Nature. London. Vol. 64.
MacDowall, Alexander B. The Moon and Wet Days. Pp. 424–425.
La Nature. Paris. 29me Année.
Espitallier, —. Le [balon] dirigeable de M. Santos-Dumont. P. 182.
Proceedings of the Royal Society. London. Vol. 68.
Dewar, James. The Nadir of Temperature and Allied Problems. Pp. 360–366.
Physical Review. London. Vol. 13.
Barnes, H. C. On the Density of Ice. Pp. 55–59.
Davis, Bergen. On a newly Discovered Phenomenon produced by Stationary Sound Waves. Pp. 31–47.
Symons' Meteorological Magazine. London. Vol. 36.
——. London Thunderstorm of July 25. Pp. 109–112.
Dines, W. H. On a Fallacy as to the Diurnal Barometer Wave. Pp. 93–95.
Scientific American Supplement. New York. Vol. 52.
Henry, A. J. Amplification of Weather Forecasts. P. 2146.
Scientific American. New York. Vol. 85.
——. Nemethy's Flying Machine. P. 72.
——. Humidity and Heating Systems. P. 98.
Terrestrial Magnetism and Atmospheric Electricity. Baltimore. Vol. 6.
Bauer, L. A. Note on the Secular Motion of the Earth's Mean Magnetic Axis. P. 73.
Neumayer, G. Mean Secular Change of the Magnetic Declination for the Epoch, 1890–1900. P. 62.
Cady, W. G. Wild's New Method for Determining the Variations of Magnetic Inclination. Pp. 63–64.
—— Notes on Atmospheric Electricity. P. 82–84.
—— Rainfall Traditions. Pp. 112–113.
Memorias y Revista de la Sociedad Cientifica "Antonio Alzate," Mexico. Tomo 15.
Moreno y Andra. Contribution à l'étude climatologique de la vallée de Mexico. La variabilité interdiurne moyenne de la température à Tacubaya. Pp. 201–219.

YUKON WEATHER.

By U. G. MYERS, Section Director, Eagle, Alaska, dated June 20, 1901.

While temperature is the chief element in any climate, it becomes more dominant as the poles are approached, the other elements becoming more and more subordinated in relative importance.

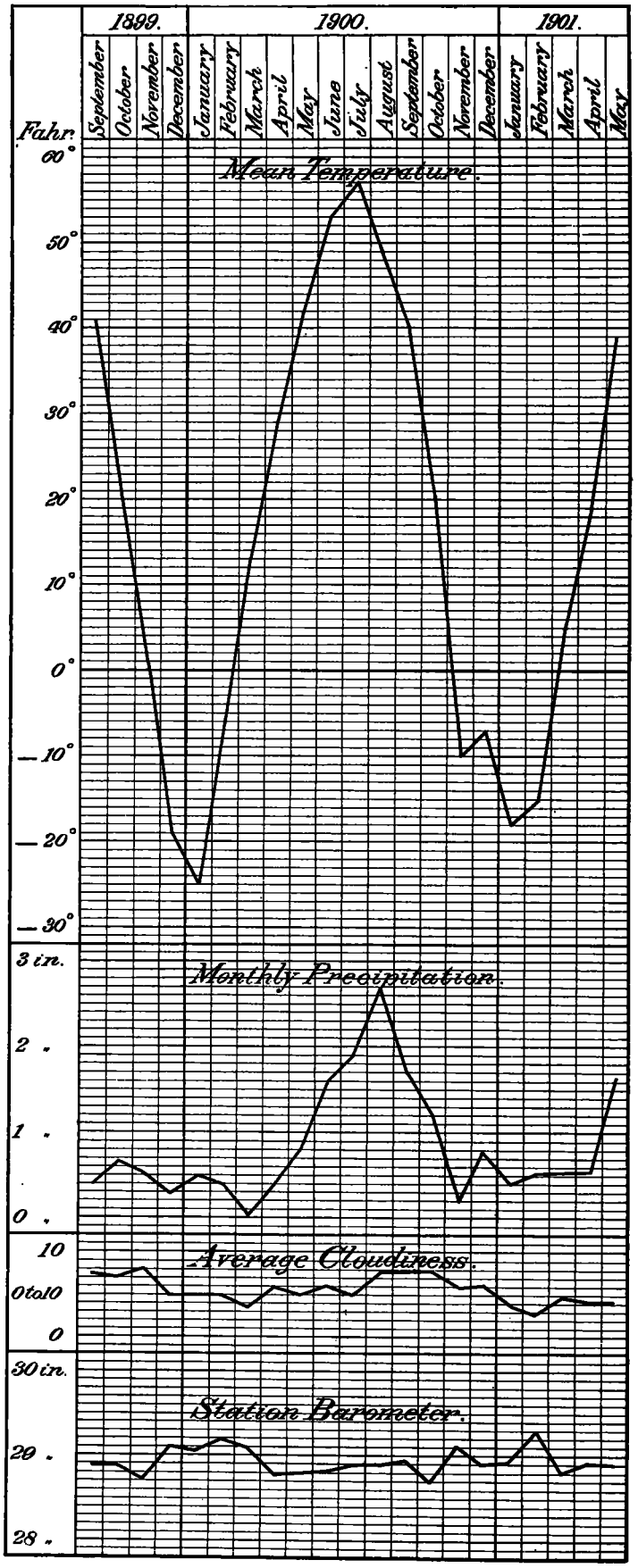
Though Siberia stands first in producing low temperatures, interior Alaska has always been considered a creditable second. In point of occupation the contrast is more marked. While not so cold and easier of access interior Alaska has never been turned to man's account as has been Siberia, but has remained practically an unknown heritage of the aborigines.

Isolated from the States and further shut off from occupation by vague rumors of frightful winter cold, overpowering summer heat, swarms of hungry mosquitoes, fever fuming bogs, etc., the exploitation of the interior seemed fated to await that motive which inspires men to undertakings otherwise insurmountable. Interior Alaska will date her substantial development from the day Henderson met Carmack at the junction of the Klondike and the Yukon rather than from the discoveries of the man who gave his name to the strait and sea of Bering.

While observations at Eagle, owing to their short duration, do not furnish us a safe guide to the climate, they do serve to bring to view important meteorological features of this section; and at the same time eliminate the personal equation from many "personal recollections." The sign of this annoying human element in its relation to weather features here seems always to have been plus during the summer season not only as regards temperature, but mosquitoes also, and just as readily changed to minus along with the temperature.

The town of Eagle is situated in latitude 64° 46′ north, longitude 141° 12′ east. Its location, in a natural amphitheater, 5 to 7 miles across, is peculiarly favorable to local radiation in winter, and to the observation of clouds formed by ascending currents during the warmer months. The clouds formed over the surrounding mountains tend to converge overhead, and all changes to which they are subjected are readily observed.

Meteorological record at Eagle, Alaska.



For many miles on all sides surrounding this place, so far as can be learned, the topography is practically the same,—one succession of hills and mountains with deep and generally contracted valleys lying between. The nearest notable departure from this is found in going down the river 160 miles to Circle where the Yukon flats begin. Here the mountains recede from the river on either side for many miles, and the main stream is cut up into many smaller ones that shift about continually in their sandy beds among the islands.

The configuration is such as to have a marked influence on the surface winds, and anywhere immediately on the river bank the river valley itself is the dominating influence. This is especially noticeable in winter; and more so during the most severe cold than at other times. It is generally understood that during periods of severe cold the air is motionless. Away from the river this may be said to be universally the case, except when the temperature begins to moderate. But at many points along the river (meaning on the ice itself) fresh to brisk winds are not uncommon during periods of lowest temperature. At one moment these winds may be sweeping down stream driving the snow along when suddenly they abate and immediately blow with equal energy from the opposite direction. Only brief exposure to such conditions can be endured; and then clothing must be suitable and exercise energetic and constant.

This blustery condition seems to be confined chiefly within the immediate banks of the river, and is felt less on the top of the banks at the edge and still less and less as you recede.

During these periods of turbulent cold on the river the air has been found to be 20° to 30° warmer, and perfectly calm toward the tops of the higher mountains. Of this increase in temperature there is no doubt, for it can be detected even without an instrument when the valley of a creek, having a marked fall, is ascended with dispatch; but of the prevailing freedom from wind at high elevations during all cold periods I can not speak with confidence.

While the observations are meager and the accuracy of some is doubtful, they seem to point strongly toward a reversal of temperature conditions between this place and adjacent smaller valleys as early as February, when the sun's rays are beginning to be appreciable, the smaller valleys then having the lower temperatures as is the case in summer.

It is probably the exception here if any month in any year passes without frost, or freezing temperature. The highest temperatures of the year occur between June 15 and July 15, and extend over a period of seven days or less, when the maximum temperature may reach 90° or even more. It is only during this period that a few hot and sultry days are experienced, but such nights are never had. In 1898 and 1899 the warmest weather was in early July; in 1900, in the latter part of June, when the maximum rose to 87°. This is probably the only 30-day period during which the nights are likely to be free from frost.

The highest temperatures of the year, seem, from three years of observation and from common report, to occur with marked regularity as to time, apparently oscillating over a period of less than twenty days, from year to year.

The occurrence of the lowest temperature would not seem to be confined to such a limited time, though all data at hand point to its occurrence in January as a rule. It occurred here quite probably in November, 1898, for the winter of 1898–'99. At Dawson the minimum for November, 1898, was —40°; for December, —41°; for January, 1899, —45°, and for February, —41°.

The lowest temperature at Eagle for the past two winters was —68° in January each winter. On February 12 this year, —70° was recorded by a standard minimum thermometer on Seventy Mile Creek [River], some 30 miles northwest of here. At Eagle the same morning the minimum was —65°. The highest minimum since opening the station here was 55° on June 26, 1900; the lowest maximum, —62° on January 14, 1901.

The two years of observation here show a marked variation in the spring rise of temperature. While during all years a marked rise may be expected about the middle of March its progress is not always continuous with the season. The mean temperature for the three months, March, April, and May, 1900, was 28°; for the same period in 1900 it was 21°. The difference in the amount of snow on the ground was more noticeable: On March 31, 1900, it was 0.2 inch; on April 10, 1900, it was trace; on March 31, 1901, it was 22.0 inches, on April 10, 1900, it was trace; on March 31, 1901, it was 22.0 inches; and on April 10, 1901, it was 23.0 inches, though the total depth for 1901 exceeded that for 1900 by less than 6 inches. From common report this variation has even been more decided, as for instance in the spring[1] the Yukon ice did not break up until May 26. During this year unusually bright and warm weather was experienced in the latter part of March and during April only to be succeeded by unseasonably cold and harsh conditions, snowstorms continuing into July.

Even more striking are the temperature anomalies of winter. In December, 1898, after experiencing some of the lowest temperatures of the winter in November, the temperature rose to 40°, and light showers of rain were general throughout the upper Yukon Valley. No such rise is known to have occurred during the winter of 1899–1900, though the maximum temperature was above freezing several days in late October. In February of the present year, a decided rise occurred on the middle and lower Yukon. At Eagle the maximum rose to 28°; at Fort Yukon, to the northwest and 260 miles farther down stream, the temperature went above freezing and a sprinkle of rain fell on one day; at Rampart, some 600 miles down the river from Eagle, the temperature rose to 40° and heavy showers of rain fell on five different days; at Holy Cross Mission, in the lower valley, the temperature rose to 41° and moderately heavy rains fell on three different days. Similar temperature conditions are known to have prevailed at St. Michael, 21° west of this place. No data are available to determine the extent north and south from the Yukon Valley, but in covering this distance of longitude the river ranges over 5° of latitude.

As is to be expected at inland places so far north the precipitation is relatively light and of marked intensity in certain localities only. The annual fall is in the neighborhood of 12 inches, 75 per cent of which falls during the six months of April, May, June, July, August, and September in the form of rain. The heaviest monthly fall seems to occur regularly in August, diminishing with the same rapidity with the approach of cold weather in the fall as it increases with the coming of warm weather in the spring.

While the writer in his experience has never observed any excessive rainfalls it would seem probable that the same occur in certain localities. Seventy Mile Creek [River], entering the Yukon 20 miles below Eagle, is at times suddenly and without warning raised 8 to 10 feet above its ordinary stage in as many hours almost entirely from rains at its headwaters. The watershed at its head while steep is not extensive.

The snowfall at this elevation is not heavy, averaging between 3 and 3.5 feet each winter, and is distributed more or less uniformly over the different months. No single fall here has reached five inches, the average of the heaviest falls being about three inches.

Here, as usual, the precipitation increases with the altitude, and at an elevation of 2,000 feet the snowfall increases 50 per cent or more.

[1] So in the original type-written manuscript. Evidently the year was accidently omitted by Mr. Myers, the date was "within the past decade."—A., ED.]

The depth of snow on ground gradually increases during winter, reaching its maximum depth just previous to the spring rise of temperature. With a combination of favorable conditions its disappearance is rapid. In March, 1900, the first warm day, combined with brisk to high south winds and low relative humidity, decreased the depth from 20.7 inches to 10 inches. In the present year a similar thaw did not occur until a month later and was also not so rapid.

The lowest relative humidity is during May when the air is warming rapidly, and the highest during the coldest month of winter, the fluctuations of the absolute humidity are opposite to this though the highest does not occur with the lowest relative humidity but later in the summer.

The coldest weather is freest from cloud though the coldest month does not show the lowest average cloudiness, the latter occurring in February or March. In February of the present year, during a period of four consecutive days, not a vestige of cloud, fog, haze, or smoke was observed at any time. At this same time, considering a period of seven consecutive days, five of them were perfectly cloudless, and a single small cumulus cloud observed on each of the others.

In the coldest weather where considerable smoke is discharged into the air, as from a town, a heavy dark gray veil is formed having the appearance of fog and smoke mingled. This veil is dissipated by the slightest breath of air, and is consequently more prominent during morning and evening than at other times.

Cloudiness increases as the summer comes on and perfectly cloudless days are rare. Then only a few hours of sunshine are necessary to supply the water vapor and set ascending currents in motion when heavy cumuli form over the surrounding mountains, often producing thunderstorms and local showers. Toward evening, as the atmosphere becomes more quiet, the clouds settle down and to a marked extent pass away. This is repeated almost daily during June, July, and August.

Considering the wind direction here as deduced from two daily observations, 8 a. m. and 8 p. m., local time, for 638 consecutive days, we find west is the prevailing direction with 17 per cent of total times observed. This is followed closely by southeast, 16 per cent; northeast, 15 per cent; east, 14 per cent; northwest, 13 per cent, and calms 10 per cent. The percentage of calms is high, and these are practically all observed during the coldest periods of winter. The diurnal variation of direction is well defined, being from an easterly quarter during the day and westerly during night. In point of number of miles probably more blow from the northeast than from any other direction.

Considering the year 1900 the greatest mean hourly velocity was from 1 to 2 p. m., averaging 6.7 miles; the least was from 5 to 6 a. m., averaging 3.8 miles. High winds are the exception and no gales have yet been recorded; the extreme velocity during the entire period of observation has been 35 miles. On the other hand calms are numerous; no less than three days are on record during which not a single mile was recorded, and four days on which one mile was recorded as the total daily movement.

Observations of soil temperature made in 1900 in cultivated soil, a mixture of humus and clay, show the maximum temperature, at a depth of six inches, to have been 60°. This was reached the first of July or immediately following the maximum air temperature. At this depth the fluctuations followed closely those of the air temperature. At a depth of two feet, the thermometer bulb being in clay alone, the rise was unbroken from 38° in early June to a maximum of 50.5°. On July 27, 50° was reached, and from this time, including August 13, the oscillation was 0.5°; following the latter date the seasonal fall was uninterrupted, dropping to 42° on September 30 when observations ceased.

The monthly averages of the radiation minimum thermometer, 1 foot above cultivated ground, differed from the 8 a. m. station minimum as follows: For June, 2.6° lower; for July, 2.1° lower; for August, 2.6° lower; and for September, 2.6° lower.

Some mention must be made of the Yukon River, the natural highway of interior Alaska both summer and winter. Both the opening and closing of this stream are now matters of important consideration owing to its vastly increased traffic.

The break up occurs annually in May. Within the last decade the earliest this has occurred was on the 8th and the latest on the 26th, considering this immediate section of the river. According to an enterprising journalist a tradition of the Moosehide Indians is to the effect that "one summer, a long time ago" the ice remained the summer through.

The breaking is not simultaneous along the entire river, but begins at the head and continues in chronological order toward the mouth. At Eagle, for the four seasons past, it has occurred as follows: 1898, May 8; 1899, May 17; 1900, May 10; 1901, May 15. The last date is probably about the average. It has closed recently as follows: 1898, November 4; 1899, November 24; 1900, November 8.

Navigation usually ends with September, or when ice begins to run heavily. Ice comes earliest from northern tributaries, the Porcupine usually leading. High water usually occurs in June, and low water just previous to the spring thaw. The range between high and low water each year is 20 to 25 feet. Light travel on the ice begins immediately after the freeze up in the fall and continues up to within ten days of the break up, though at both beginning and ending travelers keep within easy reach of shore.

While no one ever expects to see the interior of Alaska become an agricultural country, its possibilities in that line are not so limited as at first supposed. The ground is practically all frozen to a varying depth and covered with soggy moss, and, where level, swamps abound. Almost all localities are capable of furnishing garden spots at least, and the swamps are bountiful sources of native hay which is known to be good fodder for horses and cattle. While the soil is sour and needs cultivation and aeration to render it more productive, hardy vegetables sufficient for all local needs can be grown; radishes, lettuce, turnips, and potatoes do well and are particularly sweet and succulent.

As to the healthfulness of this portion of the Yukon Valley there seems no doubt. While Dawson has had a goodly percentage of sickness from typhoid fever and pneumonia it is mostly traceable to foolhardiness in undergoing constant exposure and fatigue without due or intelligent care in the matters of food, clothing, and relaxation.