

THE INFLUENCE OF GEOGRAPHIC FACTORS IN THE DEVELOPMENT OF MINNESOTA¹

Geography and history are two branches of knowledge that are very closely related. Whether recording the history of to-day or that of some past epoch, the historian writes most accurately when he has in mind, as his background, the geographic conditions of the times of which he writes. The geographer, in turn, must study the pages of history if he wishes to comprehend fully the geographic conditions of any period, the present not excepted. Some one has tersely defined history as geography set in motion, meaning thereby that the geography of to-day becomes the history of to-morrow, a definition that geographers can accept; to speak of its acceptance by historians would be presumption on my part.

In considering the influence of geography in the settlement and development of Minnesota a brief statement of the factors involved will be of advantage, since it will indicate the general lines along which the discussion will proceed. Among geographers it is generally conceded that a study of the geography of a region embraces a discussion of the climate, the topography and relief, the question of glaciation, the hydrography, the mineral resources, the flora, the fauna, the soils, the position with reference to lines of commerce and accessibility, and, finally, the people themselves. It is purposed to show briefly and, therefore, rather generally, some of the ways in which each of these factors has played a part in the development of the state.

Without doubt climate is one of the most fundamental of the geographic factors of a region. It may be such as to make

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development practically out of the question, as is the case in lands where low temperatures prevail throughout the year, or where extreme drought is perennial; on the other hand, where the climate is favorable, some of its influences are often so subtle as to preclude their exact statement; sometimes, moreover, a given phase may be from one viewpoint decidedly favorable, and from another quite as unfavorable.

It is not at all beside the mark to say that it was the climate of Minnesota and of the states to the east that brought the French explorers here so early. In the first place, the rainfall was sufficient to fill the many lake basins, formed as the result of geologically recent glaciation, so that it was possible to travel long distances by canoe. Then, the abundance of lakes, the presence of large forest and prairie tracts, and the long, cold winters, all served to furnish an ideal habitat for animals bearing furs of the highest quality. It was for furs that Radisson and Groseilliers first came into this region; on their return from their second trip, in 1660, they are said to have reached Montreal "in sixty canoes loaded with furs worth \$40,000." From that time on until 1850 furs were the leading product of the region that later became Minnesota; and the fur trade, it should be stated, occupied a leading place here for a much longer time than any other single industry.

The climate of Minnesota, by defining the length of the crop-growing season, together with the average summer temperatures, plays also an important part in determining what crops may be raised. In the early days the impression seems to have been abroad in the older states to the southeast that the summers in Minnesota were so short that in most of the years the staple crops would not mature. One can not help but notice how in the early numbers of the *Minnesota Pioneer* Editor Goodhue apparently went out of his way to show that the growing season is long enough for the maturing of crops in this state as well as in those farther south, and in California, which was at that time much in the public eye.

Within my own recollection Minnesota was hardly considered a corn-growing state; its right to be classed as an apple-producing state may scarcely be said to be proved as yet; and no one claims for it any consideration as a place suitable for the cultivation of peaches and pears. The data collected by the United States weather bureau at Minneapolis show that, on the basis of the average date of the last killing frost in the spring to the earliest killing frost in the autumn, the longest growing season for Minnesota, a period of one hundred and sixty days, is found in the southeastern part along the Mississippi. The shortest season, found near the Lake of the Woods and in the northeastern part of the state, is just short of one hundred days. For most seasons one hundred days is too short for the maturing of corn. In these two facts we have an exact statement of the reason why that crop is confined to the southern part of the state. Though the growing season is too short in some parts of the state for the maturing of corn, it is, nevertheless, of such character that it produces a harder wheat and one that is richer in gluten than the varieties grown in most sections of the country. This same wheat has revolutionized the flour-milling industry and has been largely responsible for making the name "Minneapolis" familiar to millions of housewives the world over.

Stories of Minnesota's long and severe winters probably kept many an immigrant from coming to the state; but that result had its compensations, since only the most hardy ventured within its borders. The character of the winters kept the early settlers within or along the margin of the timbered areas because these were the source of the fuel supply. By the time the frontier had reached Minnesota, the value and fertility of the prairies and oak openings were thoroughly understood, and the problem of breaking the tough prairie sod had been solved, things which were unknown to the pioneers of Ohio and of southern Indiana and Illinois. In this state, therefore, the prairies were the first lands to be brought under cultivation; with less prairie land the agricultural development

of the state would probably have been less rapid. The climate, however, was partly responsible for the existence of the prairies as well as for the conditions that tended to keep the early settlers near their periphery.

There are still other ways in which climate has played an important part in the development of the state, its influence being, in some respects, direct and unfavorable in character, in others beneficial; but as most of these can better be discussed under other headings they will not be taken up at this point. One other characteristic, however, should be mentioned here. I refer to the great differences between summer and winter temperatures, and to the sudden changes not infrequently experienced within a period of twenty-four or thirty-six hours. The immigration of the virile people of northern Europe to Minnesota was in part due to its climate, since it is somewhat similar to theirs. Moreover, the climate tends to keep the inhabitants of a similar type. The tang of our cold winter days induces energy and vim, and the heat of summer is neither great enough nor of long enough duration to be especially enervating. Indeed, on the whole, its climate is one of Minnesota's most valuable geographic assets.

The character of the surface of the land, whether it is rough or generally level, is a primary geographic factor. Particularly is this true in Minnesota, where the surface is so typical of its mode of origin and where the reactions to the surface conditions have been so characteristic. No one now questions the fact of the recent glaciation of the state. Before the coming of the glacier this region would probably have passed as a level country, but of greater relief than it now has. More significant is the fact that at that time the drainage lines were well established, and lakes and swamp areas were probably reduced to a minimum. How many major drainage lines there were and what courses they took is not altogether clear. The soils were largely alluvial and residual, and showed a zonal arrangement as an expression of the arrangement of the underlying rock. The glaciers, however, changed all this.

The well-established drainage lines were entirely obliterated in many cases, and in others much altered. While no major relief features were developed, the surface was left pitted with numerous depressions, many of which are now the sites of lakes or of swamps. In many places the drainage lines have not yet become well established, and as a result the *voyageur* found passage from one river system to another a relatively easy matter, since it usually required only a short portage; hence, his early acquaintance with our state.

A glacier modifies greatly the character of the soil. It mixes heterogeneously the fine and the coarse, the alluvial and the residual soils, and the rock flour which it has made in its movements. Where limestone has been the underlying rock, the limey nature of the flour has tended to "sweeten" other residual clays that might otherwise be acid and not so productive. Again this very heterogeneity is an asset. Studies of statistics show that glaciated regions generally have better soils, and are more productive than adjacent nonglaciated ones, and that they are, therefore, more valuable from the agricultural standpoint.

We must not lose sight of the fact, on the other hand, that in its erosional and depositional effects a glacier may work harm. There were many places where the country was pretty well stripped of its soil, and because the time which has elapsed since the passing of the glacier has been far too short for the formation of a sufficient depth of residual soil, such sections are unfit for agriculture and must remain so indefinitely. In most cases, however, they will maintain a good forest covering, and that is the best use to which they can be put. Such lands are found principally in the north and northeastern parts of the state.

Too much glacial deposition may at times be harmful also. It is not likely that the glacier destroyed a relatively large amount of mineral deposits. What it probably did do, however, was to cover up and conceal deposits that might be very valuable were they known to exist. Their discovery may be

merely a matter of time. Again, the thick deposits of till overlying the iron ore in some of the mines are not sufficiently indurated to permit of shaft mining and must be stripped, an operation which involves considerable expense. In this respect glaciation is a liability.

During the time of the retreat of the edge of the glacier marginal lakes were formed; these have subsequently been more or less completely drained. One of them deserves special mention, since the former lake bottom now furnishes one of the most characteristic physiographic features of the continent as well as some of the best wheat lands. I refer to Glacial Lake Agassiz, which at its greatest height covered a large area in the northwestern part of the state. The deposits laid down in the bottom of the shallow lake are now the fertile, level plains for which the Red River Valley is so justly famous.

In still another way glaciation has affected the development of Minnesota profoundly. It is axiomatic to say that all plant life of the area overridden by the glacier was destroyed. There was of course a southward migration of the various species in advance of the on-coming ice. As the ice edge retreated, there was a return migration of the plants in accordance with the changed climatic conditions. But as all species do not migrate with equal rapidity, we have the interesting phenomenon of some returning—shall we say to the old haunts?—ahead of others that were their preglacial fellows. Botanists tell us that some varieties of trees, as, for example, several members of the hickory family, have not yet returned so far north as present climatic conditions would warrant. Large forest areas of trees of the same variety are, for this reason, found here. In lands where there has been no such forced migration the forests are much mixed, and, as a result, lumbering is more difficult and less profitable. So far as ease of lumbering is concerned, the virgin pine forests of Minnesota have had no superiors and few equals the world over. Shortly after the Chippewa Indians ceded part of their lands east of the Mississippi to the government in 1837, the

lumber industry became important. It soon rivaled the fur trade and later became the leading industry of the state, a position which it held until it was displaced by agriculture in the sixties. The highest point of the lumber output was not reached until 1905, when about two billion feet were produced. The industry will never again attain the proportions which it had in the year just mentioned; but, on the other hand, it will never die out. When the people realize that there are some thousands of square miles of nonagricultural lands which are best suited to forests, and when they demand a policy of scientific afforestation, a substantial increase in the lumber business may be looked for, and, moreover, it will then become as stable an industry as agriculture.

With reference to animal life, attention has already been called to the fur-bearing animals found here as a reaction to the climatic conditions. The climate performs a further service to the inhabitants of this region in that it inhibits the presence of the malaria- and yellow-fever-carrying mosquitoes.

Minnesota is fortunate, indeed, in that three great river systems of the continent, the Mississippi, the Nelson-Red, and the St. Lawrence, have their sources within its borders. When navigation was the chief method of transport, these streams afforded easy access from three different directions. It is significant that the first two authentic exploring expeditions within the present borders of the state entered by two of these waterways, that of Duluth by the St. Lawrence and that of Hennepin by the Mississippi, and that these men should actually have met in the vicinity of Mille Lacs in 1680. Later, when it came to the matter of establishing posts and permanent settlements, entrance was made by all three of these river systems. Aside from the soldiery and the employees of the fur companies, the first white settlers came by way of the Red River, but by 1850 the larger number of immigrants were arriving by way of the Mississippi, which, from that time until the railroads were built, continued to be the principal route of

immigration. It was not until considerably after 1850 that the Lake Superior route had contributed more immigrants than that by way of the Red River.

The falls and rapids of the streams have played an important part in the development of the state, since they determine the places of portages, in some instances the head of navigation, and, later, because of the water power, the location of urban centers. Of the latter two examples may be mentioned. A short distance below the falls of the St. Croix the first settlement of Americans within the state was made in 1838, and soon there grew up along the river a number of settlements, the largest of which was Stillwater. In 1849 these were outnumbered in population only by the settlements clustered about St. Paul. Again, the Falls of St. Anthony determined the sites of both St. Paul and Minneapolis, the former at the point to which boats could conveniently ascend, and the latter at the power site itself. It is now known that within another mile of recession the Falls of St. Anthony would have disappeared, and had this taken place before the white man came upon the scene it is quite likely that the metropolis of the state would not be found in its present location. That the early settlers appreciated the value of the then-undeveloped power sites is shown by the fact that within the shortest possible time after the tidings of the conclusion of the Indian treaties ceding the triangular strip of land between the Mississippi and the St. Croix rivers to the government reached the territory, claims abutting the falls of the St. Croix were staked out. A little later claims on the east bank of the Mississippi at St. Anthony Falls were taken up. While the amount of available water power of Minnesota streams suffers in comparison with that of most of our mountainous states, yet its character is of the most satisfactory sort, since the streams are generally less subject to fluctuations in flow. The many lakes and swamps prevent heavy floods in the streams, and, as a result, less heavy dams are necessary; furthermore, the consequent greater regularity of flow means less idleness of water

turbines because of low water. Owing to the lack of coal mines within the state industries have been more or less handicapped by the cost of generating steam power. What this handicap has meant is well shown by a comparison of the development of the manufacturing industries of Minneapolis and St. Paul, the latter city depending on power from coal, the former using a fair percentage of water power. In 1914 the output of manufactured products in Minneapolis was valued at \$187,000,000; in St. Paul, at \$68,000,000. What is particularly noteworthy is that at the beginning Minneapolis derived virtually all of its power from the falls, and this gave it such an initial advantage over St. Paul that the latter never has succeeded in overcoming the handicap thus imposed. This single illustration may serve to show the great desirability of utilizing many of the remaining water-power resources of the state.

No one conversant with the subject will deny the importance of accessibility, the ease of communication and transportation, in the settlement and development of a region. A consideration of this topic as applied to Minnesota shows several geographic factors, each exerting influences of major importance. Reference has already been made to the lakes and streams as highways of communication. Upon them in summer rode the canoes, pirogues, flatboats, keel boats, and, in later years, steamboats; in winter, in the early days, the frozen streams frequently furnished the roadway upon which the hardy traveler made his way from place to place. Before the coming of the telegraph St. Paul and points above had little communication with the outside world while the navigation of the river was closed by the severe winter weather. It is said that navigation on the Mississippi was "not to be relied upon after the first week in November; and steamboats arrived in the spring about the 10th or 12th of April." The following quotation, taken from the *Minnesota Pioneer* of April 28, 1849, illustrates the point: "During five months the communication between this part of the country and our brethren in the

United States has been difficult and unfrequent. A mail now and then from Prairie du Chien, brought up on the ice in a 'train' drawn sometimes by horses and sometimes by dogs, containing news so old that the good people in the country below had forgotten all about it. . . . When the milder weather commenced, and the ice became unsafe, we were completely shut out from all communication for several weeks." To the extent that these conditions were known to the people in the older states, they undoubtedly acted as a deterrent to prospective immigrants.

The influence of the forests and prairies upon the lines of communication was characteristic. Usually the trails kept to the prairie stretches as much as possible, for the traders had not the time, nor were they disposed to expend the means, necessary to construct roads through a wooded country. This often resulted in the sacrifice of directness of route. Of the three routes from St. Paul to the Pembina settlement, two, the southern and the middle, clung to the open prairie practically all the way. It is not too much of a digression here to suggest that the peculiar type of vehicle known as the Red River cart is an expression of the level prairie region of the old Lake Agassiz bed. A cart built along similar lines has evolved in the level pampas of Argentina.

The generally low relief of the state proved a valuable asset when the time of railroad building came. Construction was relatively inexpensive so far as the grading of the right of way was concerned. In addition the neighboring forests furnished ties and the best of structural timber at a low cost. It was under such conditions that, for the first time, railroads were pushed on in advance of settlement.

It is generally understood that for a city to be situated on lines of commerce, or for such lines to run through a country, is a particularly valuable asset. Minnesota is most fortunate in this respect, for in it is located one of the principal cross-roads of the continent. The Twin Cities are at the focus of routes between the undeveloped empire to the north and west

and the states to the east of the southern end of Lake Michigan. Since it is at the head of steamboat navigation of the Mississippi, St. Paul early became an important distributing center for this great northwestern country, and that distinction it still holds. When the upper lakes navigation became important through the digging and subsequent deepening of the Sault Ste. Marie canal, Duluth similarly became the *entrepôt* for the northern part of the state. This section did not develop to any great extent, it may be remarked, until the shipment of ore from the Vermilion Range began in 1884.

While it may seem a little far-fetched, principally because one does not think of it in that way, there is no doubt that architectural styles have been modified in some respects by the geographic conditions that obtain in the region. In the larger prairie sections there was a time when houses were built of sod, since lumber was not readily available. Besides, houses so constructed were cheap and made a pretty fair type of winter residence. As railroads came in and lumber became everywhere available, the frame building became prevalent. Only as lumber has become scarcer in the last decade has there been any general use of other building material for houses. The abundant clays in the state supply a fine quality of brick, and the rigor of the winters necessitates a "tighter" house than is found in most parts of the country.

A discussion of this sort would not be complete without some mention of the high type of citizens in the commonwealth. One can not read the early history of the state without being struck by the high-mindedness of its pioneers. The establishment of this historical society is ample proof of the point. These pioneers had an abiding faith in the great future of the state they were shaping. Many of the things they hoped for have been realized, but there remains much to be done, including newer things they thought not of; and we shall do well if we "carry on" in the abiding faith that is our heritage.

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