, and has completely covered the ground. It was cut and fed to the calf September 23. The plat is green at this writing, but shows very little growth.

Orchard grass.—Seeded June 4 in rows, the same as the foregoing variety. August 1, stand excellent, 5 inches high. August 15, 8 inches high. September 1, 12 inches high. September 15, 14 to 16 inches high. It was cut for hay September 25. It made excellent hay, but showed no sign of heads.

Redtop.—Seeded June 4, same as the foregoing. August 1, stand fair, 4 to 6 inches high. August 15, 6 to 10 inches high, beginning to stem. September 1, average 12 inches high, showing a few heads. September 15, average height 16 inches and about 60 per cent headed. Cut for hay September 25. No seed had formed. Stubble still green and growing a little.

Meadow foxtail.—Seeded June 4. August 1, stand good, 6 inches high. August 15, 8 to 10 inches high and beginning to stem. September 1, most of it 12 inches high, a few seed stalks headed out. September 15, the bulk of it has not grown any. A few more seed stalks and heads in bloom. Cut for hay September 26. Stubble still green.

Timothy.—Seeded June 4. August 1, stand excellent, average 7 inches high, heading out. August 15, average height 12 inches and 50 per cent headed, early heads in bloom. September 1, 2 feet high, fully headed. September 15, 27 inches high, about 20 per cent gone out of bloom, rest in bloom. Cut for hay September 25. No seed; stubble still green and growing.

Smooth brome grass.—Seeded June 4. August 1, stand excellent, 7 inches high. August 15, 10 to 12 inches high, beginning to stem. September 1, 18 inches high, no heads. September 15, has not grown much. Cut for hay September 25. Stubble shows yellow.

Tall meadow oat grass.—Seeded June 4. August 1, stand excellent, 12 inches high. August 15, average height 18 inches. September 1, 30 inches high, 10 per cent headed. September 15, still green, has not grown much. Cut for hay September 25. Stubble shows yellow.

Tall meadow fescue.—Seeded June 4. August 1, it stands good, 4 inches high. August 15, 6 inches high. September 1, 6 to 8 inches high, no stems yet. September 15, still green, but has not grown much. It was cut September 26, but made very little hay.

Blue grass.—Seeded June 4. August 1, medium stand, 2 inches high. August 15, 3 inches high. September 1, 4 inches high, not growing much. September 15, 5 to 6 inches high, spreading out. It is still green, but not growing any.

Furze.—Seeded June 4. August 1, just showing above ground. August 15, not growing much; some of it is an inch high and some just coming up. September 1, not growing any. September 15, average height 2 to 3 inches. A few stems 7 to 8 inches high; poor stand.

Polygonum sachalinense.—Seeded June 9, in rows 2 feet apart. The seed was covered about an inch deep. August 1, poor stand, just showing above ground. August 15, not growing much. October 12, the largest of the few plants that did come up only reached a height of 2 to 3 inches; some did not grow at all after coming up. The leaves are still green.

RAPE.

Dwarf Essex.—Seeded June 11 in rows 2 inches apart and the seed covered an inch deep. July 12, coming up. August 1, now apparent that it was sowed entirely too thick; 8 to 10 inches high. The two outside rows show green and vigorous; the rest looks sick. August 15, inside rows 10 inches high, outside rows 2 feet high. September 1, inside rows setting seed and stalks, some of them in bloom; the two outside rows 30 inches high. September 15, no material difference from previous date. Began soiling and feeding cow with it September 20. Early cutting growing up again.

HEMP.

Seeded June 4 in rows 8 inches apart and seed covered an inch deep. August 1, growing uneven, stand good, average height 12 inches. August 15, the growth uneven, average 18 inches high. September 1, average height 30 inches; in the bud. Buds and top leaves nipped by frost August 31. September 15, has not grown any, will not make any seed. September 1, average height 30 inches. A few stalks were over 5 feet high. Possibly with an earlier seeding and the rows wide enough apart to admit cultivation it would do well.

MILK RECORD OF COW "BOURKA" FOR JUNE, JULY, AND AUGUST, 1902.

FEED—NATIVE PASTURE.

Dropped heifer calf June 2; calf suckled until evening of June 5, from which date the milk was weighed.

Milk record for June, July, and August.

June.		July.		August.	
Date.	Weight.	Date.	Weight.	Date.	Weight.
	<i>Pounds.</i>		<i>Pounds.</i>		<i>Pounds.</i>
6.....	28.5	1.....	31.0	1.....	26.5
7.....	32.0	2.....	32.0	2.....	26.5
8.....	33.5	3.....	30.5	3.....	29.0
9.....	34.5	4.....	32.0	4.....	27.5
10.....	27.0	5.....	30.5	5.....	27.5
11.....	31.5	6.....	29.0	6.....	26.0
12.....	28.0	7.....	29.0	7.....	28.5
13.....	33.0	8.....	28.5	8.....	28.5
14.....	32.0	9.....	31.5	9.....	27.5
15.....	35.0	10.....	28.0	10.....	26.5
16.....	30.0	11.....	29.5	11.....	28.5
17.....	31.0	12.....	30.5	12.....	27.5
18.....	30.5	13.....	29.5	13.....	29.0
19.....	31.0	14.....	30.0	14.....	24.0
20.....	30.5	15.....	30.0	15.....	31.5
21.....	30.0	16.....	28.0	16.....	26.5
22.....	32.5	17.....	27.5	17.....	29.0
23.....	28.5	18.....	29.5	18.....	28.0
24.....	33.0	19.....	28.5	19.....	28.0
25.....	30.0	20.....	28.5	20.....	27.0
26.....	31.0	21.....	26.5	21.....	28.5
27.....	31.5	22.....	28.5	22.....	27.5
28.....	30.0	23.....	29.0	23.....	28.0
29.....	30.0	24.....	27.5	24.....	28.0
30.....	30.0	25.....	28.5	25.....	27.5
		26.....	28.0	26.....	28.5
		27.....	29.5	27.....	27.5
		28.....	27.0	28.....	27.5
		29.....	27.0	29.....	29.0
		30.....	23.5	30.....	28.0
		31.....	25.5	31.....	28.0
Total for 25 days.	775.0	Total for July ..	894.0	Total for August.	861.0

Total yield for eighty-seven days was 2,530 pounds, or something over 29 pounds a day, on native grass only. Many a dairy cow in the States fed on clover and grain does not do better than this. This would indicate that successful dairying can be practiced on Kenai Peninsula.

Respectfully submitted.

H. P. NIELSEN,

Superintendent, Kenai Experiment Station.

Prof. C. C. GEORGESON,

Special Agent in Charge of Alaska Investigations.

WORK AT RAMPART STATION.

For want of funds but little work has been done at Rampart Station during the past year. As yet no one has been employed to take the place vacated by Mr. Isaac Jones in the fall of 1901. When Mr. Jones left, a resident of Rampart, Mr. J. W. Duncan, undertook to care for the property on the place, and also agreed to seed the ground Mr. Jones had cleared and cropped in 1901. Under date of June 11, 1902, Mr. Duncan reported that he had seeded the following grams: Winter rye, Romanow spring wheat, Ladoga spring wheat, Mansbury barley, and oats of the following varieties: Flying Scotchman, Black Finnish, Burt Extra Early, and common oats; also some red clover and buckwheat. On October 31 I received word from him to the effect that

the summer had been pleasant and favorable to the growth of these grains, which had all matured, and he sent a few heads of each variety. The grain of all varieties was hard, plump, and perfectly matured.

The Romanow spring wheat is especially fine. The heads are large; the grain is plump, hard, and perfectly matured. Ladoga spring wheat has a little smaller head than the foregoing, but the grain is equally plump and perfectly matured.

The winter rye was raised from seed grown at the Rampart Station in 1901. I mentioned in my last report that this rye matured perfectly. It has again lived through the winter and matured fine grain, although the heads are short.

Mansbury barley has likewise matured perfectly this season. In my report for 1901 I stated that it had ripened that year by the middle of August. The present small crop was raised from last year's crop.

Of the four varieties of oats grown, the Black Finnish is especially fine. The grains are large, plump, and heavy, and perfectly ripe.

Burt Extra Early oats is likewise a good sample, although both heads and grains are small—characteristics peculiar to the variety.

The Flying Scotelman is a variety not especially distinguished for its earliness, but it has matured plump, heavy seed.

Common oats, such as are sold for feed in the country, also matured. That these oats, which were grown for the most part in Washington and Oregon, should mature up there is, perhaps, the most convincing test of the agricultural possibilities of the country.

When we consider that Rampart Station is located in $65^{\circ} 30'$ north latitude, the fact that all these varieties have matured ought to be convincing proof that the country is capable of sustaining an agricultural population, and that the vast region south of the Yukon is well worth developing.

I recommend that the Rampart Station be equipped with implements, buildings, and a competent superintendent, and that the work of experimentation there be undertaken on a farm scale.

EXPERIMENTS ON WOOD ISLAND.

By an arrangement with Rev. Curtis P. Coe, superintendent of the Baptist Orphanage on Wood Island, a series of experiments with grains and vegetables was carried on the past season, a report on which, by Mr. Coe, is submitted herewith. In 1898 a reservation was made on Kadiak Island for an experiment station; but never having had sufficient funds to equip this station, but little work has been done there. Mr. Coe's proposition to cooperate with the experiment station in his farm work at the orphanage was therefore willingly accepted.

Mr. Coe has met with conspicuous success in nearly all of his farm and garden operations, and for the coming year he is equipped to do still better work and on a larger scale than heretofore. He has a herd

of four dairy cows, which have yielded a good supply of milk, on native feed, and as regards the adaptation of the country for the production of beef he found that one steer netted in meat and hide \$110, a cow \$82, and a yearling steer \$60.

He has acquired a small flock of Angora goats, with a view to experiment on their adaptability to the country and the available feed. He has been very successful with ducks and with a flock of Black Langshan hens.

Mr. Coe matured successfully the past season winter rye, Romanow spring wheat, Manshury barley, Black Finnish and Burt Extra Early oats, spelt, seed from Dwarf Essex rape, and he has made a good start in the leading kinds of grasses and clover. Some of his cabbage weighed 9 pounds and cauliflower 6 pounds, and carrots, parsnips, peas, beets, mustard, turnips, ruta-bagas and horse-radish were all successful. The failures were Jerusalem artichokes, buckwheat, *Polygonum sachalinense*, and celery, and onions were but a moderate success. If all these things can be grown on Wood Island it seems almost certain that they can also be grown on any of the islands along the western coast of Alaska.

REPORT OF REV. C. P. COE ON EXPERIMENTS AT KADIAK BAPTIST ORPHANAGE ON WOOD ISLAND.

KADIAK BAPTIST ORPHANAGE, WOOD ISLAND,

Kadiak, Alaska, October 20, 1902.

DEAR SIR: I have the honor to submit the following report of the agricultural experiments conducted at the Kadiak Baptist Orphanage the past year:

Plat A is a small house garden in a clearing. It has been used for five years. The last year it lay fallow. It was fertilized with barn manure, which was spaded under and a light dressing of fish guano was sown over the top before making the beds and raking. The soil is black sandy, with considerable humus.

May 25 Sir Walter Raleigh potatoes and Jerusalem artichokes were planted, and June 3 turnips and ruta-bagas were sown. The luxuriant growth tempted a cow through the barbed wire, and all the tops, except the artichokes, were eaten. I was surprised, however, to find a good yield of potatoes in September.

Plat B is near an old house which was last used for a stable. It was first broken last fall. Soil is deep and rich, but in some places very rocky. Stable manure and a slight dressing of fish guano were applied. June 2 a plat of 2 square rods was planted to potatoes, which produced 4 bushels. Artichokes did no good; tops grew 4 feet high. June 10 a few square rods of Right Side oats were planted. These produced a large amount of heavy straw; long, heavy heads. The grain was

badly trampled by dogs, but at least 2 bushels of seed were saved, the straw being put in the silo.

Plat C is an old garden, black sandy soil, oats last year, fertilized with barn manure, rotted silage, and eodfish heads and backs. Planted to potatoes May 12 and 18. Cultivated flat with horses and hoes. The plat, which contained nineteen thirty-seconds of an acre, produced 170 bushels of fine, large potatoes, but some were hollow and rotted inside. The seed was native-grown Early Rose. Radishes, turnips, and rutabagas planted in the same field gave large yields. Onions, parsnips, and carrots did not germinate, owing to dry weather, probably.

Plat D, garden in use nine years and highly fertilized every year. Kelp and barn manure used in the spring. April 29, peas were planted. Began yielding in June and continued until September. May 10 two beds of potatoes were planted, 300 feet of rows, which yielded 10 bushels, being nearly 600 bushels to the acre. Hemp was sown in drill, grew to 6 feet high, in some cases; but few seed germinated. June 3 onion multipliers were set out and did well. Same date cabbage and cauliflower, which had been raised in a window box, and later transplanted into tin cans, were set out with whole elod of dirt undisturbed. They grew quickly and well and produced cabbage heads weighing 6 to 9 pounds, and cauliflower weighing as much as 6 pounds. This way of raising plants pays for the extra tronble. June 10 seed of ash, hemlock, white birch, white pine, and red cedar were planted in very rich ground, but failed to germinate. Celery was set out June 15. Fish guano was sown in the trenches and one or two applications given later, but plants did not do well. Plants have been taken up and set very closely in boxes in a damp cellar, where they are making good growth. Buckwheat was sown in drills June 25 and grew well, blossomed, but did not mature. A very slight early frost in September nipped the tip off the plants. In this same garden we have 100 rhubarb plants that furnished good-sized stalks from May to September. Some currant bushes had a few bunches of fruit. Horse-radish made a good growth.

Plat E is a small garden which has been used ten years. It has been well manured. This year a liberal amount of barn manure was used and spaded deeply. Soil black sandy and dry. April 28 carrots, beets, parsnips, radishes, lettuce, spinach, Broad Windsor beans, parsley, turnips, and peas were sown in drills in beds. Spinach and parsley did no good. Beets did better than we have ever had them do here before, but that is saying little. Beans grew tall and bore pods which are now well filled, but not mature. The other vegetables did well. Cabbage and kale set out in June yielded large heads. The late cabbage, if planted early, makes better and larger heads than the early varieties. Hereafter I shall use Flat Dutch or a similar variety for the principal crop.

Plat F is a small garden two years in use. Soil is chocolate loam. Steep southeast hillside, fertilized with barn manure. April 18, 19, 21, and 22 peas, carrots, lettuce, mustard, parsnips, parsley, radishes, turnips, ruta-bagas, and beets were sown in drills. All did very well. On April 26 and 28 other rows of the same seeds were sown. There was no difference in results. June 25 one row of *Polygonum sachalinense* was sown, with no results. All cultivated flat.

Plat G is a southeast hillside, chocolate soil, in use three years. Was fertilized with rotted sod and a liberal dressing of fish guano. May 12, rape was sown; June 9, radishes and winter radishes were planted; June 12, a bed of *Polygonum sachalinense*, and June 22, cabbage, kale, celery, and cauliflower plants were set. Later spaces were filled with ruta-baga plants. Everything in the garden did well except the *Polygonum* and celery. One head of the 1,000-headed kale weighed 9 pounds, one stalk of rape 6 pounds. Winter radishes were planted too soon, grew large, and burst open. A small patch of rye had been sown last fall. The stand was poor, but the straw was tall and the heads heavy. It did not mature until September.

Plat H is a field of deep black sand near the beach. April 22, 20 plats were prepared by sowing on each 100 square feet about 50 pounds of decayed shellfish, brought from an island a mile distant, which was harrowed in deeply. The ground was not plowed, as it was loose and easily harrowed. This was a mistake, however, as the weeds had no serious setback. On this ground 200 square feet of each of the following was sown April 22: Ruta-bagas, wheat, orchard grass, perennial rye grass, tall oat grass, meadow foxtail, tall fescue, blue grass, redtop, smooth brome grass, white clover, red clover, alsike clover, barley, furze, Black Finnish oats, rape, *Poa aquatica*, and hemp. Not one made a creditable showing.

Next to this the same amount of land was plowed and sown May 1. Lettuce, radishes, turnips, and rape did fairly well. Millet grew 6 inches in height.

Peas were tried on another plat of the same, but a strong hot wind blighted them so that the yield was very small. One small plat of grass, mixed seed, took a slight hold and may be all right another year. Smooth brome grass sown in May did not germinate. Potatoes planted May 10 and 18 gave a fair yield, but not nearly so great a yield as those noted above. For these barnyard manure was used in addition to the shellfish.

June 10 turnips, ruta-bagas, kale, giant spurry, furze, hemp, parsnips, and carrots were sown in drills in ground just plowed. A small amount of fish guano was sown on the ground after plowing and before harrowing. The turnips and ruta-bagas yielded very well. The giant spurry grew to about a foot high and was cut for hay. The rest was a failure. Giant spurry sown on newly plowed ground a week

later failed to make a showing until this fall. There is now a scattering stand. *Polygonum* also failed here. This field is infested with sorrel, which is hard to control in seed sown broadcast. In the potatoes it was no trouble, except where planted in the sand without plowing.

Plat I is a northwest slope, plowed for the first time last fall, and consists of about one-half acre. Soil heavy sod, sandy, black. Sod was too stiff to plow again in spring. Harrow and plank clod crusher were used thoroughly. A liberal dressing of fish guano was applied before harrowing the last few times. The field was divided into plats 20 feet square, and May 1 sown to grass seed as follows: Plats 1 and 2, rye grass; 3, white clover; 4 and 5, foxtail; 6 and 7, timothy; 8, alsike clover; 9 and 24, oat grass; 10 and 11, smooth brome grass; 12, red clover; 13 and 14, orchard grass; 15 and 16, blue grass; 17 and 32, red top. The rest of the 56 plats were sown to mixtures of grass seed, each two different from the rest, except two plats in a very wet corner, where *Poa aquatica* was sown alone. Every variety, whether alone or in mixture, did very well except the *Poa aquatica*, which made no show at all. The field was cut for hay in September. The clover was a surprise, as heretofore I have not had good results from it. Furze was sown along one edge of this field, but nothing which could be taken for the plant has been seen.

August 15, on a patch of ground in this field just plowed, a mixture of grass seed was sown. Rain immediately followed and now the grass shows a good stand. On August 23 one-third peck of Excelsior rye was also sown, and has made a fair start. October 4 one-sixth peck of rye was sown on the ground after potatoes had been removed.

Plat J is a southeast hillside, plowed first last fall. Too stiff to plow in spring. Harrowed several times. Moderate dressing of fish guano applied. Planted May 21 to rape broadcast, and giant spurry, 1,000-headed kale, Scotch kale, parsnips, carrots, Broad Windsor beans, Brussels sprouts, and turnips in drills. Turnips, ruta-bagas, rape, carrots for stock broadcast, and peas in drills. Brussels sprouts and Broad Windsor beans did no good, although both had fair tops. The rest of the vegetables did very well. From the small patches of turnips and ruta-bagas here and in plats H, C, and G, we had nearly 100 bushels of turnips and 50 bushels of ruta-bagas. Carrots were used through the summer, and a few bushels harvested this fall. Parsnips have been left in the ground. They are fair sized, and there was a better yield than ever before. Furze sown in this plat failed to make a showing.

Plat K has been used two years. Plowed first in the spring of 1901, and planted to grain and potatoes. Plowed in the fall of 1901 and this spring again. The old sod was still much in evidence. The soil is dark, loamy, and slightly gravelly. April 30 the portion used for

grain last year was again sown to grain, as follows: 200 square feet Blaek Finnish oats, home-grown seed; 480 square feet home-grown Romanow wheat; 720 square feet barley, Wisconsin seed; 1,320 square feet Wisconsin oats; 960 square feet Romanow wheat, Government seed; 1,000 square feet Blaek Finnish oats, Government seed. Every plat did exceedingly well. The grain stood from 4 to 5 feet high, the heads were large and full, and all matured, although the home-grown Blaek Finnish oats were the latest to mature. They were cut October 10. Rape sown broadcast on the same plat was too thick and thinning out was injurious to it. It went to seed early and will furnish a large amount of seed. Hemp did not grow at all.

The grain has not been thrashed, but I will try to report this yield later on. It will be creditable, I am sure.

The portion in potatoes last year was again planted to potatoes, one-half in home-grown seed and the other in Wisconsin seed imported this year. The tubers were good size, smooth, and clean, but the yield was not large. In August the tops of the potatoes seemed to have been nipped with frost.

Jerusalem artichokes were a failure here as elsewhere. This may be accounted for by the fact that the tubers were cut in pieces before planting. They will be tried again next year and whole tubers will be planted.

Before the potatoes were out of this plat, on August 29, winter rye was sown between the rows. Exeelsior and Giant rye were 2 inches high when the potatoes were dug, and at this time they and the Sehlansted rye are looking very fine.

A small patch of timothy sown last year grew 2 feet high, and bore good heads of seed that ripened early. The stalks were well leaved out, and there is no doubt timothy will do well.

Plat L consists of a southeast slope and top of two hills, plowed first last fall. The sod was too heavy to plow again in the spring. Fish guano was applied after one or two harrowings, and harrowed in repeatedly. A harrow and a plank mold crusher and leveler were used after sowing. On this plat were sown, April 30, 1 bushel Marvel spring wheat, Wisconsin seed imported last year; Manshury barley, home grown, about one-half bushel, and 32 square rods of spelt. Wisconsin seed imported last year. These all grew well, forming straw 3 to 5 feet high, and the heads were well filled. The barley was cut September 10, the spelt September 25, and the wheat October 13. All grain was cradled.

Rape, turnips, and ruta-bagas were sown broadcast at the same time, and all did well, but were too thick to make the best returns. The rape was cut and put in the silo. The turnips and ruta-bagas were pulled and hauled to the silo, where the tops were cut off and used for silage, and the roots put in the root cellar.

May 20 Earliest Russian millet was sown, and a light dressing of fish guano again given the ground. The millet made slow growth, but looked healthy at all times. It grew to about 16 inches high, and was just forming heads when cut for hay, September 26. Repeated rains following immediately, it was finally put in the silo. This is the best millet we have raised in several attempts.

Plat M is a small garden in Plat L, used several years. In this were planted, April 30, Burt Extra Early oats, Manshury barley, rape, and hemp. The oats and barley did well, rape little, and hemp nothing at all.

Plat N is long and narrow, on a southeast hillside, surrounded with timber, and consists of about 9 acres, which have been plowed for the first time this fall. The sod is very tough and the whole was covered, when plowed, with much herbage, grass, ferns, etc.

On a portion of the first plowing one-third of a peck of Excelsior winter rye was sown August 25, and one-sixth of a peck of Giant rye October 3. The first sowing is looking well. I have not seen the other since planting.

Plat O is a marsh and extension of same which has been filled with sand blowing in. The sandy part was plowed August 2, and August 6 a small patch of alsike clover was sown. It has made a start, but does not promise well. Some grass seed was sown in the marshy part, but the results can not be told at this time.

I consider this year's work on the whole very successful. We raised about 250 bushels of potatoes, 100 bushels turnips, 50 bushels rutabagas, carrots, parsnips, cabbage, cauliflower, onions, kale, rhubarb, etc., in sufficient quantities to supply our family of 40 members and have considerable for sale. The grain in every particular surpassed my expectations, and we had rape, kale, and grass in the silo.

Artichokes and millet, and in some places peas, Giant spurry, carrots, parsnips, and celery, were failures. All the latter, however, I am convinced, were because of poor seed, or dry, hot weather, which we had in May and June.

It may be interesting also to know the progress of our live stock. We had 4 milch cows and raised 3 calves; the fourth one was premature. The cows were kept for milk. One of these, raised by us from a native cow, gave for about three months an average of 35 pounds of rich milk a day. The others gave a better quality of milk, but not so much. Our large family was supplied with milk and cream, and some butter was made besides. The cows received no feed, but ran in pasture. They continue to give good milk, but a less quantity.

From a flock of 30 hens we had eggs in good number, and raised over 100 chickens this summer. They are free from disease and grow well. They are Black Langshans, and 2 young roosters killed recently weighed, after killing, 4 pounds each.

I purchased 4 ducks in the spring, and besides using many of the eggs, raised 20 ducklings, which are now full grown. They did so well that I have recently purchased a half dozen large Pekin ducks at Seattle. Three ducks and a drake I will keep separate and 2 drakes I will put with the native ducks.

In August I received the 5 Angora goats I had ordered and they are doing well. Their fleeces at this time are long and glossy. They will find a great plenty of forage without diminishing the feed for cattle, but are somewhat difficult to confine within a fence.

Cattle that run all winter without feed do well. One steer, a native, $3\frac{1}{2}$ years old, killed this summer, brought, in beef and skin, about \$110. A cow 4 years old, which had been used for milk, and had raised a calf this year, when dressed brought \$82. A steer 16 months old, which had been fed last winter, when dressed brought over \$60.

This report would not be complete without mention of the success with flowers. We have not tried to raise a great variety, but have had abundant success with pansies, poppies, and sweet peas, besides hot-house plants.

The crab-apple trees spoken of last year continue to thrive.

Thanking you for your kind and hearty cooperation in the work here, I am,

Sincerely,

CURTIS P. COE.

THE OPENING OF AN EXPERIMENT STATION IN THE COPPER RIVER VALLEY.

In accordance with the plans formulated last year we have taken preliminary steps for the opening and equipping of a station on the Copper River. All the information which we have collected in regard to the agricultural possibilities of that region of the interior was so favorable that it seemed to be imperative that work should be begun there. Mr. Jones's observations on the country last year proved that there are many thousand square miles in the valleys of the Copper, the Tanana, and the Fortymile which are adapted to agriculture and to grazing. We have reliable evidence that grain will mature there, and it is likewise known that live stock has lived through the winters without shelter. These facts strengthen the probabilities that agriculture can be made successful there.

The great drawback to the opening of a station in the interior is the difficulty of transporting the equipment and supplies. The military trail which has been completed by the Government from Valdez as far as the Tanana River, 265 miles distant, has made it possible, however, to carry goods inside, but transportation is still expensive. During

the summer season it costs 50 cents a pound to pack goods from Valdez to Copper Center, 103 miles from tide water. In the winter season, when sleds are used, packing will cost somewhat less. No regular price is established for the winter trail.

The plans for this work have been under consideration for a long time, but the execution of these plans began last April with the appointment of J. W. Neal, of California, to take charge of the work. Mr. Neal comes to us highly recommended by the authorities of the Agricultural Experiment Station of California, where he has been employed for some nine or ten years past. He reported for duty at Sitka on June 27 last, and a few days later, with F. E. Rader, the assistant at Sitka Station, started for the Copper River country, via Valdez, with a view to inaugurate the work.

When Mr. Isaac Jones made his reconnoissance in the fall of 1901, he was instructed to look out for a suitable location for an experiment station, and he recommended that a station be located in the neighborhood of Copper Center, near the junction of the Klutina with the Copper River. Messrs. Rader and Neal, after examination of the immediate neighborhood, confirmed this view, and they accordingly began work there.

A TEMPORARY RESERVATION.

With only a pocket compass to guide them, they ran lines about a quadrangle, which contains approximately 775 acres. They planted stakes at the corners and at intervals along the sides and marked these stakes "U. S. Experiment Station." I recommend that this tract be retained temporarily as an experiment station. Whether or not it will be advisable to locate the station there permanently will depend on the location of the railroad, which doubtless will be built into that region in the near future. If the railroad does not pass within a few miles of this tract, I would recommend that the location be changed to some place near the railroad.

The tract lies in the angle between the Copper and the Klutina rivers. On the low ground near the Copper River there is a stretch of good sized timber, which will furnish material for the necessary buildings. As one goes away from the Copper River the land rises in a succession of benches, and not by a gradual ascent. Each bench rises abruptly from the preceding to a height of from 50 to 100 feet. The ground is level on each bench, as though it had been terraced by some gigantic force.

Messrs. Rader and Neal spaded up a patch of ground on each of three of these benches and seeded part of the ground thus prepared to winter grains, wheat and rye, and they also seeded some grasses. I directed them to build a cabin and a barn, but they found that the

proper location for the buildings was some distance from suitable building timber, and having no means to transport the logs they put in their time in clearing and preparing ground instead. Mr. Neal will haul the logs this winter on the snow and put up the buildings in early spring, before active farm operations can begin.

Messrs. Rader and Neal arrived at Copper Center on July 17. The former remained there until August 23, when he left for Valdez on his return trip to Sitka. Mr. Neal, who will remain in charge of the station, stayed there until October 1. There was then a snow fall of several inches, which prevented further work in clearing land, and, having no building and little equipment, he could do no further work; so he too returned to Valdez.

By arrangement with Mr. F. C. Schrader, chief of a geological surveying party which operated in the Copper River country last summer, a team of horses for the use of the station was obtained from among the pack horses used by him, after his work was finished. These horses were sold on his return to Valdez, but he permitted Mr. Neal to select a team of good horses before the sale. This team is now at Valdez, and through the courtesy of the War Department we have obtained permission to stable them temporarily in the military barn at that place.

An equipment of agricultural implements has been purchased and shipped to Valdez. It consists of the following: Two plows, a smoothing harrow, a disk harrow, a mower, and a light wagon. Mr. Neal has also been supplied with hand tools and a set of carpenter's tools. In the latter part of January or early in February, when a trail has been broken, this equipment will be taken inside on sleds and Mr. Neal will then remain at the station permanently. Only implements absolutely necessary to work the ground will be sent in at present. It is hoped that the projected railroad may be built next season, so that a more complete equipment can be sent in with greater ease and less expense.

The first season's work will be expensive; labor will cost from \$3 to \$5 per day and board, and at least one man must be hired for the summer season. Transportation of the equipment will also be expensive. It is estimated that it will cost about \$5,000 to put the station on a working basis. It is planned to clear and break about 50 acres of land, if possible, during the coming season. For the first few years experiments should be directed chiefly to the growth of grains, vegetables, and forage plants. When we shall have learned from these experiments which varieties can be depended upon to mature, the work should be extended to embrace animal husbandry. Grain growing and stock raising will be characteristic features of farming in the Copper River Valley.

Detailed reports by Messrs. Rader and Neal are submitted herewith.

REPORT OF MESSRS. RADER AND NEAL ON THE COPPER RIVER
EXPERIMENT STATION.

Prof. C. C. GEORGESON,

Special Agent in Charge of Alaska Investigation.

SIR: It having been decided to establish an agricultural experiment station in the Copper River Valley, we set out under your instructions from Sitka on July 2, with Copper Center as our destination. This place had been selected as seeming to be the most suitable and representative of possible agricultural development along the military trail from Valdez to Eagle. We arrived at Valdez July 6, where we purchased our outfit and hired three pack horses and an experienced packer. Leaving Valdez July 11 for the interior, we proceeded as far north as Copper Center, 103 miles from Valdez, where we arrived July 17. Mr. R. Blix, the postmaster, offered us the use of one of his cabins, which offer we accepted, and there arranged eating and sleeping quarters.

On the morning of July 18 we began the task of selecting suitable grounds for the proposed station. After exploring the country for several miles around we selected a tract of 775 acres, which seemed the most desirable tract that could be found, considering soil, elevation, and exposure, together with accessibility to the military road, and it is also about the only location we could find with living water, which can be brought into use for irrigation purposes, if desired, in case of drought. The stream also will furnish water for the stock and some considerable power can be developed, if desired.

After the east line was established we began the clearing of land for fall seeding. In the meantime we also cleared a small place at the most desirable building site, and, pitching our tent, we moved out on the reservation July 24.

Trail.—The trail from Valdez to the interior passes through a country of great beauty and grandeur. Traveling in an easterly direction up Lowe River for some 25 miles to the foot of Thomson Pass, the trail crosses the Chugach Range and pursues a general northeasterly course down Ptarmigan Creek and Tonsina River to the junction of the latter with the Kenata River; then leads up the Kenata and crosses Kimball Pass and down into the Tonsina Valley, about 70 miles from Valdez, where the traveler encounters the first land suitable for farming. However, there is an abundance of grazing land all along the trail, profusely set to redtop and bunch grass; also, many flowers and berries of various kinds are seen along the trail.

Approaching the Tonsina Valley, we came into a broad, flat country, about 8 miles from the river, covered with small timber. The soil seemed very shallow, though rich at the surface, and any cleared

places are covered with grasses of several species. The remainder of our journey to Copper Center was simply through a continuous flat country, and as we advanced the soil deepened and the vegetation became more luxuriant.

Location and area.—The tract selected comprises 775 acres of land. It lies in the angle between the Copper and Klutina rivers and about one-half mile to the northwest of Copper Center. The east line begins on the bank of the Copper River and extends south three-fourths of a mile and to within 1,000 feet of the Klutina. The south line extends $1\frac{1}{4}$ miles up along the Klutina, nearly touching the river bank in some places. The west line extends from about 1,000 feet off the bank of the Klutina for 1 mile north nearly to a high bluff about three-fourths of a mile back from the Copper. The north line extends east 4,620 feet, touching the Copper, then following down the river in a southeasterly direction 2,379 feet to the place of beginning. The tract is about 103 miles from tide water and 140 miles from the mouth of the Copper River and 110 miles from its source.

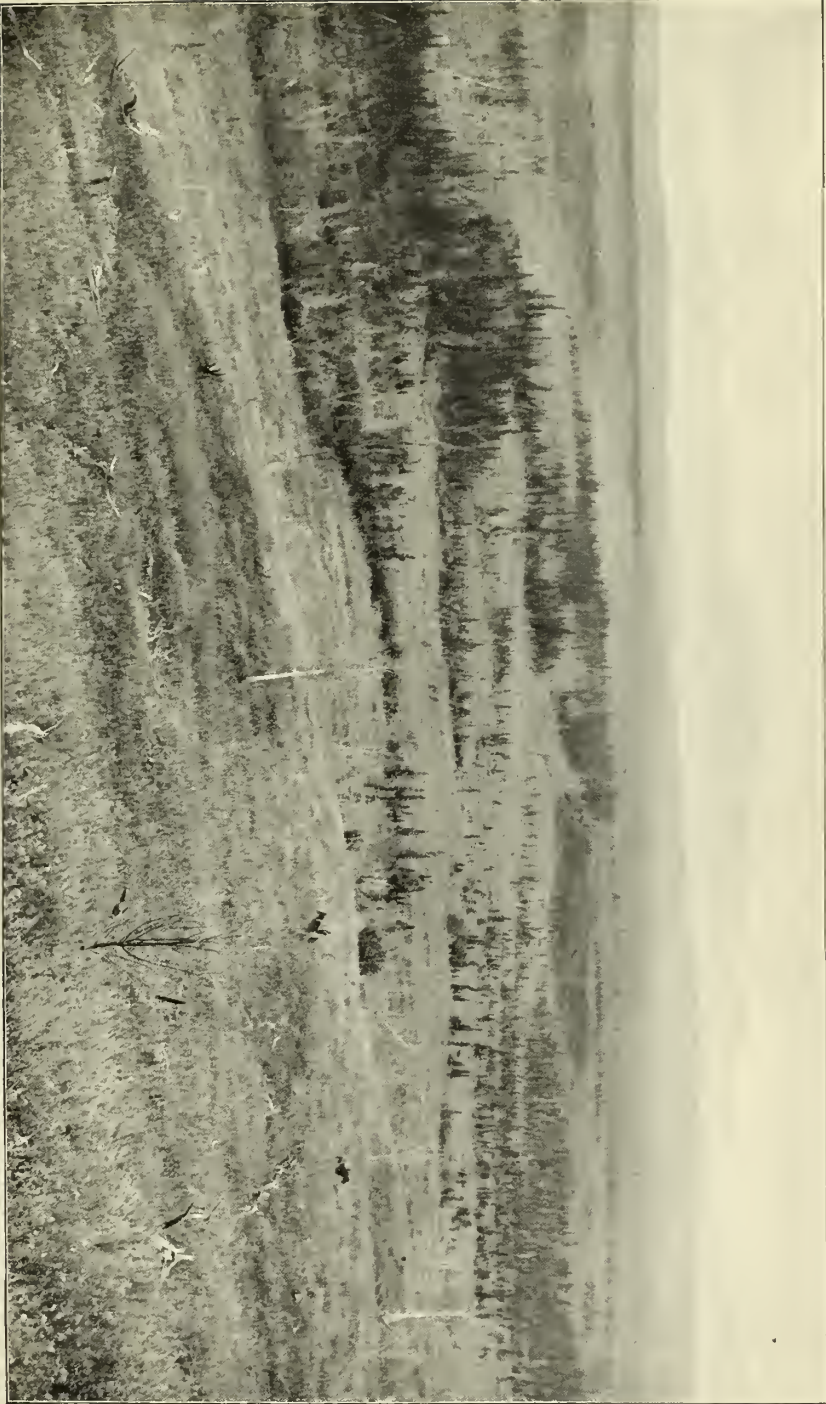
Topography.—The valley as a whole is a broad table-land of slight relief, sloping with the Copper River and extending from the Matanuska plateau, at about 3,000 feet elevation, for more than 100 miles down the river to Wood Canyon, where the valley floor is about 1,200 feet above sea level. The valley is estimated as comprising at least 35,000 square miles of agricultural land. The tract of land selected consists of a succession of benches or terraces, from a few feet above the river to probably 200 feet at the highest point, each bench rising abruptly to its regular height from the bench below it. The trend of these benches follows the course of the Copper River, and finally circling off toward and up the Klutina, the location being only about 1 mile from the confluence of the two rivers.

There is a small creek on the first level above the Copper, which forms a slough, but furnishes a minimum of from 30 to 40 miner's inches of water when not frozen.

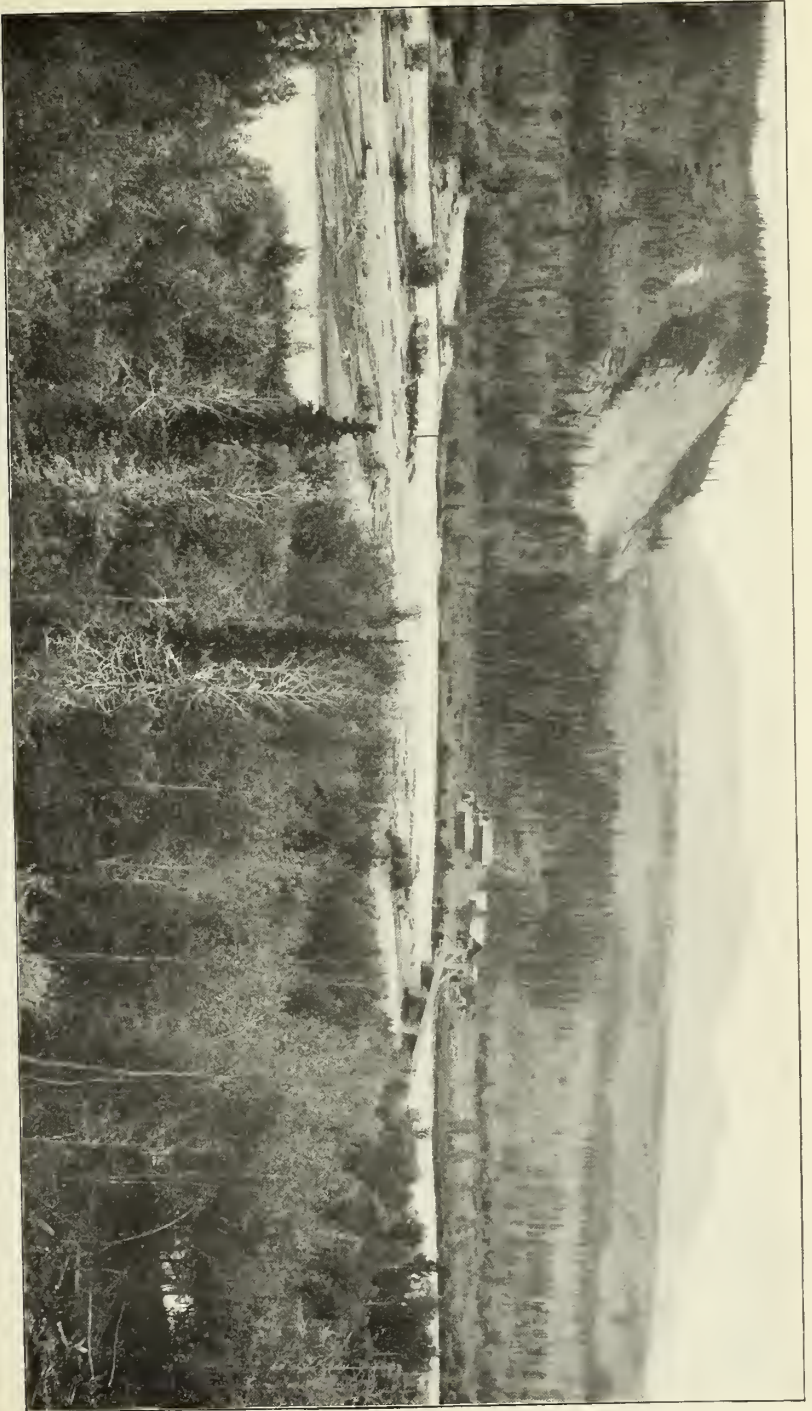
Altitude.—The altitude of the station at the lowest point is 1,050 feet, while the upper bench is fully 200 feet higher.

Soil.—It is conceded beyond question that the Pleistocene and Recent deposits, which have filled up the Copper Basin for several hundred feet in depth, were carried down from the Wrangell and Alaskan ranges with the great ice sheets of the Glacial period, which is, geologically speaking, very recent. This theory is sustained by the presence of gravel within the length and breadth of the valley, the tributary valleys being veneered by the same kind of surface deposits.

Immediately above this gravel deposit we find a stratum of sand covered with and sometimes intermingled with boulder clay for 6 to 15 inches, and in some instances as much as 2 feet of this clay is found on the station. Above the clay there are several inches of silt, or rock



ALASKA STATIONS—COPPER RIVER VALLEY NEAR THE MOUTH OF TONSINA RIVER.



ALASKA STATIONS—TONSINA RIVER AND BRIDGE.



ALASKA STATIONS—COPPER RIVER VALLEY NEAR THE CHITINA.

flour, which becomes loaded with decomposing vegetation, and, where recent fires have not invaded, there are 3 to 4 inches of leaf mold, usually overgrown with moss. The soil as a whole is of a very friable nature, and where fires have run through and burned up the moss and leaf mold the soil pulverizes easily when broken. The clayey stratum, or subsoil, is less pulverous. The gravel is usually 2 to 3 feet below the surface, but where the land is more or less swampy it is deeper to the gravel and the soil is better.

Vegetation.—The prevailing vegetation throughout the Copper Valley and valleys tributary to the Copper is spruce forest. It is said that the trees frequently reach a diameter of 3 feet, but in the vicinity of Copper Center the timber is small and very close together. The largest trees seen do not exceed 15 inches in diameter. These are along the river, where the drainage is good. On the higher benches and in swampy places the average is probably 6 to 8 inches in diameter. Pioneers tell us that the timber on the other side of the Copper River, opposite the station, is somewhat larger, many trees being fully 20 inches in diameter.

The spruce timber grows rather tall and straight as candles. Usually the branches are dead for 6 to 8 feet above the ground. The wood is very knotty and hard to split. Fires have devastated much of the forest, and cottonwoods of two or three species frequently occur after the spruce is killed.

There are also some birch, alder, and willow, and occasionally the balsam poplar. But these occur mostly as shrubs or underbrush. In the vicinity of Mount Drum the birch is said to attain a considerable size—sometimes as much as 10 inches in diameter. The Indians make use of these trees for bows and arrows and numerous other articles.

There are two species of the willow, which occupy almost all marshy places. When found on higher soil among the timber, one species, the diamond willow, grows up brushlike, but rather straight for several feet in height. We also found the wild currant, both red and black, the low-bush cranberry, grouseberry, blueberry, swampberry, mossberry, and some others, the names of which are not known. The red raspberry is found along the trail for 60 miles out from Valdez.

Natural meadows.—While we found few natural meadows, and those of but small area, near Copper Center, prospectors report a number of meadows of considerable extent farther up the Copper River. We were informed of a meadow of about 100 acres near the mouth of the Tonsino River. There is also a small meadow of a few acres along the Klutina, 4 miles above Copper Center. The latter, and about 3 acres within and adjacent to the boundary lines of the reservation, are about the most available to the station.

Mineral resources.—Much has already been said through the press on this subject, but it may be added that each year brings forth new

and rich discoveries in gold, copper, lead, and tin. A number of new coal beds have recently been found. Platinum sand is found in considerable quantity near Mount Drum, but no real development work has been done as yet.

The strike in gold placers this season on the Nazina and other tributaries of the Chitina is thought to be a second Klondike, and from the latest developments, as the season eloses, it certainly is an Eldorado, and no doubt will cause a great influx of people to that section of the interior. There is also a strike reported from the Mantasta Divide, and one at Yaktag, on White River. A big strike in oil is reported at Cotella, near Kayak, 30 or 40 miles from the mouth of the Copper.

Work accomplished.—The station has been surveyed with a pocket compass, the lines brushed out and blazed on the north, east, and south sides, and all the corner posts set and properly marked. Three small tracts on as many elevations, or benches, have been cleared, fenced, spaded up, and seeded to 9 varieties of grasses, 6 of winter wheat, and 4 of winter rye. Most of these seeds were sown on each of the three benches. There were about 2 tons of hay made from the meadow on and adjaent to the station and put under cover. One-half acre of land was cleared for a building site, and a whipsaw frame made for spring sawing while the snow is leaving.

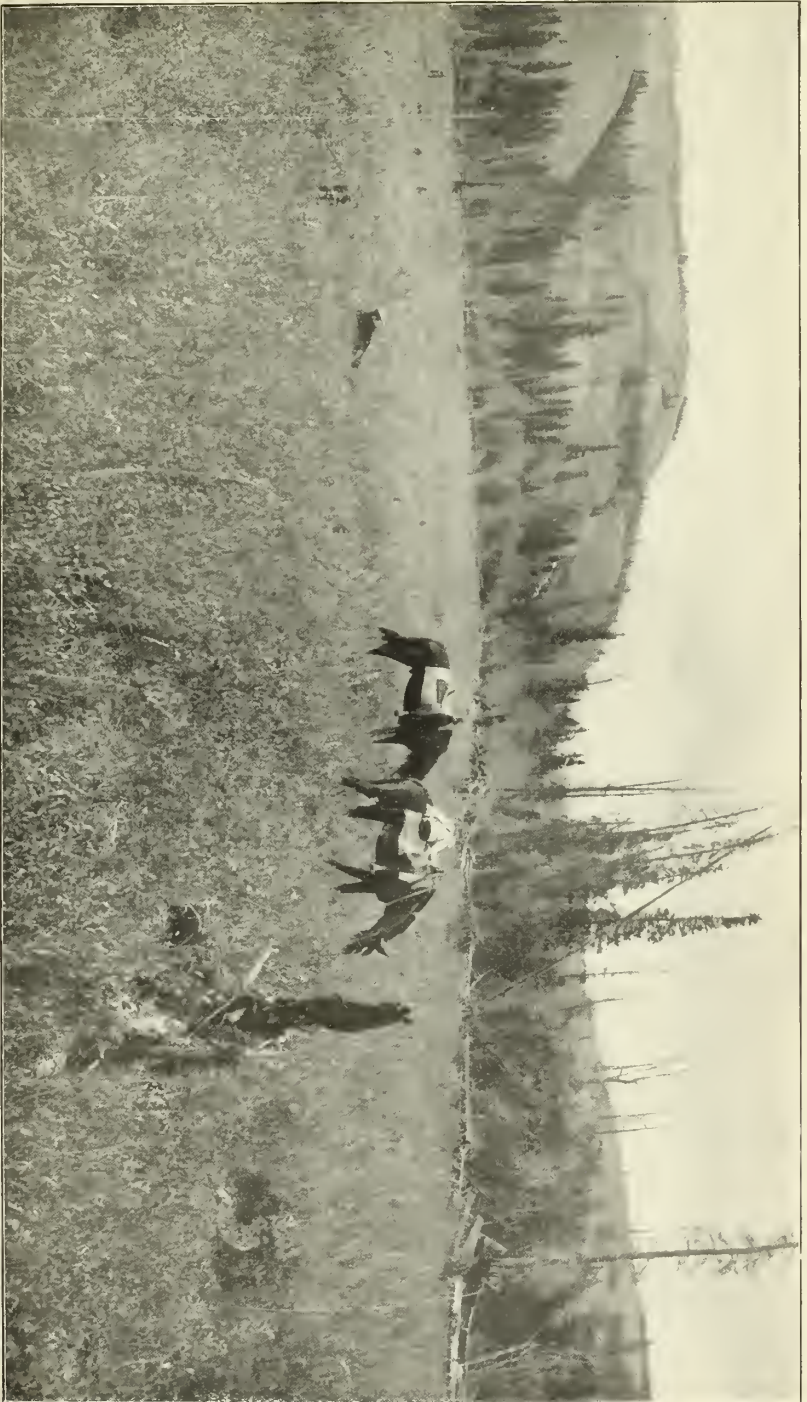
The general work of the season being that of clearing up land, we now have $8\frac{3}{4}$ acres ready for the plow, aside from the grain tracts already seeded and the half acre above mentioned, all of which will total $9\frac{1}{2}$ acres. In conjunction with the clearing we have built 55 rods of fence (Pl. XV).

Gardens.—At Valdez a number of gardens were seen, containing all the hardy vegetables, apparently as good as we are accustomed to seeing in the States. It is not uncommon to see turnips weighing 6 and 7 pounds. Cauliflower and cabbage matured and did fairly well. Potatoes yielded well, but were a little watery.

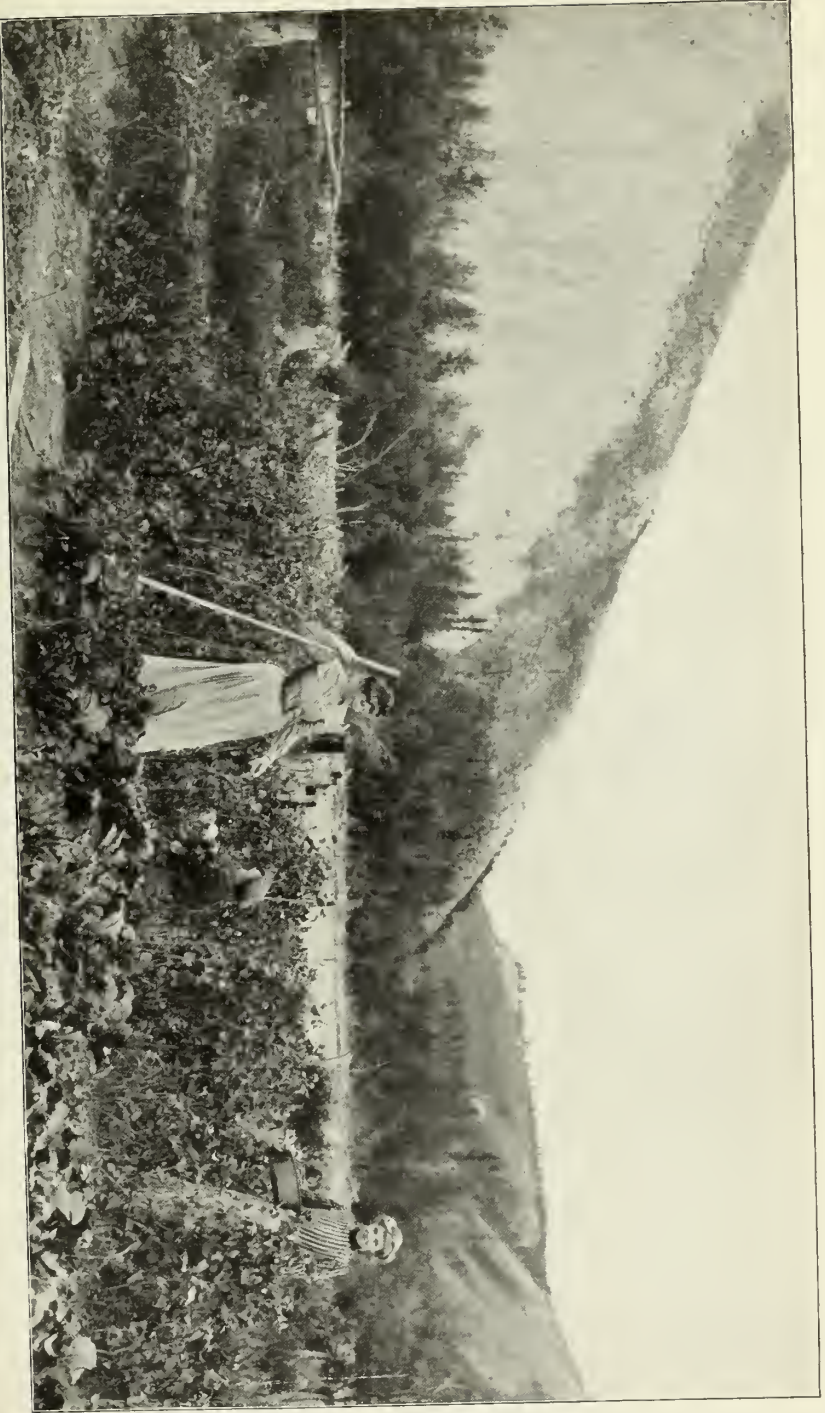
There were some good gardens at Tonsino, 24 miles from the Copper River Station. Radishes, lettuce, spinach, peas, onions, potatoes, turnips, and ruta-bagas were doing well. (See Pl. XVI.)

Several gardens were seen at Copper Center, and many hardy vegetables were growing there very satisfactorily. In Mr. Blix's garden the Windsor bean was growing and yielding well. The cabbage and cauliflower were planted too late and did not head. He planted his potatoes late and on low ground, which is subject to early frosts. Consequently they were killed by the frost on August 8. At that time the tubers were as large as hens' eggs. Mr. Blix put carrots and turnips away for the winter. These were of very good size, sweet, and highly flavored.

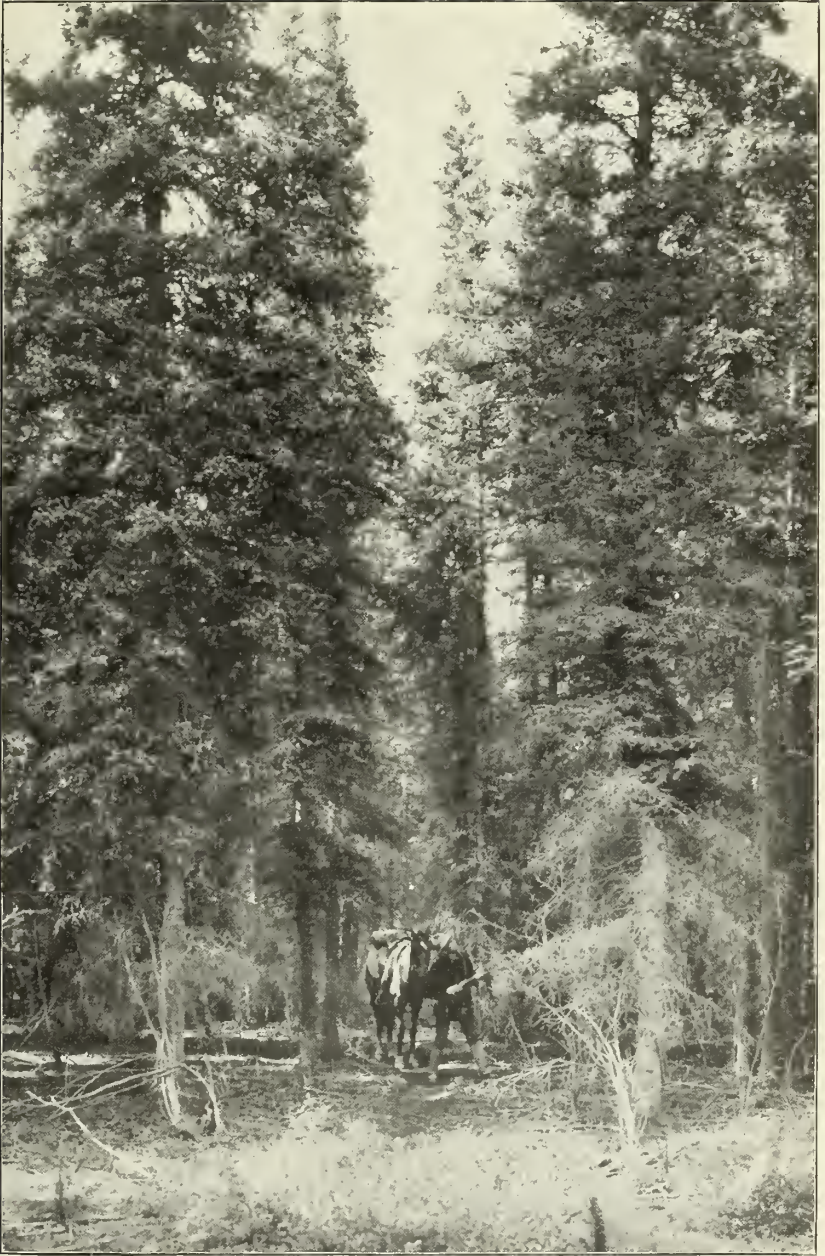
W. D. McGee grew turnips at Lake Abercrombie, 25 miles up the Klutina River from Copper Center, which speaks well for that section. They were large, smooth, and sweet, one weighing $3\frac{1}{2}$ pounds



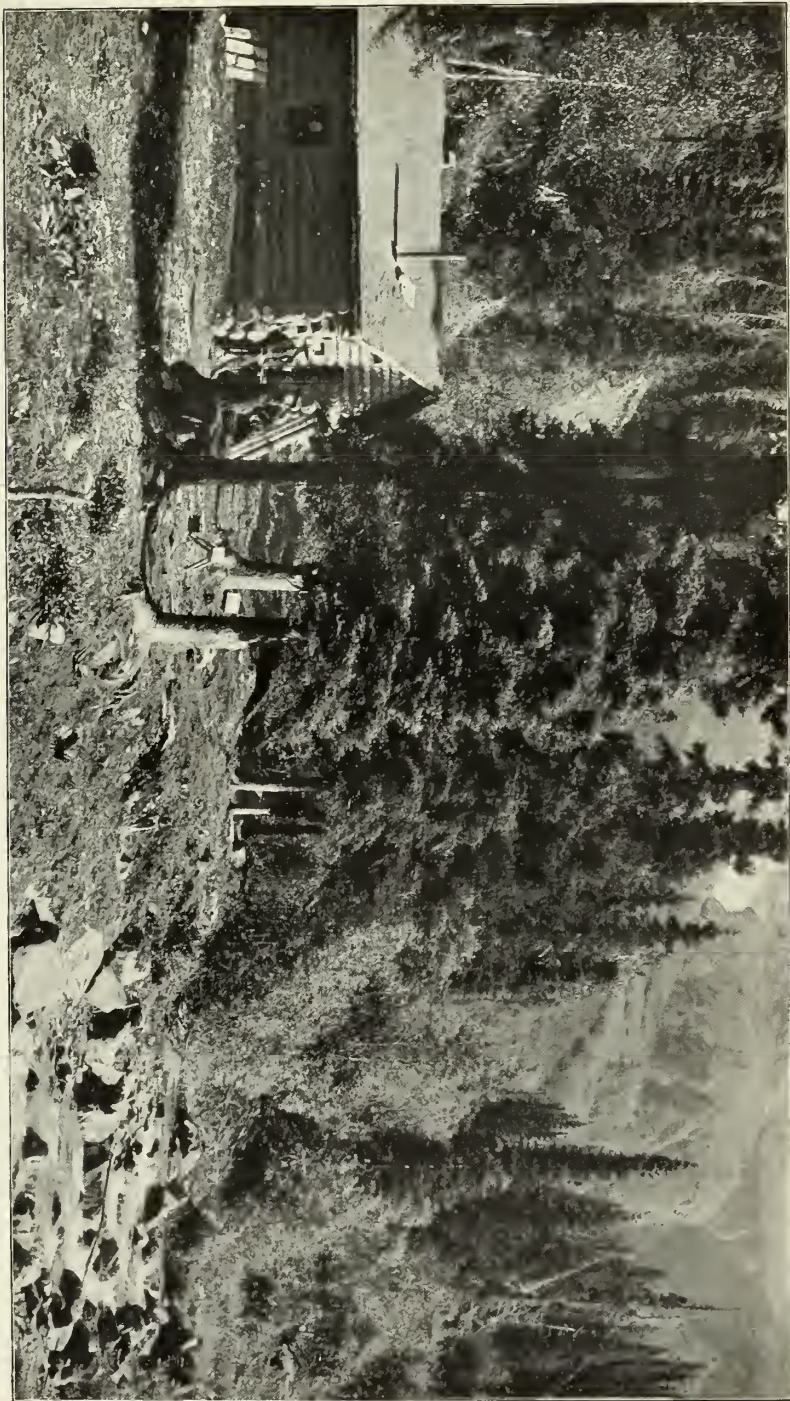
ALASKA STATIONS—CLEARED AND FENCED LAND ON THE COPPER RIVER.



ALASKA STATIONS—VEGETABLE GARDEN AT TONSINA BRIDGE.



ALASKA STATIONS—SPRUCE TIMBER ON THE TRAIL BETWEEN TONSINA BRIDGE AND
COPPER RIVER.



ALASKA STATIONS—MILLARD'S CABIN, AND IN THE BACKGROUND, $1\frac{1}{2}$ MILES DISTANT, THE LOCATION OF THE FAMOUS NICOLAI COPPER MINES, 150 MILES FROM VALDEZ.

and measuring $6\frac{3}{4}$ inches in diameter. He also planted lettuce, radishes, and peas, all of which matured and did very well with little or no care after planting. The land was new, but manured some.

Grains and grasses.—Along the military trail we found oats headed out when we arrived July 17; also a few stalks of wheat and barley just heading. The oats were in the milk by August 6, and all that escaped the loose stock matured good grain. The wheat and barley were eaten off before they filled. Heads of wheat were seen elsewhere along the trail which did mature, and the grain was plump and hard.

Several stalks of timothy 2 to 3 feet high were found, but the heads seemed unusually short. Also several stalks of red clover in full bloom August 1 and well covered with foliage. One or two stalks of white clover appeared.

Growing in Mr. Blix's garden at Copper Center were Finnish Black oats. This variety was seeded May 17. The growth was very uneven, averaging about 2 feet. It headed out very well and matured good grain August 22. Burt Extra Early oats, seeded May 17, made 2 feet of growth and matured August 27. The heads were well filled.

Manshury barley, seeded May 17, made a growth of $1\frac{1}{2}$ to 2 feet. The grain matured by August 25 and is of very good quality.

Emmer, seeded May 17, being sown broadcast, germinated poorly. The growth was poor, owing, perhaps, to the unusually dry season. The average was about 2 feet, and the heads did not fill. The same variety seeded on the same plat in 1901, sown in drills 1 to 2 inches deep, made a growth of 5 feet and filled well. It is well to add that there was more rainfall that season.

Orchard grass, brome grass, fescue, and timothy were seeded May 17, all of which made a fair growth and formed a good sod. The timothy headed some and looked very encouraging. Hassock grass failed to germinate. Alsike clover, seeded May 17, came up sparingly and made 6 to 10 inches growth. Some blossoms appeared early in August.

SEEDING AT THE STATION.

The following grains and grasses were sown in drills about $1\frac{1}{2}$ inches deep July 28, 1902; final notes taken September 29:

Grasses.—Timothy germinated well and made a growth of about $1\frac{1}{2}$ inches by the end of September. Redtop germinated very slowly and only made about 1 inch growth. Perennial rye grass germinated well and made a growth of $1\frac{1}{2}$ to 2 inches. Tall oat grass germinated well; growth, 2 inches and over. Smooth brome grass germinated well and made a growth of 2 to 3 inches. Orchard grass germinated well and made a growth of about 2 inches. Hair grass germinated slowly and rather poor; growth, $1\frac{1}{2}$ inches. Meadow foxtail germinated rather well; growth, 1 to $1\frac{1}{2}$ inches. Meadow fescue germinated well and made a growth of about 2 inches. The time required for most of the above to germinate was 12 to 16 days.

Wheat.—Yaraslof (No. 2791) germinated well; time, 7 days; growth, 3 to 4 inches and began stooling. Russia Winter (No. 2956) germinated poorly; time, 12 days; growth, 2 to 3 inches and began stooling. Russia Winter (No. 2958) germinated well; time, 4 to 5 days; growth, 3 to 4 inches and began stooling. Swedish Winter germinated well; time, 5 days; growth, 3 to 4 inches and began stooling. Swedish Winter (No. 102) germinated well; time, 6 days; growth, 4 to 6 inches. This variety did not show any signs of stooling, but began jointing about the middle of September, and by the end of the month every plant had thrown out a single stalk. The early frost has seriously injured, if not killed, the plant.

Rye.—West Virginia Winter (No. 5905) germinated well; time, 7 days; growth, 3 to 5 inches and began stooling. Russian winter (No. 2961) germinated only fairly; time, 8 days; growth, 3 to 4 inches and just began stooling. A few plants had begun jointing and were frozen. Swedish winter, germination only fair; time, 7 days; growth, 3 to 4 inches and stooling. Sehlansted (No. 5031) germinated well; time, 7 days; growth, 3 to 4 inches and stooling. A few plants were jointing, but were injured September 29. The duplicate plats were all sown broadcast July 29, and were much slower germinating and did not make nearly as much growth.

General outlook.—The Copper Valley is one of vast area, and although somewhat difficult to get into at present it is believed the time is near at hand when thousands of homes will be established there. (See Pl. XIX, fig. 2.) With her broad acres of alluvial soil capable of producing vegetable crops of untold values, her heavy forests, and her great areas of rich grazing land only awaiting the advent of the dairy herd, and with many possibilities still undeveloped, no one can say what changes may take place in the near future. Enough has already been seen to convince us that wheat, barley, and oats can be successfully and profitably grown, and that meadows can be made here the same as in the eastern Middle States. Redtop is native and grows 5 to 7 feet high, seemingly, wherever the seed may fall. Timothy, as seen along the trail, or wherever horses have been fed, would indicate that it should become one of the meadow grasses, and we believe red clover can be successfully grown.

We would recommend stock raising and dairying as the most profitable industries. The average farm should comprise at least 320 acres. This would admit of a small reserve whereon fuel and timber for home use might be perpetuated. There is also need of good-sized farms, as stock will have to be sheltered and fed seven months in the year.

Very respectfully,

F. E. RADER.
J. W. NEAL.



FIG. 1.—ALASKA STATIONS—CLEARING IN PROGRESS, COPPER RIVER STATION.



FIG. 2.—ALASKA STATIONS—VIEW OF COPPER RIVER VALLEY NEAR COPPER CENTER.

RIPE GRAIN.

Samples of ripe grain have been received from several other parties, besides the samples from Rampart, above referred to. M. W. Lane, of Haines, Alaska, writes as follows, under date of September 4, 1902: "Please find inclosed samples of grain grown on my place 1 mile west of Haines, Alaska. These samples, which are Siberian wheat, Norway oats, and Norway barley, were cut just ten weeks after planting." The samples referred to were ripe and of fair quality.

S. Blackburn, of Juneau, Alaska, sent me, in the latter part of September, ripe samples of Romanow spring wheat, and of Burt Extra Early oats. Small patches of these grains have been grown by him the past season.

H. S. Tibbey, of Coal Harbor, Unga Island, sent me small samples of Romanow spring wheat and Manshury barley. The samples were cut September 11, at which date the wheat was not quite ripe. The barley was fully ripe, however. The samples were accompanied by the following notes: "Romanow spring wheat planted on undrained ground May 11. Manshury barley planted May 11. June 12, 1½ feet high. Cut September 11, four months after planting. The weather from August to September has been very unfavorable. The wheat planted at the same time is looking finer than the barley, but it is not so far advanced toward maturity."

I also received a fine sample of Finnish Black oats from Rev. S. H. Rock, of Nushagak, on the Nushagak River. The grain was ripe and of good medium quality.

M. W. Gorman, a botanist in the employ of the United States Department of Agriculture, who has been collecting in the region about Lake Clark, north of Cook Inlet, informed me that on September 4 of the present year he found a small patch of perfectly ripe oats at Iliamna village, on Iliamna Lake.

J. W. Neal, in charge of the Copper River Station, mentions in his report that he saw ripe wheat, barley, and oats in the interior along the trail and at Copper Center.

In several of the reports from the seed distribution mention is also made of grain which matured.

All of the foregoing afford still further proof that Alaska has agricultural possibilities worthy of consideration.

INDIAN GARDENS.

That the Government seed distribution is a great help to the Indians as well as to the white settlers in Alaska is proved by the fact that the Indians in several places have undertaken to raise gardens as a result of this distribution. Missionaries in all parts of Alaska

encourage them in this work and aid in the distribution of the seed, and the same is true of the white miners and prospectors in many places, who have made their homes temporarily among the natives. The following brief extracts from letters received bear upon this point. Mr. Fillmore, of Seldovia, writes: "I have given some of the seeds to the natives to plant, and I will show them how to plant them. Some of them had very good gardens last year and this year they will have more and better gardens, as they have received more and better seeds."

W. L. Bunard, of Kasaan, Alaska, writes: "I would like you to send me some more seed. We have here 42 Indians who raise gardens for themselves and I would like to help them out with seeds, but the few you have sent me will hardly go around to all of them."

C. B. Olssen, of Cape Elizabeth Island, writes: "I will distribute the seeds which you sent me among the natives. Nearly all of the natives in English Bay have small gardens in which they raise potatoes, turnips, etc."

Rev. James W. Kirk, of the Presbyterian mission at Eagle, Alaska, writes: "I wish to do what I can for the Indians, as their case is becoming more and more hopeless each year, save as they turn to modern pursuits. I do not find them all disinclined to gardening, as some of them are willing to labor, and do it very well. I will try to do what I can for them, and hope you will send me the seeds and that there will be a good proportion of turnips, carrots, parsnips, and lettuce." In another letter he says, "They (the Indians) are successful in raising turnips, and I hope you will send seed of this kind, for then they are sure of something."

Reference to Indian gardens is also made in many of the reports from the seed distribution.

At Sitka several Indian families raise creditable gardens, and in this connection it is pertinent to add that Miss Cassia Patton, a recently teacher of the Sitka school, annually offers cash prizes for the best three gardens made by Sitka Indians, the prizes being awarded to the first, second, and third best efforts. The offer of these prizes not only stimulates them to raise gardens, but they consider it an honor to win a prize.

LETTER FROM AN ESKIMO.

The following letter from an Eskimo, a native of Unalaklik, is of special interest, not only because his report shows him to have been a successful gardener, but more particularly because he is proof that the natives of Alaska are susceptible of civilization, and that they can be interested in gardening if they are furnished with seeds and instructed in their culture:

UNALAKLIK, ALASKA. *October 1, 1902.*

DEAR SIR: Your seeds received and tried. They were planted the 1st of June last and the crops harvested on September 25. My garden did well. The turnips grew

to weigh from 4 to 5 pounds, on an average, and some of them weighed up to 7 pounds. The cabbage and cauliflower were fine. Lettuce, parsnips, peas, radishes, cress, ruta-bagas, and carrots were planted and did well. All of these are a very great help to us. We use them in our kitchen.

I am expecting to have my people interested in raising gardens. Quite a number of them have asked me for seed, and I will ask you to kindly send some seed to us. George Kutok, a young man at Unalaklik, also wants some. He is very much interested in garden work.

We also planted flowers on the 1st of June, pansies, morning glories, wall flowers, poppies, marigolds, mignonette, nasturtium, and these are still in bloom in our windows.

I am thankful for the seeds you have sent us. My wife is greatly interested in flowers. We are natives of Alaska, born at Unalaklik. We have learned to read and write from the Swedish missionaries at Unalaklik, for which we are very thankful to them.

Yours, truly,

STEPHAN IVANOFF.

ALASKA-GROWN POTATOES KEEP WELL.

It is occasionally stated in the papers that Alaska-grown potatoes can not be kept over winter; that they are watery, small, or otherwise worthless. In proof that such statements are not always reliable I quote Rev. James W. Kirk, of Eagle, above referred to. Mr. Kirk writes: "I never saw finer potatoes than those raised here. All winter we have used potatoes raised at Eagle, and have found them excellent." In another letter he says, "Our cellar has worked splendidly, and we have been using potatoes all winter which were raised in the Yukon Valley. They are fine and keep well."

AGRICULTURAL INSTRUCTION FOR THE INDIANS.

This brings me to mention a subject which in my view is of vast importance to the natives of Alaska, and that is that an agricultural teacher should be employed during the summer season to teach gardening to the natives. In many places their condition is becoming desperate. With the influx of white settlers their chances for making a living at their usual pursuits, viz, hunting and fishing, are constantly diminishing. The fur-bearing animals are practically exterminated, and the sale of furs to trading companies, which formerly enabled them to procure a large share of their provisions, is well nigh a thing of the past. Even the game animals, on which they have largely subsisted, are becoming scarce in many sections. In some sections their fishing grounds are also encroached upon by the canneries, and unless they are provided with means of subsistence other than those referred to many of them must of necessity soon be brought face to face with starvation. As a remedy, I recommend that they be instructed in agriculture and particularly in the growing of the more common vegetables. They are, as a general thing, totally ignorant of this subject.

The foregoing extracts show that although they may not be apt scholars they are willing to learn and to take advantage of such resources as a garden may give them, if they only are supplied with seed and shown how to go to work. While this work can scarcely be said to be the proper line of work for an experiment station, it could probably be conducted under the supervision of the experiment station to better advantage and along more practical lines than would be possible under other departments of the Government. An active young man, who has the interest of the work at heart, who is familiar with the conditions, and who has the required scientific knowledge and practical skill, should be employed to travel from village to village all through the season, distributing seeds, particularly seed potatoes, and give them practical lessons in the planting and cultivation of common garden crops. This work could undoubtedly be done in a large degree in conjunction with the native schools. The teacher of each school would be intimately acquainted with the condition and needs of the people, and he or she could act as an agent in the distribution of seed and as an assistant in giving the required instruction.

Five thousand dollars appropriated for this purpose would do more good now in preventing starvation than will \$100,000 later on as a relief fund when the point is reached that they must be fed by the Government or die of starvation.

DISTRIBUTION OF SEEDS.

During the past year seed has been distributed to about 750 settlers located in all parts of the Territory. It consisted of the leading hardy kinds of vegetables, a few early maturing grains, a little clover and grass seed, and also a little flower seed. The policy of distribution of seed by the Government has proved itself to be eminently proper and decidedly popular with the people. It is so difficult to obtain seed in the interior that unless they are supplied from this source comparatively few would raise gardens. The distribution, therefore, not only is an aid to the settlers, but it stimulates the development of agriculture. It is also cooperative experimentation on an extensive scale. Vegetables and grains are grown at many points in out-of-the-way places where it would be impossible for the station to conduct direct experiments. The information proves of much value to the work in hand.

I recommend that this seed distribution be continued and extended. The miners and prospectors on the rivers and creeks in the interior, far from the seacoast, appear to be especially pleased with the seed sent them. The gardens which they are thereby enabled to raise will help to reduce the cost of living, and, what is perhaps of more importance in

regions where they are compelled to subsist largely on canned goods, they are an aid to good health.

REPORTS FROM SEED DISTRIBUTION.

The letters and reports herewith submitted from settlers in nearly all parts of the Territory deserve to be read for the information they contain. A careful perusal of these letters will give the reader a better insight into conditions in Alaska than it would be possible to impart in a detailed article on the subject, although they are not designed to be anything more than simple reports of the results obtained from the seeds sent the writers.

INDIAN GARDENING IN SOUTHEASTERN ALASKA.

NOVEMBER 19, 1902.

DEAR SIR: The natives—Tongas, Cape Fox, Tsimpshean, and Hydah—in this section take more kindly to gardening than heretofore. The Tsimpsheans, at Metlakahtla, do more than any of the others. Their only hindrance is in their lack of gardening area. They do not till the ground anywhere else than around their town houses, and these lots are only 80 by 90 feet square. If in some way they could be induced to clear grounds elsewhere than their town lots, they could soon supply some of the Alaska market. But as it is they raise only what they consume.

The Tongas and Cape Fox Indians do some gardening in their fishing places, and not at their homes. Within the last five years many new families which have always lived by hunting and fishing have taken some interest in raising some of their articles of food. Like the people of Metlakahtla, they have cleared only a very limited area of ground, and this usually at some old deserted town.

The Hydahs, at Kasaan, do some gardening to a very limited degree. They have good lands, which are capable of a large crop.

The crops raised here are potatoes, turnips, carrots, parsnips, cabbages, onions, and radishes. There are a few others, but these are the principal ones, especially the first three. They grow very nicely to full maturity and have a good flavor. Some of the families raise all that they consume the year round, and they depend but little on the grocery stores.

The other things raised are raspberries, strawberries, gooseberries, and blackberries. These grow abundantly. With experiments we have carried on, cherries and apples can be raised here. Wheat can grow, but we have not yet tried to raise it to do it justice. The natives are anxious to know how to raise fruits and some of the cereals.

Many of the families among the natives keep chickens. Three of them raise White Pekin ducks and the common turkeys. One family is now trying to raise cattle. This is the extent of live stock among them. There are large pasturages here for cattle, and there is nothing in the way of raising cattle except that the natives have not yet interested themselves in this work.

I suggest that a personal visit to these people by you or your authorized agent in the interest of agriculture be made some time next spring or early in the year. You can then talk with them intelligently and they can ask questions of you on the subject. I suggest also that the Government send to this section some cherry and apple trees for distribution among the most progressive in gardening. If the Indians are properly taught the cultivation of the soil, they will then contribute to the building up of this large and wild territory to be country it ought to be.

Yours, very truly,

EDWARD MARSDEN.

INDIANS RAISE A "WORLD OF CABBAGE."

KASAAN, ALASKA, *October 25, 1902.*

DEAR SIR: I have made inquiries here of the Indians as to how the seed came up this summer which you sent me in the spring. Am glad to say that with a few exceptions they have turned out all that could be wished. One thing they have done for the first time is that they have raised a "world of cabbage." I took some of the cabbage seed that you sent me and made a large hotbed and when the plants came up I gave the Indians all they wanted and showed them how to set the plants out and how to take care of them. As for my own garden, it did well under the circumstances, as I was called away from home early in July and left my family to take care of it, and as they were not thoroughly posted on gardening some things did not do as well as they would had I been here. However, I shall have in the neighborhood of 30 bushels of potatoes and about the same amount of turnips. Ruta-bagas and carrots did finely, and I will probably have all I want and some to spare. Have 200 head of cabbage, and some are large and solid. My beets and parsnips did not do as well, all for the lack of care.

Yours, truly,

W. T. BERNARD.

VEGETABLES IN PLENTY.

PRINCE OF WALES ISLAND,
Grindall, Alaska, October 11, 1902.

DEAR SIR: Our wheat, oats, and barley were planted on raw land without drainage and fertilizer and did not attain a height of much more than 2 feet. They headed out and filled to some extent, and some of the barley ripened, but the oats are still green and in full head. All were planted June 1.

Our clover and grasses did nicely, especially the English rye grass which grew rank over 2 feet high and headed out. The clover and timothy made a fine growth and blossomed out six weeks ago and are still blooming and growing.

Our flower seed did not do much, as only a few grew and bloomed. Rhubarb made a fine growth and is still growing, as we will not have frost before November 15. On land fertilized with seaweeds we grew turnips, beets, parsnips, ruta-bagas, peas, spinach, potatoes, cabbage, rhubarb, and onions, all from seed except potatoes. They did as well as any vegetables I ever saw grow anywhere, and we have had vegetables to use all summer and still have plenty left for winter use. We also grew lettuce and radishes, which were all that could be desired, and much better than expected.

Yours, truly,

ISAAC J. TOMLINSON, *P. M.*

A NOTE FROM LORING.

LORING, ALASKA, *October 9, 1902.*

DEAR SIR: In reporting growth of seed this year, would say that the wet weather in August prevented beans from maturing, but the ruta-bagas, turnips, parsnips, carrots, peas, lettuce, radishes, and onions were very abundant and rhubarb made a good growth and was ready for table use from May 1 until the past fortnight.

Respectfully, yours,

FREDERICK KNIGHT.

A KETCHIKAN GARDEN.

KETCHIKAN, ALASKA, *October 15, 1902.*

DEAR SIR: I received your seeds and planted same. The soil is situated on a hillside, is fairly dry, and consists largely of rotten vegetation and broken slate. I dug

the ground up about 6 inches deep and put on a thin coat of cow manure. Planted the seed on May 1, with the following results: Peas, cauliflower, parsnips, radishes, turnips, and potatoes all good. Beets small. Carrots fair size, very tender and sweet. Cabbage, big leaves and small heads. Lettuce good, very tender. Onions good, if the ground is not worked over 2 or 3 inches deep. Ruta-bagas good, 3 to 5 pounds each. I do not know of anyone raising grass or grain. The Indians here do not want to plant anything except potatoes.

Respectfully,

AUGUST GROOT.

MOST GRATIFYING SUCCESS.

KETCHIKAN, ALASKA, *October 30, 1902.*

DEAR SIR: I did not plant any of your seed myself last spring, but I lived nearly all summer on vegetables from the garden of a near neighbor whom I supplied with seed. As far as I can learn nearly everybody who planted the seeds met with the most gratifying success. I am certain that the result has been a complete demonstration of the fact that we can grow in this section as fine vegetables of the hardy varieties as can be grown anywhere, potatoes, turnips, ruta-bagas, cabbage, carrots, parsnips, cauliflower, beets, radishes, lettuce, etc., while we can beat the world on berries.

Yours, truly,

A. P. SWINEFORD.

GOOD GARDENS AND SUCCESSFUL GRAIN GROWING AT DOLOMI.

Under date of October 25, 1902, Mr. H. Heerdt, of Dolomi, writes me a detailed report of his experiments during the past season, which may be summarized as follows: He cleared a piece of ground which was not especially well adapted to gardening. The soil contained much rotten wood, but he manured it with ashes, spoiled fish, and other refuse. On this ground was seeded Romanow spring wheat, Burt Extra Early oats, and Manshury barley. These grains were all seeded April 20 and grew nicely and matured as follows: The wheat was ripe October 1, the oats September 1, and the barley August 15. The barley especially produced an excellent crop and superior grain. He seeded red, white, and alsike clover, and while they all grew the soil was too sour and the results were not striking. However, some volunteer clover which sprang up in better soil near the house made a very excellent growth. Orchard grass and timothy also seeded April 20, likewise made good growth, but volunteer timothy second year's growth grew to a height of over 4 feet with heads over 4 inches long.

He made one-half dozen seedings of lettuce at various times from March 25 to July 2, all of which produced lettuce of superior quality. That seeded on March 25 was ready for use June 1 and the seeding made May 24 was ready for use July 1.

Cabbage was seeded in boxes indoors March 25. The variety was Early Jersey Wakefield. Planted in the latter part of May, it grew fairly well and was ready for use by August 10. The heads were not large, but firm. His chief trouble with cabbage was that many of the heads burst open.

Cauliflower, Extra Early Erfurt, seeded in boxes latter part of March and treated like cabbage, produced very excellent heads by August.

Cucumbers and beans did not do well. Some small cucumbers were produced, but on the whole they could not be called a success. Beans were likewise a partial failure. Turnips and ruta-bagas were a marked success. Onions were seeded at four different dates from March 25 to May 25. The bulbs resulting from all seedings were nearly all of the same size. They were large enough to use for sets, but not large enough for the market. They averaged about the size of marbles.

Parsnips and carrots were seeded April 10 and produced fairly good roots, but none of them extra large. Beets were seeded April 5 and 15 and May 5. The leaves

were used for greens. If not for this the roots would have been larger, but they averaged 3 inches in diameter. Radishes were seeded on several dates, and all seedings produced excellent, crisp roots.

White mustard was a great success, but spinach, on the other hand, did not do well, as it ran to seed too early. A lot of nice rhubarb plants were produced from a setting made in the latter part of April.

DUG $1\frac{1}{2}$ TONS OF FINE POTATOES.

SULZER, ALASKA, *October 19, 1902.*

DEAR SIR: On May 15 I planted 35 rows of potatoes, each 55 feet long, one-half on new ground and the other half on ground on which I raised a crop of potatoes last year. In the above patch I dug $1\frac{1}{2}$ tons of fine potatoes, some of the largest ones weighing $1\frac{1}{2}$ pounds each. The ruta-bagas, turnips, parsnips, beets, peas, lettuce, radishes, and onions all did very well. I raised the onions from seed and they were as large as big walnuts. The rhubarb did not do very well, but may come out all right in the spring.

I had a fine lot of clover, both red and white, which grew to the height of 30 inches, and it is still in bloom.

Yours, very respectfully,

A. SHELLHOUSE.

ABUNDANT PROFUSION OF BLOSSOMS.

JUNEAU, DISTRICT OF ALASKA, *October 29, 1902.*

DEAR SIR: From flower seeds, which I planted in boxes around my cabin, I was delightfully rewarded with an abundant profusion of blossoms of sweet peas, pansies, daisies, verbenas, and phlox in variety, notwithstanding the unusually rainy season.

Very truly, yours,

WM. N. C. WADDLETON.

GARDENING ON THE PORCUPINE.

PORCUPINE CITY, ALASKA, *February 19, 1902.*

DEAR SIR: I came here from Massachusetts in the fall of 1898, and have lived here ever since. I raised my own vegetables, potatoes, turnips, cabbage, beets, carrots, and onions from sets, but have had no success with onions from seed. Potatoes (Early Rose) grow fine, very nearly as well as in Massachusetts, and the cabbage is better, larger, more plump, and of fine flavor, the varieties being the Early Summer and Early Jersey Wakefield. On the river bottoms cabbage, turnips, parsnips, and carrots do finely, while potatoes do well only 100 to 200 feet above on sides of hills or uplands. Frost cut them in June, July, and August on river bottoms, while 100 feet above the frost does not bother them until after they are nearly ready to dig. Last year there was so much rain that the potato tops were green October 10 up on my sidehill patch. About the middle of October I dug them, and the frost had just cut the tops. A neighbor of mine had potatoes in the river bottom and they were cut down in July and August.

Yours, truly,

HERMAN F. EMMONS.

REPORT FROM HAINES.

HAINES, ALASKA, *October 28, 1902.*

DEAR SIR: Allow me to say that my crop was very gratifying, indeed, and had I received the seed a trifle earlier am sure that vegetables and flowers would have sur-

passed my expectations. Of the flowers, the poppies, mignonette, sweet peas, and giant pansy did exceptionally well, while asters, giant marguerite, carnation, and Drummond phlox left something to be desired.

All the vegetables seem to thrive here, as also do the red and white clovers. I also raised strawberries here $5\frac{1}{2}$ inches in circumference, sound and wholesome.

Yours, very respectfully,

JOHN RIPINSKY.

A LETTER FROM HOONAH.

HOONAH, ALASKA, *October 8, 1902.*

DEAR SIR: I prepared my grounds the second week in May. Used seaweed pretty freely and sowed the seed for my winter vegetables. I went below May 15, and as there was no one to hoe or give it any attention, I was surprised on my return to see as fine ruta-bagas and turnips as ever I ate. My beets and carrots were not as good as usual, for they required more attention. My flowers were not as successful as last year for the same reason. My white and red clovers were a success. I hear some of our native people have raised fine vegetables this season.

Yours, respectfully,

M. J. McFARLAND.

A SKAGWAY MARKET GARDEN.

SKAGWAY, ALASKA, *October 12, 1902.*

DEAR SIR: I have a garden of over 5 acres planted to small truck. It has a sandy soil, heavily enriched with stable manure; also use considerable nitrate of soda on growing crops with good effect. I have about one-half acre of cultivated raspberries, which are very prolific and of the largest size and the finest flavor I have ever seen and tasted. Sixteen thousand celery, the largest celery 3 feet high and 5 inches in diameter, and of better quality than the Colorado celery, which is the finest celery I have seen before coming here. Lettuce, radishes, green onions, beets, turnips, carrots, parsnips, rhubarb, cabbage, cauliflower, and peas are of the best qualities I have ever tasted, and produce larger quantities to the acre than in the States. I had about 2,000 Snowball cauliflowers planted this year. Many of the heads weighed 5 pounds. All varieties of turnips grown here are sweet, while my experience in Colorado was that most varieties grown were bitter, with possibly the exception of the White Egg. Potatoes are very prolific, but inclined to be watery; white potatoes have my preference, as they give the best satisfaction. Burbank has been most successful. I have grown cucumbers in the greenhouse for four years with good success. Wax beans have also done well in the greenhouse.

While all hardy and half-hardy annual flowers are the finest grown anywhere, pansies, especially, are far superior in size and quality to those grown in the States.

Salsify has not been a success, running too much to roots. Kale, parsley, spinach, mustard, and leek have all done well.

Very truly, yours,

H. N. HOLMES.

SUPPLIED THE HOSPITAL WITH VEGETABLES.

SKAGWAY, ALASKA, *April 5, 1902.*

DEAR SIR: I broke the ground at the rear of the hospital for the first time. It was very sandy and full of stumps, roots, etc., but raised sufficient vegetables to supply the hospital pretty nearly all summer. I dug in all the manure and loam that I could get hold of. I had radishes, lettuce, mustard, parsnips, carrots, peas, turnips, cabbage, and cauliflower. Cucumbers I had no success with, although I can grow

them to perfection. My cauliflowers were a sight, 15 inches in diameter, some of them, and I notice that very few of them were grown by gardeners around here. They went for cabbage mostly, and they do not make the heart they should. I raised my plants in boxes in the house and transplanted most of them again in boxes, as the weather gets mild enough to put them outside, covering them in the evening, until the ground is ready, then they grow like "wild fire." All the vegetables I speak of were from Government seed, which I obtained by chance.

Yours, respectfully,

WM. H. TAYLOR, *Secretary.*

GARDENING AT SKAGWAY.

SKAGWAY, ALASKA, *March 12, 1902.*

DEAR SIR: I have a garden 50 by 100 feet, and last year I raised strawberries, cabbage, cauliflower, kale, carrots, celery, parsley, peas, beans, lettuce, spinach, and various other kinds of garden truck. Rhubarb was especially fine; potatoes were mellow and of fine size. Roses bloomed three times last spring. I planted cherry trees last spring, which bloomed three times likewise, but as the trees were too young I broke the blossoms off. This year I expect both apples and cherries to ripen.

Respectfully, yours,

HERMAN GRIMM.

EXTENSIVE MARKET GARDENS.

SKAGWAY, ALASKA, *November 15, 1902.*

DEAR SIR: At Dyea we raised about 31 tons of potatoes. They are good quality. Our early planting did the best. We planted as soon as the frost was out of the ground sufficiently to work it. We tried irrigating, but made up our minds that it is a detriment. We did not give it a fair trial, however, as the dam gave way at high water and flooded the potatoes for four days. We concluded that it is better to plant the potatoes early, while the ground is moist. The variety called the Milwaukee did the best this year. The Ohio is good, and we have no fault to find with the Burbanks. We tried 4 quarts of a new kind known as the Early Michigan. We found it so satisfactory that in time I think we will get the seed and plant it for our main crop.

We have from 20 to 25 tons of hay, mostly oat. The greater part of it is good. It rained so much in August that we made poor headway haying, but it was good weather through September. We cured a good deal of our hay under cover. We have some timothy, but I like the oat hay better and it is easier to cure.

We tried several kinds of vegetables at Dyea. Our carrots did fairly well, but I have seen much larger yields here in small patches. Our parsnips were a medium crop. We raised 1 ton. We had a big crop of turnips, both yellow and white, and our ruta-bagas were also a good crop. We raised about 1,000 bushels of turnips and ruta-bagas.

Part of our strawberries lived through last winter. We set out some new plants last spring, all of which made an excellent growth this season. The ones that wintered here are the thriftier plants, however, and they bore some fruit this season. We have hardly made up our minds yet whether we can raise them successfully. We have covered them less heavily than we did last winter and shall give them another trial.

I will now tell you something of the crops on the Skagway ranch. Our rhubarb did very well. We began selling May 30 and sold the last October 11. In all we sold about a ton. We raised two crops of cauliflower from the same ground; both

were fair crops. The second crop was the more even; not so many small ones and none very large. We sold the first on July 2 and the last October 1. We had a splendid crop of beets. I never saw better. We raised something over $4\frac{1}{2}$ tons from 1 pound of seed. We set out 100 pounds of onion sets. We did not find sale for them all as bunch onions. We had 16 sacks of dry onions of good quality. We started some seed in the greenhouse and transplanted the young onions to the field. They grew to large size, but did not ripen off right. We raised a good crop of cabbage on the ground where we had our onion sets; also a crop of radishes and lettuce on the same ground as that on which our early turnips were raised.

We built a large storage building this season for carrying our vegetables through the winter. It is 30 by 60 feet, with 10-foot studding. It is double boarded, with tar paper between. We dug down 3 feet and banked it up 4 feet. We have a stove in it, but do not expect to have a fire except in the coldest weather.

Our Golden Self-blanching celery was a failure; most of it went to seed. What little did not was poor quality and poor flavor. Very little of the White Plume went to seed, and it is as nice celery as I ever saw. None of the Evans Triumph went to seed. It is harder to blanch than the White Plume, but I think is going to be a better keeper for winter use. We have the celery in our storage building, where it is blanching finely. We tried a few of the Flat Parisian cabbages again, but they do not give satisfaction for shipping trade. For an early cabbage I like the Alpha best, although I shall plant a few of the Jersey Wakefield again. We raised a good many of a kind called Long Keepers this year. For solidity and quality I never saw any cabbage equal to them, and they yield well. We shall depend on them for the main crop next year. We have about 23 tons of cabbage on hand now. We tried a little spinach, but it did not do well. It went to seed while very small. We had a hard time trying to raise early radishes and turnips out of doors on account of the worms. Can you tell me anything that will destroy them? Our peas were a great success. We picked the first July 4 and sold the last October 11. We had a large crop of wild raspberries on the ranch.

There were numerous small gardens in Skagway this season. Most of them were planted with Government seeds. They did very well. We tried raising tomatoes under glass this season. We filled in the ground floor of our hothouse with rich soil and set out some fine plants about the middle of June. The plants made a great growth and we got a good many green tomatoes, but only a very few ripe ones. There was not enough sun in the latter part of the season to make tomato raising profitable.

Yours, truly,

H. D. CLARK.

OPINIONS OF A PIONEER.

SKAGWAY, ALASKA, *March 15, 1902.*

DEAR SIR: This is my third season at Skagway. Two years ago I was quite successful with all kinds of garden vegetables and potatoes, on new ground, with only a little dressing of stable manure. I was raised on a farm and have had twenty years of experience in California and southern Oregon as a farmer and orchardist, and in a lifetime of over fifty years I have never seen finer vegetables grown than I have grown here. I have grown tomatoes to maturity, but not ripening in open culture. I have found no trouble to mature Burbank and Snowflake potatoes of the choicest quality.

Strawberries and small fruits are simply perfect, and, in localities sheltered from the winter winds, I fully believe hardy cherries, plums, pears, and apples of early varieties could be successfully grown.

Yours, very truly,

W. P. BENN.

TOO MUCH RAIN AT YAKUTAT.

YAKUTAT, ALASKA, *October 14, 1902.*

DEAR SIR: I regret to say that this has been a bad season, as the spring was very late and seeds could not be planted before May, and since the middle of July it has been raining incessantly, thereby rotting such vegetables and grain as were in the ground. I used seaweed for fertilizer, and the ground is a sandy loam. I planted the seed the 15th and 16th of May, with the following results, viz: The asparagus, cucumbers, and rhubarb did not grow at all. Windsor beans and peas grew well at first, but rotted later on account of too much rain. Beets, cabbage, cauliflower, and carrots grew well at first, but continued rains stopped their growth. Kale and parsnips grew well. The lettuce, radishes, and mustard were a success. The onions and spinach grew very little; turnips and ruta-bagas grew well at first, but were very small. Red, white, and alsike clover grew very poorly owing to the fact that it was late in the season and they died from too much rain. The barley, wheat, oats, and grasses were planted in the sand on Kantaag Island, as I did not have room for them in the garden, and they grew very little. The potatoes generally grow well here, and I think almost all vegetables could be raised successfully, providing one could give them the proper attention.

Very respectfully,

R. W. BEASLEY.

CROPS RAISED BY AN INDIAN.

ELLAMAR, ALASKA, *October 8, 1902.*

DEAR SIR: I gave some of my seeds to an Indian, as I had to make a trip to Dawson and could not get back in time to plant them. He raised very fine radishes, turnips, lettuce, and potatoes. The largest turnip was 5 inches across the root. I did not know the name of the potatoes, as I bought them in a store here, but they were crisp and fine, but not mealy. I gave the native instructions how to plant them and showed him where to plant them. The yield was large.

Yours, truly,

JOHN M. DE HART.

GOOD GARDENS ON PRINCE WILLIAM SOUND.

BLIGH ISLAND, PRINCE WILLIAM SOUND,

Ellamar, Alaska, October 1, 1902.

DEAR SIR: As requested, I send you a report of our experiments. The report includes Mr. Cloudman's and the undersigned. Both of us are located on the above island, about $3\frac{1}{2}$ miles apart, and both locations have an east and south exposure. Mr. Cloudman's soil is peaty, while mine is a black loam, and where the garden is planted has been under cultivation for five years. Mr. Cloudman's land has been under cultivation for four years.

Beans (Windsor) planted late made a growth of 4 feet and blossomed freely, but bore no beans. I think if they had been planted earlier they would have done better, as the latter part of the season was very wet.

Beets (Early Egyptian) were planted in rows 18 inches apart and about 8 inches apart in the rows. When well up, I gave mine a good dressing of burnt clam shells (powdered) close to the plants. They did splendidly, and several will measure 6 inches in diameter. Carrots I did not plant, but have grown them here to a good size.

Cabbage (Jersey Wakefield) was planted in a box March 28, and kept in the house until they were transplanted, May 30, in rows 2 feet apart and about 20 inches apart in the row. I had to thin them out later in the season. They made good, solid heads, some weighing 8 and 9 pounds. We were unsuccessful with cucumbers.

Lettuce, radishes, and mustard did well. Onions made a very fine showing. Parsnips did well and were of a fine flavor. The peas (American Wonder) which I planted were destroyed by birds. Mr. Cloudman had some that did well. Rhubarb does well here. I have raised it in the past four years. Turnips of all kinds did extra well. They were planted in rows 20 inches apart, and when well up were thinned out to about 8 inches in the rows. Some of the earlier varieties were left thicker, and thinned out as wanted for the table. One of the Golden Bull turnips weighed $7\frac{1}{2}$ pounds, was solid, and of splendid flavor. Ruta-bagas made good growth. Potatoes did splendidly, both the Early Rose and Burbank. Mr. Cloudman had one hill of Early Rose that weighed $11\frac{1}{2}$ pounds. He sold over 1,200 pounds of potatoes this season at $3\frac{1}{2}$ cents per pound. I estimated Mr. Cloudman's crop of potatoes this year at 3,000 pounds. We used seaweed as a fertilizer. It was gathered in the fall and piled up in the garden and spaded under in the spring. I do not know how much it would weigh to the acre, but it was applied very liberally. Wood ashes and burnt clam shells were also used. The clover and grass seeds were planted in new ground outside of the fence. The chickens kept them from making much of a growth, but I believe they would be all right here. Timothy I have raised for several years, and it does well.

Yours, truly,

W. J. BUSBY.

NOTE FROM A PIONEER.

GAGE ISLAND, ALASKA, *October 4, 1902.*

DEAR SIR: I have this day finished gathering my vegetables. Potatoes did well; fairly large and good yield of crop. Turnips are very large and solid. Ruta-bagas are good. Carrots are small. Parsnips are very small. Radishes are very large and brittle. Lettuce grew large and tender. Cabbage has fairly large and solid heads. Kale grew very large. Peas will not mature here on Gage Island. Cucumbers will not grow to success. Beets have done very poorly. Onions are small, but good for sets next year.

I have been raising garden vegetables for three years here for my own use. I find with a little work that any of this ground properly broken up and pulverized with any kind of fertilizer mixed in will grow good vegetables. The best cabbage I have is raised on ground that was broken on a grass flat, which took two years to rot and get in proper shape for tilling. The seasons are very late here, as Gage Island is close to a large glacier. June 1 is the earliest I have ever planted seeds, while this year it was June 4 and 5.

Yours, respectfully,

G. W. FLEMMING.

LETTER FROM VALDEZ.

VALDEZ, ALASKA, *October 13, 1902.*

DEAR SIR: Circumstances prevented my making use of the seeds sent me in the early spring, and it was the end of May before I made a start. We had a comparatively dry spring, which necessitated considerable use of the watering can until the end of July. From then to date of writing, say twelve weeks, we have only had about six fine days. Notwithstanding the extreme humidity my garden has been a source of pleasure and profit, as well as a delight to strangers coming to town. In regard to vegetation, they expected to see little, and they were agreeably surprised to find that the useful hardy vegetables looked as well and in most cases tasted better than anything raised in the most favored localities.

As this is my third season, I knew just what seeds to sow in my limited patches, and have to report only two failures, viz, turnips and cucumbers. The former, after

making rapid growth for a few weeks, were attacked by a worm, which cut away the roots and destroyed the plants. I afterwards sowed ruta-bagas in a patch about 100 feet away, and they have done very well. So, whether it was that the worms affected that particular spot or have an aversion to the ruta-baga's flavor I can not say, but will try to find out on a future occasion. The cucumbers were fine, healthy plants and showed great promise until the cold rain came. I think if the seed had been sown a month earlier we would have had a crop suitable for picking. Among the vegetables which were a success would particularly mention spinach, cabbage, kale, carrots, beets, radishes, lettuce, and parsley. Potatoes have done well. I was planting till well on in July, so have been regaled with new potatoes for several months. Peas did all we could wish during the fine weather. Had they been sown earlier the crop would have been abundant, and as it was, the few messes we gathered were so delicious that I was more than compensated for the trouble taken.

Yours, truly,

JAS. FISH, JR.

FEEL HIGHLY ENCOURAGED.

HALIBUT COVE, VIA HOMER, ALASKA, *September 15, 1902.*

DEAR SIR: AS I am about to leave for the States, I am forwarding you an early report of the success of the seeds you so kindly sent.

The ground was not prepared until late in May. We used no fertilizer and had dry weather for two months after seeding. The flowers did well, especially the nasturtiums, sweet allysum, pansies, and sweet williams. Of the garden vegetables, the radishes, ruta-bagas, Brussels sprouts, carrots, parsley, and cabbage have all done well. We also put in some potato parings and potatoes, and, strange to say, plants from the parings have grown nicely. Considering all, we feel highly encouraged for the next season. Next year we shall prepare most thoroughly and use seaweed as fertilizer. The soil is alder bottom.

Respectfully,

FRANCIS X. WALDRON.

GRAIN RIPE BY MIDDLE OF AUGUST.

KENAI, COOK INLET, ALASKA, *August 24, 1902.*

DEAR SIR: I am having great success with my vegetable garden this summer. Last spring I seeded potatoes, cabbage, ruta-bagas, turnips, radishes, lettuce, peas, etc. I sowed Manshury barley and Burt Extra Early oats on May 7, in light sandy soil, which were ripe by the middle of August. I also sowed some flower seeds, and have my house decorated with flowers. Thanking you for the favor in sending seeds, I remain,

Yours, respectfully,

ED. EDELMANN.

REPORT FROM HOPE.

HOPE CITY, ALASKA, *July 28, 1902.*

DEAR SIR: We received and distributed the vegetable and flower seeds sent us this spring.

The white-flesh ruta-baga seed, sent us in 1901, we have sown and find the ruta-bagas are very small, with many branch roots, and not well liked by the public.

The season of 1901 was dry up to July 3, and rather cold all season. Everything matured rather late, but everything turned out unusually well. The first frost set in about middle part of October.

Only about 12 strawberry plants of the 50 we had growing last summer came to life this spring. The small plants are doing well now, and we had ripe strawberries

on July 20. The best berries measured $4\frac{3}{4}$ inches in circumference and weighed one-half ounce troy weight. Gooseberries planted in 1901 were all alive this spring, and have made a rapid growth up to this date. Our fruit trees, planted in 1901, such as apples, plums, and cherries, were killed by last winter's frost. Pear trees have started to grow again just above the ground. This spring we have planted only one Bismarck apple tree from Michigan, and it is growing nicely; also have planted strawberries from Michigan.

White Dutch turnips, sown May 17, were ready for the table July 10. We believe that the Early White Milan is earlier than the White Dutch. We have had peas ready for the table this year July 17. Cabbage is also ready for the table at this date, and so are beets. Potatoes will be ready for the table by the 1st of August.

Everything was from 10 to 14 days earlier than any previous year. We have had a very dry, warm summer, and the first rain of any consequence, after the snow left the ground, fell on July 22.

Yours, truly,

ROLL BROS.

GARDENING AND POULTRY RAISING SUCCESSFUL AT KADIAK.

KADIAK, ALASKA, *October 18, 1902.*

DEAR SIR: I desire to say that a certain class of vegetables, including potatoes, are a success in Alaska. I planted quite a large garden; its equal I have never raised nor seen in the States. Radishes, onions, lettuce, beets, parsnips, cauliflower, peas, turnips, ruta-bagas, and carrots were the best-flavored and the largest I ever raised. Cabbage is excellent. Potatoes are immense, for size and yield, and of most excellent flavor.

They told me I could not raise anything. A number of families received vegetables from my garden during the summer. They told me poultry was not a success, and I tried it in a small way. On December 10, 1901, I selected from a lot of chickens 21 hens and 1 rooster. The hens were a mixture. They commenced to lay and we sold the first eggs at Christmas time at 50 cents per dozen, which price continued throughout the year. Sold from the date mentioned to September 15, 1902, $113\frac{1}{2}$ dozens of eggs, during which time I had 12 hens to hatch and raised 100 chickens. I have sold from the lot \$34 worth of chickens. Have used several chickens for family use, and have 45 left. During the time mentioned my wife used what eggs were wanted for household use. The chickens are healthy and I feed them well. The feed used during the time cost \$27. I used wheat, bran, plenty of red pepper, boiled potatoes, together with turnips thickened with bran. This makes a healthful food for chickens, and helps them to molt, and is excellent for laying hens.

Yours, truly,

L. L. BOWERS,
Deputy United States Marshal.

TREES FAIL AT KARLUK.

KARLUK, KADIAK ISLAND, ALASKA,
April 13, 1902.

DEAR SIR: Some two years or more ago I obtained a nice lot of Norway spruce and set them out in ground prepared for them. They were getting on nicely when our hares discovered them and soon made short work of them. Some five years ago I obtained a hundred American elms from Connecticut. The spring following they were found to be lifted clear out of the ground by the frost and were standing on tiptoe, as it were. The lesson from this experiment would indicate that it was very necessary to mulch, and to do it thoroughly. We replaced them and a portion of

them lived for some three years, but made scarcely any growth or headway, and finally all died. Last year I obtained some blackberries and currants (plants).

Rhubarb, English turnips, radishes, and spinach did splendidly. Red clover and timothy I have tried and they do well here. We found that horse-radish and parsnips grow freely enough, but are a mass of fine roots. Beets go to seed at once. Cabbages go to tops. Planted cress, but it never came up.

Sincerely,

JAMES A. RICKARDSON.

EVERYTHING DID WELL.

AFOGNAK, ALASKA, *October 17, 1902.*

SIR: In regard to the seeds would say that we had a very favorable season this year, and everything that I planted did well. I had one cauliflower weighing 6 pounds. The potato crop was about double that of last year, owing to the fact that I mixed kelp with barn manure, according to your suggestion. Oats and barley ripened.

Yours, truly,

EMIL CHRISTENSEN.

A GARDEN ON SEMINOVSKY ISLAND.

UNGA, ALASKA, *August 3, 1902.*

DEAR SIR: A few days ago I returned from the island of Seminovsky, where Mr. J. C. Smith lives. I had heard so much about the agricultural possibilities of that place that I was very anxious to see them for myself. Mr. Smith has a garden covering about one-half an acre, and it is in fine condition. The soil is not so heavy as on the other islands of the Shumagin group, and on the spot where the garden is formerly was an old settlement. I dug around there, and to the depth of about 8 feet found decayed fish and decomposed bones, etc. This partly accounts for the good results of the garden, but the chief reason of its success was the way it was attended to. It is kept as clear of weeds as possible, and not planted too closely together, and worked sufficiently. The cabbage, potatoes, beets, turnips, etc., are as nice as I ever saw anywhere.

He also has a nice herd of cattle, and altogether it is an ideal place, where plenty reigns. He asks me to write to tell you about it, and I take pleasure in doing so. He is very anxious to plant some blue-grass seed, and I promised that you would send him some. He complains that his cabbages, when they reach a certain size, break open.

Respectfully, yours,

T. A. GOLDER.

JUST GETTING INTERESTED.

SANAK ISLAND, ALASKA, *September 4, 1902.*

DEAR SIR: I have tried turnips, radishes, carrots, beets, kale, and cabbage. The first year I just turned up the ground and planted the seed, and it did not succeed very well. The second year, after having put on some stable manure, I raised some very fine radishes and turnips. Potatoes grew fairly well. I am just getting interested in the business now and am going to give it a good trial next year. I haven't had much time so far, but there are several settlers here who are going to take it up and see what can be done. I am almost certain that the ground will answer well for agricultural purposes.

Respectfully, yours,

PAUL HANSEN.

GRASS GOING TO WASTE.

SANAK ISLAND, VIA SAND POINT, ALASKA, *September 7, 1902.*

DEAR SIR: The seed I got last year I distributed among the natives here, and they planted some of it. The turnips and radishes turned out fine, but the rest of the seed they would not bother with, as it was too much trouble. The country around here is one of the greatest grazing lands that I have ever seen, and I think in time it will be taken up for cattle; and anyone who is interested in the opening up of this part of the country should advance that interest first, and the rest would follow without trouble. On Sanak Island there are 40 head of cattle, owned by four parties, and on the other islands more or less, but so far there has been no market for them. As soon as there is a possibility of a market for beef the country will boom, and the first will make a haul. There are thousands of acres lying idle with the finest kind of grass going to waste, and the climate is mild enough for the cattle to remain out most of the winter, as they do on Sanak. If we had a market, the people up here could tend to their homes and raise all kinds of vegetables, and even grain, besides cattle. Farmers and cattlemen would flock in from all parts, and fox breeders could use the same island for a cattle ranch and farm. However, I suppose it will not be in our time. I must say that it would be an Eden for some farmers, as the ground is mostly level and the soil rich with millions of tons of manure, that is, kelp, an eel-grass, around the beaches. There are all kinds of berries growing wild, and the water teems with fish of all kinds. I have lived here now close on twenty years, and I love the place.

Yours, truly,

ANDREW GROSVOLD.

POULTRY ON THE NUSHAGAK.

Rev. S. H. Rock, of the Moravian mission on the Nushagak, writes me as follows about his poultry: "I must not forget to tell you how well my hens are doing. Since January 1 they have not stopped laying, and since that date until the present (July 3) they have laid $75\frac{1}{2}$ dozens of eggs. I have 13 hens, and 8 of these did not begin to lay before February and March, because they were young hens, hatched late last summer. I never saw hens look more healthy than ours do. In the coldest weather in the winter, when hens usually sit with their heads under their wings, ours were lively and busy. We used eggs moderately, of course, but we sold about \$12 worth to our neighbors, and gave quite a few to such as were in need of them."

He adds further: "The white settlers are one and all starting gardens, and they raise principally potatoes, but other vegetables also. They are poor writers, they say, and I guess they do not acknowledge the seeds, but I have often heard them say that they are thankful for the seeds the Government sends them."

DID NOT DO WELL.

COPPER CENTER, ALASKA, *September 30, 1902.*

DEAR SIR: My observations this year convince me that an experienced man can raise any hardy variety of vegetables in the Copper River Valley.

On April 15 I planted curly kale and spinach in seed boxes, putting them out in the sun in the daytime, and until May 8 I kept them in the house at nights, and after that date the boxes remained in the open air both day and night. The plants from this seed were transplanted June 6. The kale grew to good size and the spinach went to seed before the plants were fully matured.

On June 3 the frost was out of the ground, and I then selected a spot where several large cabins had been burned. The soil was sandy and mixed with ashes and charcoal. I covered the soil with 3-year-old manure, dug it under, and put in the seeds. Planted carrots, lettuce (Red Simpson, Green Simpson, and Deacon), and radishes June 4. The carrots never grew to any size; the lettuce, however, did very well, excepting Deacon. The Curly Red Simpson did best. Radishes suffered from a red bug. Lettuce and radishes were up in five days.

Planted peas June 5 in a bed that had been worked in 1901. Gave light covering of manure, dug spade deep, and on June 12 the peas showed overground. On July 4 they were in blossom, and August 1 I picked some pods and found the peas fully developed. At the present date they have thrown out new runners, which are in blossom. The peas were never irrigated, and we had no rain to speak of the entire summer. The varieties planted were as follows: American Wonder, Alaska, Thorburn Extra Early. The first two varieties did best.

Planted carrots June 6. The soil was so full of ashes and precipitation so little that the wind would shift the soil. Did not mature. Planted spinach June 7, which did well; parsnips planted same day, but these did not get large enough to use. June 9 planted cabbage (Early Jersey, Wakefield, and Drumhead), mustard (White London), Brussels sprouts, cauliflower (Extra Early Snowball). At present date, September 10, cabbage is just heading. Brussels sprouts barely show the buttons; cauliflower has formed heads; the mustard did well.

I also planted turnips (Whitetop and ruta-bagas) broadcast, but too thick to do any good. As both have been successfully grown here the year previous there is no doubt that they will do well.

Yours, truly,

F. W. ROSENTHAL.

GRASS AND GRAIN ON THE CHISNA.

CHISNA, ALASKA, *September 7, 1902.*

DEAR SIR: We inclose under separate cover samples of timothy and clover (alsike) sown in this locality on July 6, 1901. The ground was not prepared, but the seed was sown broadcast over the tundra and grasses that cover the lowlands of the Chisna Creek.

The timothy was noticeable last year, and the present year it ripened two weeks before the frost came. This has matured at an altitude of 3,200 feet at this place and 4,500 feet at a point 8 miles up the Chisna.

Blue grass was sown at the same time, but I could not find a sample of sufficient growth to forward for your inspection. We also planted peas, beans, wheat, oats, barley, and radishes; also onions, lettuce, and turnips in the locality of the Chisna post-office. Had the horses not nipped the oats, wheat, and barley they doubtless would have matured. The vegetables above named would do well under favorable attention.

From the inspection of what we have sown and planted, we are of the opinion that oats, barley, and timothy will do quite well—timothy in particular.

Very respectfully, yours,

HAZELET and MEALS,

Of the Chisna Mining and Improvement Company.

GARDENS ON THE YUKON.

NULATO, ALASKA, *September 22, 1902.*

DEAR SIR: The five packages of assorted seeds which I received from the Department in the summer of 1901 were distributed to Mr. George Perrault, Bishop

Mountain, 30 miles above Nulato, on the south bank of the Yukon; to Corpl. Joseph R. Randolet, U. S. Signal Corps, Narardotiltén, 45 miles above Nulato, northern bank of the Yukon; to Mr. Edward Keogh, Kantotsitsten, 55 miles above Nulato, on the north bank of the river; to Mr. Richard Motschman, in the same locality, and one package was kept and used at the mission in Nulato.

I visited the gardens during the summer, except that of Mr. Perrault, and found them quite satisfactory. Mr. Perrault reports that he had not as good success as he anticipated, though he carefully prepared the ground, burning the stumps and brush. He attributes his partial failure to the fact that the ground was altogether new, and he expects better success next year, the soil being now loose and thawed. However, the radishes, ruta-bagas, and lettuce have given full satisfaction.

Corporal Randolet sowed his seeds in several patches, on the best exposed points around the telegraph station. The patches of cultivated soil almost disappeared amidst the rank grass that surrounded them, and made very little show on the ground. The growth, however, was good, and the vegetables came out very nicely.

Messrs. Keogh and Motschman were under better circumstances, being able to avail themselves of a large patch already cleared, and tilled in previous year.

This garden was quite a success, having a variety of vegetables which I have not seen equaled except in our mission gardens, which are on a rather large scale. Besides the ordinary radish, ruta-baga, and lettuce, there were beans and peas, carrots and parsnips, all in very good shape when I passed. The cabbage, however, did not seem to prosper as well as the other plants.

In the mission garden all the above seeds have given full satisfaction. Potatoes have succeeded remarkably well this season. About 30 bushels were dug from our garden, and their size and quality are by far above that of the preceding years. The barley which you gave me for experimenting was sown, part along the southern side of the residence on a narrow strip of good soil in an exceptionally well-exposed situation, and part in the garden, without special protection. Only the former matured; the latter did not harden, though the season has been remarkably long and warm.

Very sincerely, yours,

[Rev.] JULIUS JETTE, S. J.

HOLY CROSS GARDENS BETTER THAN EVER BEFORE.

HOLY CROSS MISSION, KOSEREFSKY POST-OFFICE,
Yukon River, Alaska, September 23, 1902.

DEAR SIR: Our gardens have beaten the record for ten years. The potatoes are large and better quality than usual, especially those from seed sprouted in soil before planting in the garden. The largest turnip, Flat Dutch, weighed about 16 pounds. The Yellow Globes did well also. We had green peas in abundance, and beans for the first time. Our radishes and lettuce found a ready sale on the boats. Berries grew in profusion, and almost everybody has a good supply for winter.

Some of our more intelligent natives are trying to start gardening and are receiving substantial encouragement from the mission.

Respectfully, yours,

J. V. O'HARE, S. J.

SEEDS ARE VALUED—TANANA FARM LANDS.

RAMPART, ALASKA, *August 1, 1902.*

DEAR SIR: Please permit me to thank you for the supply of garden and grass seed, which came to hand some weeks since, and all of which have been carefully planted, although put in very late. I am located across the divide on the Tanana slope, where there is an untold acreage of the finest farm land imaginable. More gardens

have been planted here this summer, by far, than ever before, but not one-hundredth of what should be planted. No seed is to be had except what is supplied by the Government, and the encouragement to farming and gardening will prove a good investment.

Sincerely, yours,

E. J. TOWNSEND.

ON THE YUKON.

RAMPART, ALASKA, *July 2, 1902.*

DEAR SIR: The present season so far promises to be the most favorable for gardening of any for six years. Spring came early, with steady, fine, warm weather about the 1st of May. June was hot and dry, and vegetables needed a good deal of watering to give them a good start. The last two weeks have brought plenty of rain.

Cabbage, kale, cauliflower, ruta-bagas, beets, turnips, and lettuce are well advanced and look as healthy and strong as those grown under the most favorable circumstances of soil and climate. Radishes did not grow as crisp and tender as in former years, probably due to the hot sun shining on them from eighteen to twenty hours daily. Peas did not come up well; only about one-tenth of the seeds sprouted. They are in bloom now. All of the above seeds were planted in ground that had been under cultivation from two to five years, were well taken care of, but, with exception of the potatoes, had no manure or fertilizer. This is my third attempt to grow potatoes. Twice the frost killed them, in 1901 on July 30 and in 1900 on August 16.

Respectfully,

JNO. A. CLINTON.

STRAWBERRIES SURVIVE WINTER AT DAWSON.

DAWSON, ALASKA, *July 3, 1902.*

DEAR SIR: The oats which we planted this year on old ground look as if they were going to do much better this summer than last. The spring was much later this year. We planted a few strawberries last year in July just for an experiment. They lived through the winter nicely and now have quite a supply of good-sized berries on them. We put them in sandy soil and put lots of ashes around them.

Yours, sincerely,

J. A. MORGAN.

GARDENING AT COLDFOOT, ONE HUNDRED MILES NORTH OF THE ARCTIC CIRCLE.

DEAR SIR: We are located about 100 miles north of the Arctic Circle, near the headwaters of the Koyukuk River. Last year I had very good success with radishes, lettuce, turnips, and cabbage, although the cabbage did not come to head, yet it grew so rapidly that the leaves were tender and of fine flavor. I pulled the cabbage after the first light snow and hung it up and let it freeze. Have only used the last a few days ago, and it was as good as in the early fall. Have turnips yet, and they are all right. I think that my success with gardening last year will induce a number of other people to try it this year. It will be a great help to the community if all would raise a few of the vegetables mentioned, should we not succeed with other varieties, and will do much to promote good health, as we are in such an isolated locality that it is almost impossible to get any fresh vegetables, and when we do, the expense is very high. Last summer I paid 45 cents per pound for potatoes.

Yours, truly,

D. A. MCKENZIE,
United States Commissioner.

COLDFOOT, ALASKA, *September 1, 1902.*

MY DEAR SIR: This was a dry season, the driest in four seasons I have been in Alaska, but I have had fairly good success with my garden this year. The radishes, lettuce, and turnips were a perfect success; also the cabbage looks very healthy at this writing, and I believe fairly developed heads will appear. The onions raised from sets did nicely; the turnips—if I had any way of sending one to you, would certainly do so—the largest I should judge would weigh 4 pounds. I do not want to pull them yet, as I want to give the largest show possible; later I will send their weight.

I am satisfied that with a little investigation and study vegetables can be produced in this country that will satisfy the demands of the population. If we could only secure fresh potatoes, I have no doubt they would make a fairly good crop, but the trouble is the potatoes we receive are two years old when they are planted, consequently do not thrive. We can not raise onions from the seed, but if we could get onion sets we could supply ourselves with green onions.

It seems that the success of gardening rests entirely on the proper soil and then giving it proper attention. The ground that I prepared last year produced at least four times the amount of vegetables that the new ground produced. Sandy soil, worked very thoroughly, with plenty of wood ashes and horse manure, if it can be secured, seems to produce the best results. I shall extend my ground next spring so that I will have about an acre.

We have an abundance of some varieties of wild berries in this section of the country that are a great help in the food line. Blueberries grow in abundance; also the low bush cranberry, a very delicious berry when preserved; also the wild currant. I believe the domestic currant would thrive here, and perhaps some other small fruits, if we could only manage to get the sets in here for a starter. In fact, there is far more that can be accomplished in this northern country than would be imagined possible by people who have not investigated the subject.

Yours, respectfully,

D. A. MCKENZIE,
United States Commissioner.

FROM THE SHORES OF THE ARCTIC OCEAN.

POINT HOPE, ALASKA, *August 10, 1902.*

DEAR SIR: The seeds which you sent reached me a few days since, but I will not be able to plant them until next year. I have already planted twice this season, once on June 15 and again July 9, but can not at present report results. I will do so later on.

The radishes appear to be the only vegetables that will mature. They were planted June 15, and I expect that if no frost comes they will have sufficiently matured for use by the beginning of September. The peas have come up, but are quite small, and do not look as if they will amount to anything. Some of the other seeds have not made any sign of coming up. I am afraid that the ground is too cold.

Yours, very truly,

[Rev.] JOHN B. DRIGGS.

GARDENING IN NORTHERN ALASKA.

The Crop Reporter for the month of September, 1902, issued by the United States Department of Agriculture, contains an article by Mr. Middleton Smith, which is of special interest because of the author's experience in the north. Mr. Smith was

employed as a naturalist on the International Polar Expedition, to which he refers. An extract from this article follows:

"Probably the first experimental gardening in Alaska, north of the Arctic Circle, was done by the International Polar Expedition to Point Barrow, Alaska, 1881-1883, which was organized for the purpose of cooperating in the work of circumpolar observation proposed by the International Polar Conference. The main object of the expedition was the prosecution of observations in terrestrial magnetism and meteorology. Experimental gardening was an elective investigation.

"The arctic night at Point Barrow, which is of seventy days' duration, ends at noon on January 23, when the upper edge of the sun's disk appears above the southern horizon. The day continues to lengthen and night to shorten until the middle of May, when the midnight sun appears above the northern horizon and the long arctic day begins. The sun then remains above the horizon both day and night for seventy days, or until July 24, when it dips its lower disk at midnight below the northern horizon, and night and day again begin.

"The snow does not begin to melt until after the sun remains continuously above the horizon and does not disappear before July, but the land close to the coast is practically free from snow by the 5th of June. The snowfall is very light, the depth on the land along the coast at no time exceeding 15 or 18 inches. The total annual precipitation—rainfall or melted snow—is only 8 inches.

"A level, treeless area (tundra) occupies the entire Point Barrow region. The subsoil, principally sand and gravel, perpetually frozen, is covered on the tundra generally by a light, clayey soil, and at spots near the coast by a dark, loam-like soil, which thaws to a depth of from 3 to 9 inches. Upon the latter soil, within 200 yards of the ocean water line, the gardening was done. The soil has been enriched somewhat by refuse from Eskimo igloos, or permanent dwellings, which many years previous existed there. The garden was dug to the depth of about 4 inches and raked. No other preparation of the soil was made, and no further attention was given to the garden from the time of seeding to harvest day.

"On June 13 the seed of lettuce, radish, and mustard were sown. By this date caterpillars, worms, flies, and beetles appeared; ranunculus flowers were in bloom. June 21, 1 day before the sun reached its highest altitude and 8 days after the date of seeding, the lettuce and radish germinated, but the mustard failed of germination. By this date additional species of flowers, including the daisy and willow, were in bloom, and the pools of fresh water, which had formed on the tundra from rain and melted snow, were fairly alive with insect life.

"On the tenth day of July, 27 days after seeding and 19 days after germination, harvesting began. The lettuce leaves were from 1 to 2 inches in width and from 3 to 4 inches in length. The radishes, spherical in form, were from one-half to 1 inch in diameter. The condition of these vegetables at the time of harvest was perfect. The quality could not be excelled by any grown anywhere in the lower latitudes, Antarctica by inference excepted.

"During the nineteen days required for the crops to mature the minimum temperature was 32° or below for 9 days. The maximum temperature was 50° or above for 3 days only. The mean daily temperature, from hourly observations, ranged from 30.92° to 53.35°, the general average mean for the entire time being 38.16°. The total precipitation was 0.13 inch. There were 4 clear, 5 fair, and 10 cloudy or foggy days.

"A study of the conditions under which the plants germinated and matured is not only curiously interesting, but suggests that there was some stimulating force—perhaps the large amount of atmospherical electricity—which caused them to arrive at maturity in a much shorter period than those grown in temperate zones. Whatever the agency, inasmuch as the summer season is so very brief, it is absolutely necessary that plant life in the north should arrive at maturity very quickly in order to perpetuate the species."

A COLONY OF FINNS TO BE LOCATED ON KENAI PENINSULA.

Messrs. Hornborg & Co., who operate a steamship line between Finland and New York, have made arrangements to bring out a colony of Finns the coming spring and locate them in Alaska. The Finlanders are at present leaving their native land in great numbers, and the climate of Alaska being similar to that of Finland, they naturally desire to locate there. The place which has been selected for the settlement is on the southern end of the Kenai Peninsula, on Katchamak Bay, which is bordered by a large tract of land that appears promising for agriculture. The bay is large; it affords excellent shipping facilities; some large streams empty into it which abound in fish, and the neighboring mountains are well stocked with game. The selection seems to be a favorable one from all points of view.

In response to a letter of inquiry which I sent to a member of the company I received the following reply:

HOMER, ALASKA, *September 26, 1902.*

Prof. C. C. GEORGESON, *Sitka, Alaska.*

DEAR SIR: I have just completed all that can be done this season in the way of arranging for the bringing to the upper part of the bay our Finnish colony, and am now on my way to New York.

The necessary lands for landing and caring for the immigrants while their houses are being put up have been surveyed, and a location on the highland on the upper western shore of the bay decided on. The landing place will be at Bear Cove, on the eastern side, as there the water is deep. The stock and immigrants can be carried over in scows from that point.

The coming spring we do not propose to locate more than 20 or 30 families, as we wish to have some here for a year before bringing out a large number, in order that they may get off one crop and we be assured that we have made no mistake in the selection of the Kenai Peninsula for a colony site.

We know that you are interested in the success of the experiment and shall feel indebted to you for any aid you may give by advice as to treatment of soil, crops, etc., and for the necessary seeds for the first year's planting.

The families will arrive here in early May, so they can plant their crops by the end of the month or the first of June.

Very truly, yours,

E. S. CHURCHILL,

Director Alaska Colony Company.

This appears to be a commendable enterprise. Alaska will be the gainer by the planting of such colonies, and she has unlimited room for them. Of all northern peoples who may find Alaska congenial there are none who will surpass the Finns as pioneers. They are a hardy, industrious, and law-abiding people. They are familiar with the climate and the methods of culture which must be adopted. They are excellent farmers, dairymen, and stock raisers.

Finland lies in the same latitudes as Alaska, and although it has but one-fourth the area of Alaska it has a population of 2,600,000. Out of this total only about 300,000 live in cities; the rest live in the country and small villages, and a large majority of them are farmers. If Alaska could secure a large immigration of Finns, the development of the Territory would be assured.

THE SOIL TEMPERATURES.

I submit herewith a record of the soil temperatures at the stations at Sitka, Kenai, and Copper River, the latter for but little over two months, however; also the record for August and September at Eagle during 1901. The two soil thermometers are planted 6 inches and 24 inches deep, respectively. The radiation thermometer is simply an ordinary minimum thermometer, which is suspended 6 inches above the surface of the soil, and therefore gives the minimum temperature as the vegetation feels it.

Soil temperatures.

SITKA EXPERIMENT STATION.

Day.	6-inch thermometer.	24-inch thermometer.	Radiation thermometer.	Day.	6-inch thermometer.	24-inch thermometer.	Radiation thermometer.	Day.	6-inch thermometer.	24-inch thermometer.	Radiation thermometer.
1902.	°F.	°F.	°F.	1902.	°F.	°F.	°F.	1902.	°F.	°F.	°F.
May 1	43.5	40.5	-----	July 2	56	52	44	Sept. 2	53	52.5	45
May 2	44	40.5	36	July 3	55.5	52	47	Sept. 3	53	52.5	46
May 3	43.5	41	30	July 4	55	52	47	Sept. 4	52.5	52	46
May 4	44	41	29	July 5	55	52	43	Sept. 5	52.5	52	46
May 5	45	41.5	29	July 6	55	52	40	Sept. 6	52	52	42
May 6	44.5	41.5	29	July 7	55	52	40	Sept. 7	51.5	52	44
May 7	45	42	30	July 8	56	52	41	Sept. 8	52.5	51.5	48
May 8	46.5	42	30	July 9	57	52.5	50	Sept. 9	54	51.5	47.5
May 9	47.5	42.5	33	July 10	57	52.5	40	Sept. 10	52	52	45
May 10	46.5	42.5	36	July 11	56	52.5	40	Sept. 11	52	51.5	44
May 11	46.5	42	36	July 12	57.5	52.5	50	Sept. 12	53	52	45
May 12	46	43	31	July 13	56.5	52.5	48	Sept. 13	51	51.5	35
May 13	46	43	31	July 14	55	53	45	Sept. 14	51	51.5	40
May 14	46	43.5	31	July 15	50.5	53	40	Sept. 15	50	51	34
May 15	47	43.5	31	July 16	56.5	53	47	Sept. 16	50	51.5	41
May 16	48	43.5	38	July 17	56.5	53	50	Sept. 17	55	51	41
May 17	47.5	44	37	July 18	56.5	53	51	Sept. 18	49	51	37
May 18	47.5	44	38	July 19	57	53	52	Sept. 19	49	50	38.5
May 19	47	44.5	38	July 20	57.5	53	52	Sept. 20	49	51.5	39
May 20	47.5	44.5	40	July 21	57	53	49	Sept. 21	49	51	40
May 21	47	44.5	37	July 22	57	53	48	Sept. 22	50	50.5	41
May 22	46.5	44.5	35	July 23	56.5	53	50	Sept. 23	49.5	50	40
May 23	47.5	44.5	35	July 24	56.5	53	50	Sept. 24	48	50	36
May 24	48	45	43	July 25	56.5	53	50	Sept. 25	49	50	41
May 25	48	45	38	July 26	56.5	53	49	Sept. 26	48	50	41.5
May 26	48	45	34	July 27	56.5	53	45	Sept. 27	48	50	39
May 27	47.5	45	32	July 28	56.5	53	50	Sept. 28	49	49.5	42
May 28	47.5	45.5	38	July 29	56.5	53	47	Sept. 29	49	49.5	44
May 29	47.5	45.5	41	July 30	57.5	53	48	Sept. 30	50	49	41
May 30	48.5	45.5	36	July 31	58.5	53.5	50	Oct. 1	51	49	46
May 31	47.5	45.5	39	Aug. 1	59	53.5	52	Oct. 2	51	49	45
June 1	47.5	45.5	32	Aug. 2	58.5	53.5	51	Oct. 3	51	49	45
June 2	49	46	38	Aug. 3	58.5	53.5	50	Oct. 4	51	49.5	44
June 3	50.5	46	38	Aug. 4	57.5	54	50	Oct. 5	50.5	49.5	46
June 4	51	46	41	Aug. 5	57	54	52	Oct. 6	51	50	46
June 5	51.5	46.5	40	Aug. 6	56.5	54	51	Oct. 7	52	50	47
June 6	51.5	46.5	45	Aug. 7	56.5	54	50	Oct. 8	51	50	46
June 7	51	47	43	Aug. 8	57	54	42	Oct. 9	51.5	50.5	46
June 8	51	47	43	Aug. 9	57.5	54	51	Oct. 10	51	50	46
June 9	51.5	47.5	44	Aug. 10	57	54	48	Oct. 11	51.5	50	36
June 10	51.5	47.5	44	Aug. 11	56.5	54	45	Oct. 12	50.5	50	36
June 11	51.5	47.5	44	Aug. 12	56	54	48	Oct. 13	49	50	34
June 12	51.5	48	45	Aug. 13	56.5	54	50	Oct. 14	48	50	34
June 13	51	48	45	Aug. 14	55	54	45	Oct. 15	46	49	34
June 14	52	48	38	Aug. 15	55	54	41	Oct. 16	47	49.5	38
June 15	53	48	38	Aug. 16	55	54	45	Oct. 17	46	49	33
June 16	54	48.5	41	Aug. 17	55	53.5	48	Oct. 18	45	49	34
June 17	54	48	37	Aug. 18	55	53.5	48	Oct. 19	45	48	25
June 18	54.5	49	42	Aug. 19	55	53.5	44	Oct. 20	43	48.5	31
June 19	55	49	40	Aug. 20	55	53.5	41	Oct. 21	45	48.5	34
June 20	55	49	38	Aug. 21	55	53.5	45	Oct. 22	45	48	35
June 21	56.5	50	42	Aug. 22	55	53.5	44	Oct. 23	45	47	32
June 22	57.5	50	50	Aug. 23	54	53.5	44	Oct. 24	44.5	47.5	35
June 23	56.5	50	50	Aug. 24	54	53.5	41	Oct. 25	44	47	35
June 24	58	51	44	Aug. 25	53	54	41	Oct. 26	43	47	26
June 25	58	51	44	Aug. 26	52.5	54	41	Oct. 27	43	47	31
June 26	57	51	47	Aug. 27	53	52.5	35	Oct. 28	45	47	32
June 27	56.5	51.5	41	Aug. 28	52	52.5	39	Oct. 29	44	47	33
June 28	57.5	51.5	46.5	Aug. 29	52	52.5	37	Oct. 30	42	45	31
June 29	56.5	51.5	40	Aug. 30	53	52.5	48	Oct. 31	42	46	32
June 30	56	52	47	Aug. 31	54	52.5	48				
July 1	56	52	48	Sept. 1	53	52.5	45				

Soil temperatures—Continued.

KENAI EXPERIMENT STATION.

Day.	6-inch ther- mome- ter.	24-inch ther- mome- ter.	Radia- tion ther- mome- ter.	Day.	6-inch ther- mome- ter.	24-inch ther- mome- ter.	Radia- tion ther- mome- ter.	Day.	6-inch ther- mome- ter.	24-inch ther- mome- ter.	Radia- tion ther- mome- ter.
1902.	°F.	°F.	°F.	1902.	°F.	°F.	°F.	1902.	°F.	°F.	°F.
May 19	38	.....	.....	June 23	54	43	.....	July 28	60.5	51.5	.....
May 20	37.5	.....	.....	June 24	55	43.5	.....	July 29	60	51.5	.....
May 21	38	.....	.....	June 25	56	44	.....	July 30	57.5	51.5	.....
May 22	39	.....	.....	June 26	56	44.5	.....	July 31	57	51.5	.....
May 23	39.5	.....	.....	June 27	55	45	.....	Aug. 1	58.5	51.5	.....
May 24	40.5	.....	.....	June 28	53.5	45	.....	Aug. 2	58	51.5	.....
May 25	40.5	.....	.....	June 29	54.5	45	.....	Aug. 3	58	51.5	.....
May 26	40	.....	.....	June 30	56	45	.....	Aug. 4	56	51.5	.....
May 27	41	.....	.....	July 1	55	45.5	.....	Aug. 5	55.5	51.5	.....
May 28	41	.....	.....	July 2	55	46	.....	Aug. 6	55.5	51	.....
May 29	44	.....	.....	July 3	56	46	.....	Aug. 7	56	51	.....
May 30	42	.....	.....	July 4	55	46	.....	Aug. 8	54.5	51	.....
May 31	42.5	.....	.....	July 5	56	46.5	.....	Aug. 9	55	51	.....
June 1	44.5	.....	.....	July 6	53.5	46.5	.....	Aug. 10	56	50.5	.....
June 2	46	34	.....	July 7	55	47	.....	Aug. 11	55	50.5	.....
June 3	48	34.5	.....	July 8	56.5	47	.....	Aug. 12	54.5	50.5	.....
June 4	49	35.5	.....	July 9	57	47	.....	Aug. 13	55	50.5	.....
June 5	49.5	36.5	.....	July 10	58	47.5	.....	Aug. 14	57	50.5	.....
June 6	49.5	37.5	.....	July 11	56	47.5	.....	Aug. 15	55	50.5	.....
June 7	50	38	.....	July 12	58.5	48.5	.....	Aug. 16	54.5	50.5	.....
June 8	50.5	38.5	.....	July 13	61	49	.....	Aug. 17	54	50.5	.....
June 9	50.5	39	.....	July 14	60.5	49.5	.....	Aug. 18	52.5	50.5	.....
June 10	50	39.5	.....	July 15	57.5	50	.....	Aug. 19	55	50	.....
June 11	49.5	39.5	.....	July 16	59	50	.....	Aug. 20	54.5	50	.....
June 12	49.5	40	.....	July 17	56.5	50	.....	Aug. 21	55.5	50	.....
June 13	51	40	.....	July 18	58	50	.....	Aug. 22	55.5	50	.....
June 14	52.5	40	.....	July 19	58	50	.....	Aug. 23	53.5	50	.....
June 15	53.5	41	.....	July 20	57.5	50	.....	Aug. 24	53	50	.....
June 16	54.5	41.5	.....	July 21	58.5	50	.....	Aug. 25	53	50	.....
June 17	55	42	.....	July 22	57.5	50	.....	Aug. 26	53.5	50	.....
June 18	54.5	42.5	.....	July 23	57	50.5	.....	Aug. 27	52.5	49.5	.....
June 19	52	42.5	.....	July 24	59.5	50.5	.....	Aug. 28	52	49.5	.....
June 20	52	43	.....	July 25	60.5	50.5	.....	Aug. 29	51.5	49.5	.....
June 21	53.5	43	.....	July 26	61	51	.....	Aug. 30	54	49.5	.....
June 22	55	43	.....	July 27	60	51	.....	Aug. 31	55	49.5	.....

COPPER RIVER STATION, COPPER CENTER.

1902.	°F.	°F.	°F.	1902.	°F.	°F.	F.	1902.	°F.	°F.	°F.
July 26	53.5	47.5	40	Aug. 18	50	47.5	34	Sept. 10	46.5	45	43
July 27	54	48	32	Aug. 19	49	47.5	40	Sept. 11	45.5	45	44
July 28	56	48	35	Aug. 20	50	47	44	Sept. 12	44	44.5	31
July 29	58	48.5	50	Aug. 21	49.5	47	34	Sept. 13	44.5	44	41
July 30	55	48.5	32	Aug. 22	49	47	25	Sept. 14	44.5	44.5	35
July 31	55.5	48.5	49	Aug. 23	52	47	43	Sept. 15	42	44	11
Aug. 1	53.5	48.5	31	Aug. 24	50	47	31	Sept. 16	42	44	16
Aug. 2	56.5	48.5	50	Aug. 25	51.5	47	43.5	Sept. 17	41	43.5	20
Aug. 3	55	49	33	Aug. 26	48	47	32	Sept. 18	40	43.5	17
Aug. 4	53.5	48.5	34	Aug. 27	47.5	46.5	27	Sept. 19	42.5	43	29
Aug. 5	54.5	48.5	45	Aug. 28	48.5	46.5	44	Sept. 20	43	43	40
Aug. 6	53.5	48.5	43	Aug. 29	48.5	46.5	38	Sept. 21	41.5	42.5	32
Aug. 7	53.5	48.5	43	Aug. 30	48	46.5	33	Sept. 22	40	42.5	21
Aug. 8	52	48.5	24	Aug. 31	47	46.5	26	Sept. 23	40	42.5	12
Aug. 9	52.5	48	45	Sept. 1	47	46	29	Sept. 24	39	42	22
Aug. 10	53	4	45	Sept. 2	47.5	46	29	Sept. 25	37	41.5	23
Aug. 11	54	48	46	Sept. 3	47.5	46	36	Sept. 26	35.5	41	23
Aug. 12	53	48	44	Sept. 4	49	46	44	Sept. 27	34	40.5	23
Aug. 13	51.5	48	41	Sept. 5	46.5	46	28	Sept. 28	36	40.5	38
Aug. 14	51.5	47.5	50	Sept. 6	47	46	39	Sept. 29	39	40	43
Aug. 15	50.5	47.5	45	Sept. 7	47	45.5	37	Sept. 30	40	40.5	39
Aug. 16	51	47.5	46	Sept. 8	46	45.5	37				
Aug. 17	52	47.5	47	Sept. 9	45.5	45.5	39				

Soil temperatures—Continued.

EAGLE.

Day.	6-inch thermometer.	24-inch thermometer.	Radiation thermometer.	Day.	6-inch thermometer.	24-inch thermometer.	Radiation thermometer.	Day.	6-inch thermometer.	24-inch thermometer.	Radiation thermometer.
1901.	°F.	°F.	°F.	1901.	°F.	°F.	°F.	1901.	°F.	°F.	°F.
Aug. 1	48	45.5	41	Aug. 22	46	43	43.5	Sept. 12	43.5	44.5	30
Aug. 2	48.5	45	31.4	Aug. 23	46	43	31	Sept. 13	43.5	44	30
Aug. 3	50.5	45	45	Aug. 24	49.5	43	41.5	Sept. 14	41.5	44	28
Aug. 4	52	45.5	49.4	Aug. 25	50	43.5	40	Sept. 15	43.5	43.5	26
Aug. 5	49.5	45.5	31.3	Aug. 26	49.5	45	41	Sept. 16	41.5	43	21.6
Aug. 6	49.5	45.5	36.2	Aug. 27	48.5	45.5	35	Sept. 17	40.5	43	22
Aug. 7	49.5	45.5	33.5	Aug. 28	47.5	45.5	36	Sept. 18	39.5	42.5	19.5
Aug. 8	51.5	45.5	46.8	Aug. 29	49.5	45.5	46	Sept. 19	40	42	31.5
Aug. 9	50.5	45.5	47	Aug. 30	47.5	46	33.5	Sept. 20	41	41.5	33
Aug. 10	47.5	45.5	28.5	Aug. 31	45.5	45.5	26.8	Sept. 21	43	41.5	41
Aug. 11	47.5	45.5	29.8	Sept. 1	44.5	45	24.2	Sept. 22	41.5	41.5	31
Aug. 12	47.5	45.5	34.6	Sept. 2	44.5	45	32.1	Sept. 23	41.5	41.5	32
Aug. 13	47	45.5	26	Sept. 3	44.5	45	36.8	Sept. 24	40.5	41.5	27
Aug. 14	48	45	39.7	Sept. 4	43.5	44.5	24.5	Sept. 25	41	41.5	36
Aug. 15	48	45	42	Sept. 5	46	44	39	Sept. 26	40	41.5	26.5
Aug. 16	46	45	29.5	Sept. 6	45.5	44	35	Sept. 27	39	41.5	26.5
Aug. 17	47	45	40.5	Sept. 7	45.5	44	35	Sept. 28	39.5	41	30.8
Aug. 18	45.5	45	29	Sept. 8	43.5	44.5	23.9	Sept. 29	38.5	40.5	27
Aug. 19	44.5	45	25	Sept. 9	45	44	36.1	Sept. 30	37	40.5	20
Aug. 20	41.5	44	24	Sept. 10	45.5	44	39.2				
Aug. 21	41.5	43.5	19	Sept. 11	46	44.5	37.5				

WEATHER SERVICE.

In addition to the foregoing, I have also, as in the past, had charge of the volunteer weather service in Alaska. The service consists entirely of volunteer observers, who are supplied with instruments and blanks by the Weather Bureau, and who render monthly reports of their observations. The supplies are sent to the headquarters station at Sitka and from there distributed to the observers as required. The reports are likewise sent to the headquarters station, where one copy is filed and another sent to the Chief of the Weather Bureau at Washington.

Until we shall have gathered data for a series of years from all parts of Alaska in regard to rainfall, temperature, and other weather conditions, this service is of the utmost importance to the success of the agricultural investigations. Condensed data for each month from 1899 to the present are submitted herewith.

Meteorological observations.

SITKA. F. E. Rader, Observer.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maxi-mum.	Mini-mum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1899.	°F.	°F.	°F.	Inches.				
May.....	61	29	43	4.01	3	7	21	17
June.....	62	33	48.3	4.99	.....	9	21	16
July.....	87	42	56.5	2.27	6	10	15	8
August.....	67	40	54.5	8.35	4	7	20	14
September.....	68	40	51.1	8.52	4	3	23	19
October.....	62	30	46.3	7.90	3	5	22	17
November.....	57	29	43.5	7.02	2	3	25	14
December.....	50	21	35.4	6.94	7	4	20	11

Meteorological observations—Continued.

SITKA. F. E. Rader, Observer—Continued.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maximum.	Minimum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
	°F.	°F.	°F.	Inches.				
1900.								
January.....	48	26	36.9	8.71	3	5	23	13
February.....	47	10	33	3.49	9	2	17	13
March.....	65	- 1	37.8	2.62	9	8	14	9
April.....	59	30	41	12.09	5	17	8	22
May.....	69	31	45.4	4.56	6	21	4	19
June.....	71	34	51.8	3.13	9	14	7	13
July.....	69	45	55.4	3.77	2	16	13	16
August.....	67	40	55.2	7.92	2	22	7	19
September.....	65	32	50.9	7.82	4	16	10	14
October.....	58	28	42.5	10.73	3	19	9	20
November.....	57	15	36.4	9.39	8	7	15	14
December.....	52	24	37.4	6.59		9	22	24
1901.								
January.....	48	18	34	9.33	7	3	21	23
February.....	45	13	30.3	6.38	12	6	10	9
March.....	46	17	36.8	7.80	4	12	15	25
April.....	58	- 27	44.5	7.17	6	12	12	15
May.....	65	31	44.5	4.86	8	13	10	16
June.....	61	36	48.6	1.26	2	11	17	9
July.....	74	35	54.8	.45	8	14	9	6
August.....	63	39	53.7	10.03		5	26	25
September.....	65	39	51.4	8.52	3	12	15	16
October.....	61	26	44.98	15.49	2	15	14	26
November.....	52	26	37.9	6.16	6	8	16	16
December.....	51	19	37.3	10.18	6	3	22	25
1902.								
January.....	49	16	36.2	10.92	4	1	26	22
February.....	51	26	39.5	2.25	8	7	13	10
March.....	50	7	34	19	6	3	22	19
April.....	59	28	40.7	12	3	11	16	12
May.....	64	34	45.7	14	8	8	15	14
June.....	77	36	53.9	6	11	8	11	6
July.....	74	38	55.53	7.35	4	11	16	20
August.....	64	40	54.16	14.96		14	17	28
September.....	62	40	50.3	13.43	1	11	18	26

KILLISNOO. Jos. Zuboff, Observer.

1899.								
January.....	40	11	29.4	6.41	6	3	22	20
February.....	42	3	26.5	4.80	3		25	20
March.....	44	8	28.6	2	12	6	13	7
April.....	47	27	38.6	1.60	5	3	22	8
May.....	54	26	40.6	1.40	8	3	20	6
June.....	65	37	48.7	3.20	1	9	20	10
July.....	71	44	56.5	.90	10	11	10	4
August.....	68	40	53.9	1.95	4	5	21	13
September.....	59	35	46.8	7.40	4	4	22	19
October.....	52	26	38.5	5.95	4	4	23	22
November.....	49	25	37.8	6.30	1	3	26	24
December.....	40	16	29.2	3.45	6	9	16	15
1900.								
January.....	42	11	31	5.55	3	6	22	17
February.....	42	10	29.9	3.35	9	4	15	12
March.....	50	- 2	32.4	2.40	13	3	15	12
April.....	53	27	40.8	6.85	4	5	21	21
May.....	60	40	46.2	2.20	7	8	16	10
June.....	71	33	50.1	4.30	8	6	16	11
July.....	74	46	57.8	8.45	4	12	15	12
August.....	70	36	54.2	2.30	1	10	20	16
September.....	60	35	48	4.25	5	7	18	18
October.....	54	28	39.5	6	2	5	24	23
November.....	45	10	31.8	7.05	11	2	17	15
December.....	45	20	34.1	6.50		5	26	19
1901.								
January.....	37	13	27	6.95	6	4	21	20
February.....	41	9	23.2	6.05	11	5	12	11
March.....	43	12	34.6	5.40	2	6	23	17
April.....	45	23	36	1.15	2	10	18	7
May.....	61	31	42.8	4	4	10	17	15
June.....	65	34	51.3	1.60	4	14	12	5

Meteorological observations—Continued.

KILLISNOO. Jos. Zuboff, Observer—Continued.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maxi-mum.	Mini-mum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1901.—	°F.	°F.	°F.	Inches.				
July.....	71	43	57.6	1.40	6	14	11	8
August.....	66	40	51.5	5.95	.....	9	22	20
September.....	63	36	49.9	5.50	.....	9	21	17
October.....	54	32	43.6	9.10	2	23	6	22
November.....	42	23	34.9	3.55	0	4	26	12
December.....	41	21	33.5	5.30	1	7	23	17
1902.								
January.....	43	13	32.5	6.95	1	5	25	18
February.....	45	19	32.6	2.65	4	7	17	12
March.....	45	6	29.6	1.50	5	10	16	12
April.....	52	26	40.5	2.10	4	12	14	8
May.....	56	32	44.3	3.70	3	13	15	11
June.....	71	36	55.5	1.60	7	10	13	9
July.....	72	45	55.9	3.80	4	11	16	11
August.....	68	41	54	4.80	0	5	26	20
September.....	60	38	49.1	7.20	0	6	24	21

JUNEAU. John McLaughlin, Observer.

1899.								
January.....	44	4	27.4	4.22	11	15	5	17
February.....	42	4	26	3.81	15	18	.....	13
March.....	44	10	29.2	1.58	9	9	13	10
April.....	52	30	40	4.28	6	3	21	19
May.....	69	29	45	4.68	4	23	4	15
June.....	68	40	52	5.63	4	8	18	20
July.....	86	48	62	1.06	18	8	5	7
August.....	71	42	56	4.88	6	11	14	16
September.....	66	36	50.3	9.10	5	3	22	23
October.....	58	26	40.4	11.90	10	6	15	18
November.....	56	28	40.6	6.71	7	7	16	18
December.....	48	11	31.4	8.32	13	12	6	16
1900.								
January.....	40	12	30.6	8.52	11	11	9	20
February.....	40	10	29	4.09	13	8	7	9
March.....	61	5	33.8	3.06	20	7	4	12
April.....	61	30	41.3	11.37	6	4	20	23
May.....	64	36	47.2	5	9	10	12	18
June.....	76	36	53.9	2.27	14	6	10	9
July.....	77	45	56.2	5.19	7	11	13	12
August.....	71	39	54.8	6.57	9	4	18	18
September.....	65	34	50.4	10.84	12	4	14	16
October.....	55	28	41.5	10.91	10	2	19	20
November.....	49	10	32.9	12.45	12	6	12	13
December.....	49	9	32	7.87	3	7	21	25
1901.								
January.....	40	10	28	9.57	8	3	20	21
February.....	44	13	26	6.32	16	2	10	8
March.....	48	16	36	8.23	10	4	17	17
April.....	55	28	40	8.39	14	3	13	13
May.....	67	33	46	3.57	10	9	12	17
June.....	69	39	53.3	1.93	8	10	12	11
July.....	79	40	57	1.98	15	4	12	12
August.....	67	45	53.7	14.04	2	2	27	22
September.....	65	36	49.5	11.41	7	6	17	18
October.....	57	23	44.2	16.50	5	8	18	26
November.....	44	20	34.2	35.2	5	20	5	17
December.....	46	13	34.5	13.33	8	3	20	23
1902.								
January.....	43	12	33	11.96	7	1	23	23
February.....	50	21	35.8	2.08	8	7	13	19
March.....	50	3	30.4	5.64	7	9	15	18
April.....	61	30	41.3	4.34	9	7	14	13
May.....	65	35	48.3	3.99	14	14	3	12
June.....	80	42	67.3	2.41	9	12	9	11
July.....	72	43	54.8	7.60	5	5	21	13
August.....	62	41	52.4	12.10	1	6	24	25
September.....	59	37	49.1	14.24	1	8	21	25

Meteorological observations—Continued.

KETCHIKAN. D. S. Whitfield, Observer.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maxi- mum.	Mini- mum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1902.	°F.	°F.	°F.	Inches.				
May (9 days)	57	44	48.9	6	5	2	2	6
June	78	46	57.5	3.37	28	1	1	14
July	69	62	58.6	5.62	25	3	3	9

SKAGWAY. George Sexton, Observer.

1899.								
January	40	- 2	22.2	0.94	18	4	9	8
February	44	- 9	19.2	.88	17	3	8	3
March	47	1	23.4	.13	22	3	6	2
April	61	16	41.4	.66	11	18	1	8
May	77.5	25	47.1	1.07	14	11	6	7
June	80	34	54	1.29	10	11	9	11
July	92	41	61.4	.59	19	7	5	3
August ^a								
September	76	30	50	4.68	5	9	16	17
October	53	16	35.7	3.05	10	15	6	10
November	49	24	35.7	2.62	9	6	15	10
December	45	- 1	23.5	1.44	16	4	11	9

SKAGWAY. J. T. Hayne, Observer.

1900.								
January	42	0	17.9	0.86	10	13	8	7
February	41	- 3	23.6	.16	24	2	2	1
March	63	10	29.4	1	24	4	3	2
April	58	21	40.4	4.12	10	10	13	13
May	65	30	49	.12	23	6	2	3
June	93	37	58.6	.20	21	8	1	1
July	84	40	59.6	1.70	20	6	5	4
August	75	38	57.9	0	15	15	1	0
1901.								
October	60	27	41.7	4.92	5	3	23	16
1902.								
May	79	30	35	.13	16		15	4
June	86	37	59	.30	16	4	10	3
July	76	39	57	10	6	8	17	10
August	68	32	54	3.03	2	19	10	17
September	62	35	50	1.74	4	17	9	10

ORCA. Capt. O. J. Humphrey, Observer.

1899.								
June	77	35	51.1		19	1	10	9
July	86	46	61		15	2	14	14
August	78	41	57.1		11	11	7	9
September	74	31	49.2	13.90				
October	59	26	38.8	17.87	12	1	18	14
November	48	28	34.4	13.02	4	5	21	16
December	47	10	28.2	9.95	12	3	16	13
1900.								
January	43	10	27.4	9.78	9	0	22	16
February	41	15	30.4	9.93	13	1	14	11
March	57	10	35.9	15.74	16	3	12	10
April	64	25	39.6	16.35	6	2	22	22
May	64	28	43.7	13.70	3	8	20	20
June				4.59	13	4	13	11
July				5.06	9	9	12	13
August				11.25	6	8	17	19
September				15.32	11	1	18	14
October (25 days)	53	25	37.8	7.68	10	3	16	17
November	47	14	28.9	4.75	16	3	11	7
December	47	7	29	13.9	10	3	18	15

^a No report received.

Meteorological observations—Continued.

ORCA. Capt. O. J. Humphrey, Observer—Continued.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maximum.	Minimum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1901.	°F.	°F.	°F.	Inches.				
January.....	40	9	27.1	16.17	13	1	17	16
February.....	38	8	25	1.21	13	2	13	5
March.....	50	11	34	16.91	6	2	23	22
April ^a								
May ^a								
June ^a								
July.....	79	33	53	3.86	11	8	12	9
August.....	71	41	52.7	27	3		28	22
September.....	74	35	49.6	26.3	10		20	19

ORCA. W. J. Shepard, Observer.

1901.								
October.....	51	28	41	24.01	3	1	27	26
November.....	46	21	33	8.02	4	10	16	16
December.....	47	9	29	9.35	5	26		13
1902.								
January.....	49	5	17	23	3	21	7	16
February.....	42	25	34.9	5.65	4	11	14	11
March.....	45	6	29.6	29.6	26	4	1	

FORT LISCUM (VALDEZ). James B. Jackson, Observer.

1900.								
November.....	50	0	22.4	2.85				6
December.....	39	-8	21.6	4.82				9
1901.								
January.....	41	-1	23.8	9.4	10	7	14	13
February.....	41	-12	15.5	.80	16	8	4	3
March.....	52	10	30.8	6.38	8	8	15	18
April.....	50	19	31.6	6.20	13	4	13	12
May.....	57	27	39.4	1.45	23	1	7	4
June.....	67	32	49.6	1.13	18		12	10
July.....	73	32	50.5	4.77	22		9	9
August.....	63	30	46.6	16.21	2	1	28	28

FORT LISCUM (VALDEZ). James T. Arivine, Observer.

1901.								
September.....	64	25	43.92	12.72	9	0	21	19
October.....	53	18	42.3	10.31	8	0	23	21
November.....	45	4	15.33	6.10	13	0	17	12
December.....	39	-13	15.98	7.03	9	0	22	17
1902.								
January.....	44	-14	13.52	9.64	6	0	25	22
February.....	42	6	16.83	1.28	18	0	10	7

FORT LISCUM (VALDEZ). C. J. Bartlett, Observer.

1902.								
March.....	44	8	19.48	4.90	17	0	14	11
April.....	52	2	25.9	2.08	23	0	7	6
May.....	62	25	19.42	3.08	17	0	14	14
June.....	79	36	15.93	6	15	0	15	6
July.....	77	32	22.96	20	8	0	23	20
August.....	70	33	52	29	6		25	29
September.....	58	27		26	8	1	21	26

a No report received.

Meteorological observations—Continued.

KENAI. H. P. Neilsen, Observer.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maximum.	Minimum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1899.								
May.....	60	22	41	8.20	8	10	13	9
June.....	68	31	47.9	6.80	13	8	8	7
July.....	82	31	54.1	1.36	12	8	10	9
August.....	66	28	51.9	2.34	10	12	9	15
September.....	73	17	46.3	4.15	7	9	14	13
October.....	51	10	34.7	4.32	6	6	19	12
November.....	44	3	27.2	.32	6	6	18	4
December.....	41	-14	13	.67	14	7	10	6
1900.								
January.....	38	-26	7.8	1.47	15	8	8	7
February.....	44	-10	22.9	.31	10	4	14	4
March.....	52	-8	30	.32	15	8	8	3
April.....	58	10	35.2	.52	8	8	14	11
May.....	60	21	42.7	.37	7	7	17	6
June.....	77	30	48.8	.55	5	0	25	4
July.....	72	33	54.9	.86	6	13	12	5
August.....	66	29	51.8	3.92	8	7	16	16
September.....	65	21	46.30	3.34	15	4	11	12
October.....	54	-5	32.24	2.19	6	10	15	8
November.....	34	-26	13.3	.90	14	5	11	6
December.....	42	-32	14.9	1.15	11	3	15	7
1901.								
January.....	45	-36	11.7	.64	15	3	12	6
February.....	37	-28	14.2	.07	13	8	7	1
March.....	50	-21	28.4	.32	6	12	11	7
April.....	51	10	32.9	.85	14	4	12	6
May.....	63	23	42.1	.30	18	7	6	2
June.....	69	29	50.8	.06	13	6	11	0
July.....	80	30	52.7	1.76	12	4	15	11
August.....	73	31	52.5	4.75	3	12	16	16
September.....	62	19	46.5	2.27	13	4	13	14

KENAI. Geo. S. Mearns, Observer.

1901.								
October.....	60	-10	38.67	1.69	2	12	17	9
November.....	42	-4	19.86	.33	6	13	11	6
December.....	45	-17	18.41	.19	13	6	12	4
1902.								
January.....	40	-36	14.93	.80	11	13	7	6
February.....	45	-15	16.21	.44	6	12	10	4
March.....	43	-34	26.54	.50	12	9	10	4

KENAI. H. P. Neilsen, Observer.

1902.								
April.....	47	4	30.36	1.03	6	15	9	4
May.....	62	23	42.06	.8	14	7	9	8
June.....	79	29	53.73	.59	20	7	3	3
July.....	75	35	55.5	1.71	12	8	11	10
August.....	70	35	53.8	2.92	4	5	22	19

TYONEK. Thomas W. Hammore, Observer.

1899.								
January.....	34	-8	5.41	1	19	7	5	6
February.....	38	-12	15.3	.85	17	.....	11	6
March.....	48	-4	23.6	.65	22	.....	9	2
April.....	52	22	37.7	1.43	19	5	6	3
May.....	60	30	43.1	1.05	13	10	8	5
June.....	68	34	53.1	1.20	24	1	5	4
July.....	82	45	58.7	.....	18	3	10	9
August.....	71	38	56.4	2.72	10	8	13	17
September.....	70	29	49	5.51	9	11	10	14
October.....	52	18	35.4	4.02	9	11	11	12
November.....	44	7	29.2	.58	10	10	10	3
December.....	41	0	17	.73	20	4	7	3

Meteorological observations—Continued.

TYONEK. Thomas W. Hanmore, Observer—Continued.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maximum.	Minimum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1900.								
January.....	°F. 35	°F. 0	°F. 13.4	<i>Inches.</i> 2.69	15	4	12	6
February.....	39	1	23.7	.52	14	4	10	6
March.....	58	1	31.9	.59	17	5	9	5
April.....	56	11	35.5	.60	9	10	11	6
May.....	68	33	45.4	.29	12	8	11	5
June.....	82	40	52.9	.72	23	0	7	6
July.....	75	40	57	1.05	18	7	6	5
August.....	73	31	54.6	4.94	10	5	16	17
September.....	67	32	48.7	4.22	14	7	9	11
October.....	61	10	36.3	1.87	16	3	12	8
November.....	34	- 6	16.6	.60	18	4	8	3
December.....	42	17	13.9	1.54	15	2	14	7
1901.								
January.....	38	-19	14.9	1.55	18	3	10	9
February.....	36	-17	29.3	.20	16	2	10	5
March.....	46	- 3	33.5	.62	12	5	14	6
April.....	56	12	33.5	1	19	3	8	5
May.....	67	22	45.3	.04	25	4	1	1
June.....	74	33	53.8	.58	15	9	6	7
July.....	83	38	59	2.68	18	5	8	8
August.....	62	37	51.7	5.77	5	9	17	17
September.....	68	32	47.9	3.16	12	5	13	16
October.....	61	10	16.2	1.87	16	3	12	8
November.....	41	2	11.9	.45	10	9	11	7
December.....	49	-17	15.9	1.13	16	4	11	8
1902.								
January.....	38	-27	12.41	3.08	10	3	18	9
February.....	49	3	15.71	.52	7	2	19	3
March.....	53	- 9	23.12	1.09	14	7	10	5
April.....	59	1	31	2	14	6	10	2
May.....	65	29	11.2	3	17	7	7	3
June.....	80	39	22.5	0	24	6	.....	.....
July.....	82	42	19.7	2.85	16	6	9	11
August.....	73	13	13.9	2	3	7	21	20

KADIAK. William J. Fisher, Observer.

1899.								
January.....	51	- 1	25.3	4.72	10	2	9	16
February.....	52	5	33.5	4.44	7	3	18	14
March.....	64	11	36	4.17	18	4	9	11
April.....	61	23	35.9	3.02	15	2	13	14
May.....	62	24	44.5	4.97	15	5	11	14
June.....	76	34	54	2.11	20	2	8	9
July.....	82	41	59.4	.82	19	3	9	7
August.....	75	41	58.2	2.37	20	3	8	10
September ^a.....	.....	.....	.....	.....	.....	.....	.....	.....
October.....	59	31	43.3	6.31	13	2	16	19
November.....	53	23	38.4	5.57	7	0	23	19
December ^a.....	.....	.....	.....	.....	.....	.....	.....	.....

KADIAK AND WOOD ISLAND. Curtis P. Coe, Observer.

1900.								
January (27 days).....	49	0	28.25	2.95	7	2	18	10
February.....	49	20	35.4	6.19	9	0	19	19
March.....	51	18	37.92	7.46	9	5	17	18
April.....	54	11	37.8	2.60	12	5	12	12
May.....	64	30	44.8	6.62	7	8	16	16
June.....	71	39	51.6	3.35	12	2	16	9
July.....	68	45	54.94	6.64	8	5	18	12
August.....	70	42	56.6	2.74	9	8	14	17
September.....	68	36	50.4	1.95	.....	.....	.....	12
October (25 days).....	63	22	41.9	1.85	4	4	18	9

^aNo report received.

Meteorological observations—Continued.

WOOD ISLAND. Curtis P. Coe, Observer.

Month.	Temperature.			Total precipitation. Inches.	Weather conditions (number of days).			
	Maxi- mum.	Mini- mum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1900.								
October	63	22	42.2	1.86	4	4	18	9
November	54	9	31.9	2.28	14	2	14	5
December	49	12	31.7	4.73	11	5	15	9
1901.								
January	47	7	30	2.65	11	6	14	9
February	58	4	30.6	.30	15	10	3	3
March	54	5	34.8	3.85	5	8	18	18
April (16 days)	55	17	36.4	4.20	10	3	3	8
May	63	20	43.2	3.45	15	3	13	16
June	73	37	51.2	4.50	15	3	12	11
July	79	42	55.3	3.56	14	3	14	8
August	70	43	54.6	5.13	4	5	22	19
September	70	36	51.27	10	7	5	17	10
October	66	25	44.1	8.95	4	3	24	21
November	52	14	35.07	4.82	8	4	18	0
December	47	2	33.82	11.10	3	4	24	20

COAL HARBOR, UNGA ISLAND. H. S. Tibbey, Observer.

1899.								
January	45	- 6	26.3	3.30	10	6	15	13
February	45	0	31.9	3.77	8	3	17	14
March	48	5	34.6	4.04	10	14	7	12
April	50	25	35.8	1.82	5	3	22	14
May	54	20	39.5	3.72	5	4	22	14
June	65	15	40	.39	18	1	11	4
July	79	40	54.9	6.21	12	5	14	12
August	69	42	54	4.87	5	4	22	10
September	66	32	48.7	4.99	5	3	22	11
October	58	31	43.6	5.04	7	2	22	18
November	49	21	36	1.91	10	0	20	6
December	46	5	27.9	.70	5	4	22	4
1900.								
January	46	0	28.1	2.69	5	2	24	8
February	51	17	35	4.33	3	0	25	16
March	53	10	33.4	2.09	11	3	17	8
April	47	10	32.3	15.53	1	9	20	19
May	57	24	40.7	2.16	2	14	15	8
June	69	36	49.5	1.88	1	6	23	6
July	69	40	51.6	2.91	5	7	19	17
August	69	42	54.2	5.47	0	4	27	16
September	64	34	49.4	4.65	3	7	20	13
October	60	25	43	5.35	4	4	27	24
November	56	18	36	7.98	4	5	24	19
December	47	13	31	3.20	8	3	21	18
1901.								
January	47	11	31	4.15	9	5	17	14
February	49	- 2	29	6.36	7	3	18	16
March	48	7	27.6	1.98	3	6	22	16
April	50	12	31.8	3.54	2	7	21	19
May	57	22	38.7	.66	8	8	15	9
June	61	29	45.3	2.21	10	4	16	14
July	69	38	51.9	1.64	8	8	15	8
August	68	38	52.2	1.63	2	5	24	18
September	64	35	47.9	13	6	3	22	13
October	54	26	40.8	7.45	5	9	17	16
November	48	16	32.9	3.53	5	8	17	23
December	50	8	32.1	8.87	5	2	24	21
1902.								
January	46	- 2	31.2	6.53	6	2	23	20
February	48	17	33.8	4.24	7	8	13	16
March	48	12	31.8	5.34	7	9	15	2
April	59	4	33	4.76	9	3	18	16
May	58	32	42.4	2.98	9	5	17	12
June	71	37	52.6	.33	18	4	8	4
July	78	54	55.9	1.70	11	5	15	12
August	67	42	52.5	3.05	3	5	23	18

Meteorological observations—Continued.

NUSHAGAK, BRISTOL BAY. S. H. Rock, Observer.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maxi-mum.	Mini-mum.	Daily-mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1902.	°F.	°F.	°F.	Inches.				
January	42	-41	14	1.4	7	6	18	8
February (19 days)	60	5	16.45	3	5	9	5	8
March	62	-70	11	2.45	10	10	11	8
April	47	-15	23.5	8	13	4	13	8
May	65	23	22	10	8	5	18	10
June	81	35	32.08	2	19	8	3	2
July	78	38	48.90	3	6	9	16	14

ST. MICHAEL. Rev. J. Post, Observer.

1899.								
October	42	13	32.2	0.4	3	13	15	2
November	31	1	17.4	.80	4	8	18	5
December	35	-36	4.4	0	7	7	17	0
1900.								
January	30	-38	-6.1	.40	18	4	9	2
February	38	-13	16	1	13	5	10	1
March	40	-18	10.4	1	15	3	13	1
April	44	-26	17.6	.40	9	2	19	2
May	54	17	34.7	0	8	6	17	0
June	64	31	44.2	0	10	3	17	0
July	77	40	55.6	(a)	5	5	21	.....
August	65	37	50.2	(a)	2	2	27	.....
September	56	25	43.6	(a)	.....	.....	30	.....
October	53	0	30.4	(a)	3	2	26	.....
November	43	-9	21	(a)	9	2	19	.....
December	33	-12	11	(a)	8	3	20	.....
1901.								
January	37	-30	-5.4	(a)	18	1	12	.....
February	38	-27	7	(a)	15	1	12	.....
March	24	-16	3.5	(a)	15	2	14	.....
April	37	-15	11.8	(a)	15	3	12	.....
May	43	-3	25.2	(a)	13	1	17	.....
June	61	23	40.8	(a)	3	1	26	.....

NOME. N. A. T. & T. Co., Observer.

1901.								
August (19 days)	59	28	45.4	0.60	9	10	0	3
September	54	22	39	7	11	4	15	17

KOTZEBUE SOUND. Anna M. Foster, Observer.

1898.								
June	72	27	48	(a)	20	(a)	10	(a)
July	81	82	55	(a)	14	(a)	17	(a)
August	64	38	50	(a)	8	(a)	23	(a)
September	50	25	39.4	(a)	12	(a)	13	(a)
October	43	-5	24.3	(a)	18	(a)	13	(a)
November	19	-23	0	(a)	17	(a)	13	(a)
December	27	-39	7.2	(a)	13	(a)	18	(a)
1899.								
January	17	-31	-10	(a)	17	(a)	14	(a)
February	23	-38	-9	(a)	20	(a)	8	(a)
March	32	-36	1	(a)	15	(a)	16	(a)
April	40	-24	12	(a)	16	(a)	14	(a)
May	59	-4	29.3	(a)	13	(a)	17	(a)
June	53	27	37.4	(a)	14	(a)	16	(a)
July	67	34	49.4	(a)	13	(a)	18	(a)
August	63	18	38.6	(a)	16	(a)	15	(a)
September	63	18	38.6	(a)	16	(a)	15	(a)
October	37	-2	22	(a)	8	(a)	23	(a)
November	22	-17	7	(a)	15	(a)	15	(a)
December	22	-35	-9	(a)	13	(a)	18	(a)

(a) Not reported.

Meteorological observations—Continued.

KOTZEBUE SOUND. Robert Summs, Observer.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maximum.	Minimum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
	°F.	°F.	°F.	Inches.				
1900.								
January.....	21	-43	-17.1	(a)	20	(a)	11	(a)
February.....	29	-25	3.3	(a)	19	(a)	9	(a)
March.....	39	-27	1.2	(a)	20	(a)	11	(a)
April.....	39	-27	7.6	(a)	17	(a)	13	(a)
May.....	44	2	28.7	(a)	25	(a)	6	(a)
June.....	65	27	39.2	(a)	16	(a)	14	(a)
July.....	71	35	53	(a)	23	(a)	8	(a)
August.....	66	31	48.8	(a)	15		16	
September.....	52	27	39.1	(a)	6		24	
October.....	45	-14	22.7	(a)	10		21	
November.....	38	-20	9	(a)	15		15	
December.....	20	-26	2	(a)	8		23	
1901.								
January.....	33	-50	-24.8	(a)	11		20	
February.....	34	-45	-6.5	(a)	14		14	
March.....	22	-27	-5	(a)	28		3	1
April.....	35	-20	8.3	(a)	20		10	
May.....	48		22.6	(a)	19		12	

TELLER REINDEER STATION. T. L. Brevig, Observer.

1901.								
July (7 days).....	57	33	44.6	1	3	1	3	1
August.....	51.9	41.3	47.6	2.5	6	6	12	10
September.....	69	26	43.06	0	7	7	16	0
October.....	43	4	17.83	1.5	9	4	18	10
November (23 days).....	25	2	16.1	1	6	7	10	8
December.....	37	-22	16	3.5	10		21	3
1902.								
January.....	36	-44		7	9	3	19	2
February.....	36	-20	5.1	3	13	2	13	2
March.....	20	-28	-17.1	2	26	1	4	2
April.....	40	-20	19	4	17	2	11	5
May (26 days).....	59	-20	20	(a)	9	6	10	0
June (29 days).....	75	31	44.92	(a)	16	11	12	0

EAGLE. U. G. Myers, section Director.

1899.								
August (16 days).....	76	24	50.1	1.63	2	5	9	8
September.....	66	8	41	.80	3	7	20	7
October.....	41	-19	21	.65	4	9	18	7
November.....	33	-25	1.2	.52	2	4	24	5
December.....	31	-57	-19	.26	15	3	13	6
1900.								
January.....	23	-68	-24.8	.52	14	6	11	7
February.....	18	-6	-51	.39	11	9	9	5
March.....	56	-46	13	.02	17	8	6	2
April.....	54	-12	29.3	.42	6	13	11	6
May.....	69	20	42.2	.84	9	17	5	7
June.....	87	28	52.6	1.57	8	7	15	13
July.....	81	31	56.9	1.88	12	9	10	13
August.....	79	25	49.1	2.71	2	9	20	16
September.....	68	15	40.4	1.72	4	6	20	14
October.....	14	-17	20.1	1.23	5	10	16	10
November.....	18	-42	-11	.21	9	8	13	5
December.....	32	-52	7.4	.77	9	6	16	8
1901.								
January.....	32	-68	-17.8	.42	13	8	10	8
February.....	28	-65	-15.3	.55	15	6	7	4
March.....	42	-49	5	.55	9	8	14	9
April.....	53	26	19	.56	8	12	10	6
May.....	71	16	39.1	1.63	11	8	12	9
June.....	34	27	52.8	1.22	3	13	14	11

a Not reported.

Meteorological observations—Continued.

EAGLE. U. G. Myers, Section Director—Continued.

Month,	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maximum.	Minimum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1901.	°F.	°F.	°F.	Inches.				
July.....	85	36	57.6	1.47	9	9	13	12
August.....	76	31	49	1.7	2	10	19	17
September.....	67	31	42	.90	3	9	18	3
October.....	53	-22	23.6	1.06	4	7	20	7
November ^a								
December.....	-30	-52	-7	.07	7	2	22	5

EAGLE. C. A. Trenholtz, Observer.

1902.								
January.....	25	-52	10.28	0.99	14	0	17	7
February.....	38	-49	5.35	0	19	2	7	0
March.....	42	-45	-6.55	.17	21	1	9	24
April.....	58.5	-8	26.41	.84	11	3	16	8
May.....	75	18	45.01	.64	7	11	13	6
June.....	86	26	56.08	1.15	14	11	5	6
July.....	82	40	60.87	2.5	7	11	13	13
August.....	78	31	54.50	1.28	11	11	9	10
September.....	63	22	40.53	.90	8	6	16	9

FORT YUKON. L. J. H. Wooden, Observer.

1899.								
September.....	54	9	34.3	0.10				
October.....	40	-13	18.7	.45	4	15	12	6
November.....	23	-34	-1.4	.30	8	12	10	3
December.....	16	-68	-16.1	.47	4	10	17	5
1900.								
January.....		-62		.36	19	5	7	7
February.....		-44		.00	20	8	0	0
March.....		-42		.42	14	10	7	5
April.....		-21		.05	15	9	6	3
May ^a								
June.....	93	27	58.6	1.19	6	21	3	9
July.....	87	41	64.2	.32	13	15	3	3
August.....	80	23	53.6	1.32	5	9	16	11
September.....	70	19	42.6	.45	5	4	19	8
October.....	48	-17	16.9	.59	5	11	15	11
November.....	22	-43	-10.8	.51	8	13	9	6
December.....	8	-56	-26	.24	5	9	17	5
1901.								
January.....		-65		.55	12	5	13	8
February.....		-53		.03	15	9	4	2
March.....	25	-41	1.6	.38	9	17	5	8
April.....	51	-16	17.4	.56	16	14		5
May.....	66	8	33.2	.46	17	13	1	6
June.....	85	26	58.6	.41	12	18		4
1902.								
January.....		-69						
February.....		-53						
March.....		40		3				
April.....		29						9
May.....	65	45						1

HOLY CROSS MISSION. Rev. R. J. Crimont, Observer.

1898.								
November.....	32	-23	1.9	2.48	9	10	11	13
December.....	30	-37	3.4		9	15	7	5
1899.								
January.....	35	-40	-3.2	5.10	15	6	10	3
February.....	39	-37	-3.1	1.46	18	5	5	0
March.....	45	16	15.6	1.49	14	9	8	6
April.....	46	0	27.3	1.42	13	9	8	9

^a No report received.

Meteorological observations—Continued.

HOLY CROSS MISSION. Rev. R. J. Crimont, Observer—Continued.

Month.	Temperature.			Total precipitation.	Weather conditions (number of days).			
	Maximum.	Minimum.	Daily mean.		Clear.	Partly cloudy.	Cloudy.	Rain or snow.
1899.								
May.....	°F. 57	°F. 13	°F. 39.4	Inches. .30	18	12	11	
June.....	74	24	50.6	.....	11	12	7	.....
July.....	82	31	56.9	.....	8	6	17	.....
August.....	70	31	51.5	3.67	0	12	19	14
September.....	62	17	40.9	4.40	2	15	13	19
October.....	44	16	30.3	1.17	4	12	15	15
November.....	23	- 5	10.6	.49	10	18	2	8
December.....	34	-40	- 2.2	.82	16	7	8	9
1900.								
January.....	35	-55	- 9.6	.74	23	4	4	7
February.....	39	-15	14.7	.57	12	8	8	8
March.....	44	-13	15.5	.50	22	4	5	5
April.....	48	-21	24.7	.46	5	15	10	6
May.....	63	18	42.5	.92	5	18	8	11
June.....	74	29	52.4	1.67	16	7	7	7
July.....	77	41	58.8	1.4	12	10	9	15
August.....	64	35	52	5.74	2	10	19	29
September.....	57	25	44.1	6.69	3	15	12	20
October.....	57	-14	27.8	3.34	4	11	16	18
November.....	41	-19	14.4	1.98	12	6	12	7
December.....	35	-24	5.8	4.49	10	9	12	16
1901.								
January.....	30	-45	-11.4	1.46	14	4	13	9
February.....	41	-32	8.3	2.46	9	9	10	11
March.....	37	-28	10	1.06	5	20	6	10
April.....	46	-13	20.6	.55	14	8	8	6
May.....	57	8	55.2	.13	16	12	3	3
June.....	70	29	51.9	.85	7	13	10	10
July.....	.....	.....	.....	.....	.....	.....	.....	.....
August.....	68	30	50.4	4.50	2	3	26	11
September.....	60	26	47	8	.....	15	15	30
October.....	43	32	11.7	6	3	22	6	6

RAMPART. Alvin Liebes, Observer.

1901.								
September (last 6 days).....	49	22	41.2	(a)	1	.....	5	1
October (23 days).....	45	-12	22.7	(a)	2	3	18	.....
November.....	28	-52	- 5.8	(a)	.....	.....	.....	.....
December.....	30	-53	-11.2	(a)	.....	.....	.....	.....
1902.								
January.....	19	-61	-23.4	(a)	.....	.....	.....	.....
February.....	41	-48	-10.3	(b)	.....	.....	.....	.....

COPPER CENTER. J. W. Neal, Observer.

1902.								
July (14 days).....	94	38	61.3	7	2	5	7	7
August.....	85	28	54.82	12	9	13	9	12
September.....	68	37	50.2	5	4	6	20	5

a Not reported.

b Rain from evening of 4th to evening of 7th.

