WHEAT IN THE GREAT NORTH

Observations in an Immense Area of Cereal Growth.

The Parallelogram Compared With a Similar District in Europe—The Testimony from Several Sources in Regard to Productiveness, Temperature, and Climate.

The following article, by Mr. James W. Taylor, for many years U. S. consul at Winnipeg, is especially important, as being the contribution of a gentleman whose long residence in the Canadian North West enables him to speak with authority upon the subject of which he writes. Those who have had doubts as to the possibilities of the North-west as a wheat growing country, will be at once convinced of their error on reading this exhaustive article :—

The area of the wheat district of central Canada between Hudson's Bay and Lake Superior for its eastern and the Rocky Mountains for its western boundary, and latitudes 50° to 60° has been ascertained to be of uniform productiveness ; and by no means a narrow selvage beyond the international boundary, as intimated by Mr. C. Wood Davis in a recent contribution to the *Arena*. The summary of this grand parallelogram of cereal growth and maturity is a series of facts and inferences, which is the result of considerable experience and observation as United States Consul at Winnipeg. Let us first consider the broader area of northwest America extended beyond the prairie division to the Arctic and Pacific Oceans, and trace on the map of North America the area enclosed between longitudes 100° and 170° west of Greenwich and latitudes 50° to 70°—a fourth of the continent—embracing the Canadian provinces, present and prospective, of Manitoba, Assiniboia, Saskatchewan, Kewatin, Mackenzie, Athabasca, Alberta, and British Columbia, and the American Territory and future State of Alaska. How little conception have we from present developments of what the twentieth century will witness over this vast realm of nature. It will assist our prophetic vision to compare an equal area on the map of Europe identical in climate and other natural manifestations. Trace 70 degrees of longitude—60 east and 10 west of Greenwich—and from latitude 50° to 70°, and mark the relations of man to earth. The European parallelogram includes England, Ireland, Scotland, Denmark, Norway, Sweden, Belgium, Holland, and most of Germany and Russia in Europe, represented by the names of London, Liverpool, Dublin, Glasgow, Edinburgh, Copenhagen, Stockholm, Berlin, St. Petersburg, Moscow, Nijni-Novgorod, and Archangel.

Of this great north land of Europe, especially its eastern and continental division, I may be permitted to repeat my own language, published at Columbus, O., in 1856 : "The northern limit of rye is 65°, of barley 67°, and oats even further north. Wheat is cultivated in Norway to Dronthelm latitude 64° ; in Sweden to latitude 62°, in western Russia to the environs of St. Petersburg, latitude, 60°, 15 ; while in central Russia the limit of wheat cultivation appears to coincide with the parallel of 58° or 59°. It is well understood that the growth of the cerealia and of the most useful vegetables depends chiefly on the intensity and duration of the summer heats, and is comparatively little influenced by the severity of the winter cold or the lowness of the mean temperature of the year. In Russia as well as in north central America the summer heats are as remarkable as the winter cold. The northern shore of Lake Huron has the mean summer heat of Bordeaux, in southern France, or 70° Fahrenheit, and Cumberland House on the Saskatchewan exceeds in this respect Brussels or Paris."

I can add nothing to the demonstration by innumerable explorations and reports that the navigable channels of the Mackenzie and the Mississippi are connected by a territory of 1,500 miles in extent, northwest of St. Paul, Minn., having an average width of 800 miles (1,200,000 square miles), which is substantially identical in climate and natural resources. There is a great variety of illustrations, but I shall limit myself to a flower. The prairie's firstling of the spring has the popular designation of "crocus." but is an anemone—A. *Patens*, the purple anemone, the wind flower—but I prefer the children's name, suggested by its soft, furry coat, the "gosling" flower, which, with its delicate lavendar petals, is fully ten days in advance of other venturesome spring blossoms. It is often gathered on the Mississippi bluffs near the Falls of St. Anthony on the 15th of April. It appears simultaneously on the dry elevations near Winnipeg. It was observed even earlier, on the 13th of April during, the Saskatchewan campaign of 1885, and is reported by Mayor Butler in his "Wild North Land" as in profusion on Peace River, 1,550 miles from St. Paul, on the 26th of April. Even beyond 1,000 miles on the Yukon, within the Arctic circle, Archdeacon McDonald, a missionary of the Church of England, has gathered the flower on the 14th of May. Equally significant as this delicate herald of the spring are the records of ice obstruction in rivers, their emancipation being simultaneous from Fort Snelling Minnesota, to Fort Vermilion, Athabasca.

But limiting further discussion to the northern limit of wheat cultivation, I will venture to repeat the results of a special inquiry into the capacity for agricultural colonization of the valleys of the Athabasca and Peace rivers between latitudes 54° and 60° and longitudes 110° and 120°, and an additional block of territory on the headwaters of the Liard River from latitude 57° to 60° and longitude 120° to 125°, these streams being the most southern tributaries, and, indeed, the sources of the great Mackenzie. The southern moiety has been carefully explored by Prof. George M. Dawson of the Canadian Geological Survey, and is properly called Athabasca as comprising most of the affluents of the river of that name. He estimates its area as about 31,550 square miles, and adds that "by far the largest part may be classed as fertile, with an average elevation above the sea of a little over 2,000 feet." In respect to the Peace River country, or the northern portion of the district of Athabasca, Prof Dawson says that the ascertained facts leave no doubt on the sufficient length and warmth of the season to ripen wheat, oats, and barley, with all the ordinary root crops and vegetables. The whole region is characterized by Archbishop Tache of St. Boniface in his "Sketch of Northern America," in terms far more favorable than he employs with reference to the South Saskatchewan districts. He speaks of a "fertile country, very well suited to colonization" on the Athabasca, and remarks that the valley watered by the Peace River "cannot but become peopled." Even more specific has been the testimony of early traders and travellers. Sir Alexander Mackenzie, as far back as 1787, saw at a trading station of Peter Pond, on the Elk or Athabasca, "as fine a kitchen garden as he ever saw in England." Mr. William McMurray, an officer of the Hudson Bay Company, informed me that at a post established by him in latitude 56°, longitude 111° he obtained good crops of wheat, barley oats, and all garden vegetables. Sir John Richardson states that wheat is raised within an altitude 122° 30', but with an elevation above the sea of only 400 or 500 feet : while Mr. Robert Campbell, a retired officer of the Hudson Bay Company, who founded Fort Halkett nearer the Rocky Mountains in the valley of the Liard River, reports an experiment of cultivation equally successful.

When, therefore, in 1879, I became solicitous, in an answer to hostile criticism in influential quarters of my publications in connection with this, to remove all reasonable doubt of the comparative mean temperatures at the interior points of central British America, and my inferences therefrom in respect to the extension north and west of cereal production. I communicated with the Rev. A. C. Garrick who had charge of a mission farm of, the Church of England at Fort Vermillion on Peace River; latitude 59°, longitude 116°, with Richard Hardesty, Esq., long an officer in charge of Fort Edmonton, on the Saskatchewan, in about latitude 54°, longitude 114°, James McDougall, H. B. C., at Fort Dunnegan, Peace River, and P. F. Lowrie, Esq., editor of the Saskatchewan *Herald* at Battleford, latitude 53°, longitude 109°, and received and was able to distribute most satisfactory samples of wheat, barley, oats and peas from the crop of 1880. In respect to the Peace River grains, the following explanations were communicated by Mr. Garrioch : "The wheat sent you," he wrote "does not do justice to Peace River for the summer last year was a most unfavorable one, the rainfall being double what we have during an ordinary season, the consequence of which was that the straw grew too rank, and the wheat from which the sample was taken lay on the ground under drenching rains for some time after it had been cut until it was partly damaged. At any rate, I have never known poorer wheat raised in Peace River than we had last year." A better sample sent by Mr. Garrioch was from a mission station on Peace River, opposite the junction of the Smoky River, nearer the Rocky Mountains, and in a situation of greater altitude than Fort Vermillion, but 200 miles west of South——, a locality 1,500 miles northwest of St. Paul, or about 2,000 miles from Chicago. Of a package of barley, a hulless variety, the seed of which was from Holland, from Fort Vermilion of Peace River, Mr. Garrioch wrote: "For the barley no apology is needed. I gave the Roman Catholic priest at this place a bushel of it this spring, and, wishing to be on the safe side, weighed out fifty pounds, but on coming to put in his bushel measure there was about two inches more required to make the proper bulk."

In corroboration of those specific statements, I find in the *Mission Field* of Jan. 2, a London monthly publication of the Society for the propogation of the Gospel, an abstract of a report of the Rev. W. Bompas, Bishop of the Church of England in the Athabasca and Mackenzie districts—his diocese comprising the entire Arctic watershed of British America—of which the following extracts are pertinent : The excellence of the land in the Peace River country for farming purposes is well known ; the soil is rich and productive, and the climate most salubrious. A mission station is established at Fort Vermilion under the charge of the Rev. Arthur Garrich, and a church is fast approaching completion. Other mission stations have been started at different parts of the river, and in 1878 a mission farm was begun which the Bishop hopes will in time obviate the necessity of procuring all the supplies of flour, &c., from Red River, the expense of which from heavy freights, is so great that every bag of flour by the time it reached the missionaries north of Athabasca costs upwards of £5." Equally explicit is the testimony of the Rev. J. Clut, Catholic Bishop of Athabasca, before a committee of the Senate of Canada. A forcible and unique illustration of the far Northwest range of the wheat plant in central Canada was a suggestion of Mr. James J. Hill of St. Paul, President of the Great Northern Railway, before a committee of the Minnesota Legislature, that a line of 2,000 miles from Chicago to Forts Vermilion and Dunnegan in the Peace River Valley, where wheat and other cereals have been successfully grown by Messrs. Garrioch and McDougall, was the radius of a circle which enclosed the Bermuda Islands on the east, the Gulf of Mexico, and San Francisco on the west.

I will now endeavor, in a few words, to indicate the causes, in my judgment, for this remarkable northwestward extension of cereal production :

First—Reduced Altitude.—The Union Pacific Railroad crosses the dome of the continent near latitude 40°, with its highest elevation at Sherman of 8,000 feet, and with an average of 5,000 feet for fifty miles eastward from the Rocky Mountains. This piedmont on the route of the Northern Pacific, in or near latitude 47°, in Montana, is reduced to an average of 4,000 feet : at the crossing of the Canadian Pacific Railway, on the south branch of the Saskatchewan, in latitude 51°, to 3,000 feet ; in the Athabasca district, latitude 55°, to 2,000 feet, and in the valleys of the Peace and Liard Rivers, latitudes 56°, to 60°, to 1,000 feet—until subsiding northeastwardly, the plains connect with the navigable channel of the Mackenzie at an elevation of only 300 feet above the Arctic Ocean. This difference of altitude is equivalent to 13° of latitude, considered climatically.

Second—Pacific Winds.—The Utah basin, a plateau 800 miles in width, at an elevation of 5,000 feet between the Rocky Mountains and the Sierra Nevada, making a total mountain barrier of 1,400 miles, excludes the moisture of the Pacific winds from the central areas of the continent, while the interlocking valleys of the Columbia and the Missouri on the route of the Northern Pacific Railroad and of the Fraser and the Columbia rivers with the Saskatchewan on the route of the Canadian Pacific, facilitate the ingress and ameliorating influence of the Chinook, or west wind of the Pacific coast to the eastern piedmont of Montana, Alberta, and Saskatchewan : but it is only in latitude 55° to 60° that the remarkable physical effects occur of the Peace and Liard rivers rising in the western slopes of the Rocky Mountains and breaking through its barrier on their courses to the Mackenzie, after interlocking at their sources with the Skesna and the Stickeen.

Third—Summer Moisture.—As a corollary to the foregoing facts of reduced altitude and the intercolation of the Pacific moisture, I am satisfied that there is no necessity of irrigation north of latitude 50°. In the north Saskatchewan, Athabasca, and Peace River districts there is much evidence that the summer rainfalls, without being excessive, still exceed the average of Manitoba and Minnesota.

Fourth—Solar Heat.—On this subject I avail myself of a very intelligent statement of Prof. G. M. Dawson of the Canadian Geological Survey : "In addition to the favorable climatic conditions indicated by the thermometer, the length favors the rapid and vigorous growth of vegetation, and takes the place, to a certain extent, of heat in this respect. This has been supposed to be the case from the luxuriance of vegetation of some northern regions, but Alphonse de Candolle has put the matter beyond doubt by subjecting it to direct experiment. In latitude 56°, which may be taken as representing much of the Peace River country, sunrise occurs on the 20th of June at 3:12 a. m., sunset at 8:50 p. m., while six degrees further south in latitude 50°, which may be assumed to represent Manitoba, sunrise occurs in the same day at 3:49 a. m., sunset at 8:13 p. m., the duration of sunlight in the first being 17 hours, 38 minutes, in the second 16 hours 24 minutes, or an hour and a quarter in excess in the north.

Fifth—Maximum of Fructification.—Over the vast northwestern territory, reaching from St. Paul, in latitude 45°, to Fort Liard, in latitude 60° : a region of vigorous winters, cool, moist springs, and dry, but intense summers, the undue luxuriance of stem and foliage is checked in the first stage of growth, greatly to the advantage of the fruit and seed. This vigor, given to vegetation in cold climates by the rapid increase and prolonged action of summer heat, has often been observed, but has been best formulated by Dr. Samuel Forry, a physician and medical writer, who died on Nov. 8, 1844, and was best known for a publication in the "American Journal of Geology" on the "Acclimating Principle of Plants," cited above.

He states as a universal fact that the cultivated plants yield the greatest product near the northernmost limit at which they will grow. His illustrations embrace nearly every plant known to commerce and used either for food or clothing. Cotton, a tropical plant, yields the best staple in the temperate latitudes. Flax and hemp are cultivated through a great extent of latitude, but the lint in southern latitudes, forced into premature maturity, acquires neither consistency nor tenacity, and we must go to the north in Europe to find these plants in perfection. Rice is tropical, yet Carolina and Florida grow the finest in the world. Indian corn is a sub-tropical plant, but it produces the heaviest crops near the northernmost limits of its range. In the West Indies it rises thirty feet, but produces only a few grains on the bottom of a spongy cob, and is regarded only as a cough provender for cattle. In the rich lands of the Middle States it will often produce fifty to sixty bushels to the acre, but in New York and in New England agricultural societies have actually awarded premiums for 125 bushels to the acre. What is a more certain crop in New York, in northern parts of Pennsylvania and Ohio, and the Baltic districts of Europe than in the south either of Europe or America. In the spring it is not forced too rapidly into head before it has time to mature fully or concoct its farina. Oats grow in almost every country, but it is in northern regions only or very moist or elevated tracts that they fill with farina suitable for human sustenance. Rye, barley, buckwheat, millet, and other culmiferous plants might be adduced to illustrate the above principle, for all the habits require a more northern latitude than is necessary to their mere growth. The grasses are in perfection only in northern or coal regions, although they grow anywhere. It is in the North alone that we raise animals from meadows, and are enabled to keep them fat and in good condition from hay and grass without grain. It is there the grass acquires succulence and consistency enough not only to mature animals, but to make the richest butter and cheese. The tuberose, bulbous and other roots cultivated for human and animal subsistence are similarly affected by climate, and manifest habits in corroboration of the above principle. The Irish potato, although from or near the tropics, will not come to perfection but in northern or cool countries, or in moist insular situations, as in Ireland. It is in such climates only that its roots acquire a farinaceous consistence and have size, flavor, and nutriment enough to support animal life in the eminent way in which they are susceptible. In the South a forcing sun brings the potato to fructification before the roots have had time to attain their proper qualifications for nourishment.

So far the suggestive illustrations of Dr. Forry, but will venture to add a further instance from the central wheat district of North America. At its southern margin in Minnesota and Iowa, seldom more than two well-formed grains are found in each cluster or tascicle forming the row ; in northern Minnesota, Dakota, and Manitoba three grains become habitual, and from heads of wheat brought to me from Prince Albert on the Saskatchewan and Fort Vermilion on the Peace River I have separated five well-formed grains from each cluster or group forming the head, which is a decisive evidence that the perfection of the wheat plant is attained near the most northern limit of its successful growth.

Sixth—Fall Ploughing for Wheat.—I append to the foregoing summary of the successful conditions of wheat culture, a brief reference to the preparation of the soil, if not the sowing of wheat in the late autumn. The only instances of injury from frost are where invaluable time is lost in the spring by a neglect of the practice, now universal in Minnesota and Dakota, of fully preparing the ground for the seed in autumn, which can be supplemented with entire success in the Saskatchewan and other northern districts, by sowing spring wheat subsequent to the fifteenth of October. In 1880, the Hon. A. G. B. Bannatyne, of Winnipeg, sowed all the varieties of spring wheat exhibited at the Provincial Fair of that year, in his garden on the 2d of November, none of which failed to germinate in the following spring (although a mild, open winter would be fatal), and all were harvested by the 8th of August.

The kindred topic of annual development in high northern latitudes, I will not undertake to discuss, but hoped to be indulged in citing the experience of European Russia, especially in the district northeast of Moscow, in respect to fruits. Neither the Province of Manitoba nor the Northwest Territory of Canada, within latitude 60o present condition more adverse than the interior of Russia, or the contiguous districts of Siberia and Central Asia, which are equivalent in latitude and other physical relations. To those regions, apples, pears, cherries and plums have been carried by civilized man in his migrations from milder climates northward, with gradual changes in the constitution of the trees until the beforementioned fruits are successfully grown at and beyond the latitude of Moscow, six degrees north of Winnipeg. Malteburn describes a variety of apples grown at Kezusk as weighing four pounds, of a delicious flavor, and keeping a long time. Another variety of apples, grown in the vicinity of Moscow, which was brought from China, is described as so transparent that when held to the light the seeds in it could be counted. Adolph Erman, in his travels through Russia and Siberia in 1840, mentions with surprise that he found at Torxhok, on the road from Moscow to St. Petersburg, north of latitude 57, and at Vladimir, north of 56 degrees, that apples and cherries of a superior kind were extensively grown and at moderate prices. Sir George Simpson, late Governor of the Hudson bay Company, gives in his "Overland Journey Around the World" an account of his visit to Burnaul in Siberia, which is north of the Little Alti Mountains and of northern China, and mentions the cultivation of apples there. In the report of Dr. Clark's travels in Norway and Sweeden published in 1838, is reference to the excellent apples, pears, plums, cherries, and strawberries at Trordhiein in Norway 63° 25 north.

Reverting to the leading topic of the northern limitation of wheat cultivation on this continent, I will only add two American authorities, Mr. Lorin Blodgett, in his standard work on the "Climatology of North America," published thirty years ago under the auspices of the Smithsonian Institution, observes: "A line drawn from Thunder Bay, on Lake Superior, northwest to the Mackenzie River, at the sixtieth parallel, and from that point southwest to the Pacific coast, would include an immense district adapted to wheat, with only the local exception of mountains and morasses," and Mr. J. A. Wheelock, First Commissioner of Statistics of Minnesota, has estimated that "in the Hudson Bay territory, outside of the old provinces, 200,000,000 acres are adapted to wheat raising," Both of these authoritative statements, with other competent testimony confirm me in the belief that the river valleys converging to Lake Winnipeg and Athabasca have the requisite conditions of soil and climate for the settlement and organization of four territorial divisions, each equal to the State of Minnesota, and that the exchanges of the cotton zone of the lower Mississippi States, the corn zone verging on the shores of the great lakes, and the wheat zone raging as far north as in Europe, and the furs, minerals, timber, and fish of the Arctic district, will in all probability constitute the bulk of the domestic or interior trade of North America.

Mashonaland, the territory in dispute between Great Britain and Portugal, is a high table-land, cool and healthy, but bordered on all sides by a malarial region. Portugal and England both make claim to it. The possession of this territory is of peculiar importance since it is the key of the South African porition, and commands the Zambesi and the great interior of the continent. Through the South Africa Company Great Britain is now endeavouring to enter into possession of it. Portugal, which has never occupied it, though for two hundred years it has held its outskirts, disputing her right to do so and resisting her action. The course of the Portuguese Ministry is a strange one, since it is plainly to be foreseen that England at whatever cost will not forego possession of the territory.

THE SLAVES ADRIFT.

Fleeing From Cruel Task Masters They Are Almost Dead When Rescued.

It has been known for months that in spite of the precaution taken by European Governments to stop the export slave trade on the east coast of Africa, the Arabs have found means of carrying on the trade surreptitiously. The volume of the trade has been greatly reduced, but it still exists, and with the present inadequate provisions against it, there is no reason why it should not thrive indefinitely. An Arab dhow has no difficulty in approaching the western Red Sea coast at some appointed spot where the country is not inhabited, and in the night time a load of slaves is packed into the little vessel, and, by morning, the boat is across the sea, all ready to dispose of its load to eager customers. Ventures of the sort are also carried on in more southern waters. A few of these boats have been captured, but more of them elude observation and get to the south and east coasts of Arabia, where they have no trouble in disposing of their human merchandise.

A very remarkable story has just reached the British and Foreign Anti-Slavery Society On April 5 last ten wretched negroes were landed at the port of Kurrachee, at the mouth of the Indus River, in British India. There were five boys and five girls in the party, and they had had a most heartrending experience. About a year before they had been shipped from the neighborhood of Zanzibar, with about 100 other slaves, by Arabs who had brought them from the far interior of Africa. They were stowed away on a dhow, which then coasted along the southern part of Arabia, disposing of the slaves at various places, where a ready market was found for them. The ten slaves with which this story is concerned were sold at a place called Sur, in the Gulf of Oman.

The people who purchased them treated them with great cruelty, and, at last, deciding that they preferred death to such abuse, the slaves conspired to run away. They found near the shore a small boat, in which the poor boys and girls got under cover of darkness, and without food or water they set sail into the unknown Indian Ocean. It happened that a small package of dates was at the bottom of the boat, and this provided a meagre supply of food for five days, but all this time they were without a drop of water. Then they drifted around for five days more, at the mercy of the wind and waves, without a paricle of food or drink. Of course they had a terrible time, and they were nearly dead when they were picked up by the captain of a native Indian craft, who attended to their needs with the greatest kindness, and took them to Kurrachee, whither he was bound, and there gave them over to the care of the British authorities. Their story was rapidly circulated and subscriptions were raised to supply their wants. Of course they are now free, and the means of earning a livelihood will be provided. The terrible risks which these poor children incurred is a proof of the cruelty of Arab slavers.

THE ROUGH SIDE OF CALIFORNIA LIFE.

Who Was Shot Last Week?

In the *Century* for June are reminiscences of the pioneer life by old miners from which we take this incident :

In 1851 Mokelumne Hill was one of the worst camps in California. "Who was shot last week?" was the first question asked by the miners when they came in from the river or surrounding diggings on Saturday nights or Sundays to gamble or get supplies. It was very seldom that the answer was," "No one."

Men made desperate by drink or losses at the gambling table would race up and down the thoroughfares, in single file, as boys play the game of "follow my leader," each imitating the actions of the foremost. Selecting some particular letter in a sign they would fire in turn, regardless of everything but the accuracy of the aim. Then they would quarrel over it as though they were boys playing a game of marbles, while every shot was likely to kill or wound some unfortunate person.

The gambling tents were large and contained not only gaming tables but billiard tables. At one of these I was once playing billiards with a man named H——. A few feet from us, raised upon a platform made for the purpose, were seated three Mexican musicians, playing guitars ; for these places were always well supplied with instrumental music. The evening seldom passed without disputes, and pistols were quickly drawn to settle quarrels. Upon any outbreak men would rush from all parts of the room, struggling to get as near as possible to the scene of action, and often they paid the penalty for their curiosity by being accidentally shot. While H——and I were engaged in our game, we could hear the monotonous appeal of the dealers, "Make your game, gentlemen, make your game. Red wins black loses." Suddenly *bang, bang, bang*, went the pistols in a distant part of the tent. The usual rush followed. *Bang, bang*, again, and this time the guitar dropped from the hands of one of the unoffending musicians, who fell forward to the ground with a bullet through his neck. His friends promptly undertook to carry him past us to the open air. Our table was so near the side of the tent that only one person at a time could go between it and the canvas. H——was standing in the way, just in the act of striking the ball with his cue, when one of the persons carrying the wounded man touched him with the request that he move to one side. He turned and saw the Mexican being supported by the legs and arms, the blood flowing from his neck ; then with the coolest indifference he said, "Hold on, hold on, boys, till I make this shot, "then, resuming his former position, he deliberately finished his shot.

He Could Trust Him.

Citizen : "Yes, I have an umbrella that needs mending ; but if I let you have it you might not bring it back."

Umbrella Mender : Haf no fear. I always charge more for mending dan I could sell zee umbrella for."

The One Thing Omitted.

"I want to pay this bill," he said to the hotel clerk. "But I think you have made a slight error here in my favour. I've been reading over the extras, and I cannot find that you have charged anything for telling me you thought it might rain."