MACOUN AND THE GREAT NORTH-FEST

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by
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The Canadian botanist and explorer, John Macoun (1831-1920), is not a major Canadian historical figure. Indeed, he is relatively unknown today. Such was not always the case. In the latter half of the nineteenth century, Macoun thoroughly explored the relatively unknown regions of Western Canada. His subsequent reports and lectures refuted the severity of earlier findings and suggested that the land’s agricultural capabilities, particularly the southern plains, were unrivalled. The story of this new interpretation is the purpose of this thesis.

During the course of my work on this thesis, I received assistance from several people and institutions, some of whom must be thanked individually. I am deeply grateful to Dr. T. D. Regehr for his attentive supervision and helpful comments throughout the course of the project. I owe a special debt to my father-in-law, J. G. English, who brought his enthusiasm and judgement to bear on so many occasions and reminded me that historians must also be writers. And I am obligated to his son, Michael English, who devoted much care and attention to the drawing of the maps.
The research and writing of the thesis was made possible by a Canada Council Queen's Fellowship and is gratefully acknowledged. I would also like to recognize the generous assistance of the National Museum of Canada, the National Herbarium of Canada and particularly the staff of the University of Saskatchewan Archives who provided a happy working environment.

To my wife, Marley, who had to give reactions to parts of the thesis and who typed these pages, I owe a deep debt of gratitude.
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Assistant Director, Geological Survey of Canada 154
ABSTRACT

This thesis deals with the development, expression and significance of Professor John Macoun's endorsement of Western Canada's potential for large scale agricultural settlement.

The study of the question first focuses on Western agricultural knowledge in 1870 and Macoun's personal development as a plant geographer up to that time. It then traces the Professor's five major Western explorations from 1872 to 1881, noting the circumstances under which they were carried out and his methods and findings. This is followed by a discussion of the various factors underlying his enthusiastic assessment and its impact on the subsequent development of Western Canada. It closes with an examination of Macoun's later work in an attempt to throw further light on the nature of his evaluation.

The thesis concludes that John Macoun's assessment was the product of his great dreams for the region, as well as his extensive field work and related discoveries. He substantiated the public's growing optimism for Western Canada and should be recognized for emphasizing the land's overall potential.
...the settlement of the Canadian plains was a

\textit{clean-cut experiment in agricultural colonization.} This experiment began in 1870. Prior to 1870

the fur trade and the buffalo, purveyor to the

fur trade, reigned supreme; after 1870, though

progress was slow, agricultural settlement was

the unquestioned policy. This decision...

marked the beginning of a new historical chapter.

\begin{quote}
W. A. Mackintosh, \textit{Prairie Settlement.}
\end{quote}

With the transfer of Rupert's Land to Canada on July 15, 1870, a crucial turning point in Western Canadian history was reached. The land transfer marked the passing of fur trade
dominance and the beginnings of an agricultural way of life in the

North-West.\footnote{"Rupert's Land and the North-Western Territory were transferred
to Canada in 1870. They were then designated the North-West Territories. The spelling was changed to the Northwest Territories in 1906." \textit{EDITOR'S NOTE, The Polar Record, v. 15, n. 5, 1970, p. 145.}} Agricultural colonization was the undisputed Canadian

policy, and the Western Interior\footnote{see \textit{JOHN WARKENTIN, The Western Interior of Canada} (Toronto: McClelland and Stewart Ltd., 1969), p. 3.} was soon to become part of the

North American settlement frontier. Yet, settlement of the West
in 1870 was "a clean-cut experiment". It was a new venture in an area where many factors critical to the growth of cereal grains were still unknown. This situation was further complicated by contradictory views of the nature of Western lands—the image of the desert and that of the fertile belt.

At the time of the land transfer, the possibility of wide scale agricultural development of the North-West remained a question. Despite agricultural activity in the area for several decades, production was limited and largely restricted. Cultivated land in 1870 was essentially confined to the shadows of the fur trade posts and the forks of the Red and Assiniboine Rivers. Moreover, the record of agricultural experience of the Hudson's Bay Company posts and Selkirk's Red River Colony contained both encouraging and discouraging elements. The things that were known about North-Western agriculture were more contradictory than conclusive.

Small garden plots had first been attempted at the Hudson's Bay Company posts on James Bay in an effort to supplement the fur traders' diet. It was not until the turn of the eighteenth century, however, that the increasing competition between English

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and Canadian interests made agriculture important to the continued survival of the fur trading companies. The increasing costs of extending the trade and the recurring periods of pemmican scarcity were sobering facts. Company officers began to devote greater attention to their garden plots to ensure a cheap and regular food supply.  

Agriculture consequently became an almost indispensable part of fur trade operations. In 1804, Alexander Henry, the younger, recorded an excellent harvest at his post on the Red River, south of the International border:

Oct. 27, 1804. The men have gathered the following crops: 1,000 bushels of potatoes (produce of 21 bushels); 40 bushels turnips; 25 bushels carrots; 20 bushels beets; 20 bushels parsnips; 10 bushels cucumbers; 2 bushels melons; 5 bushels squashes; 10 bushels Indian corn; 200 large heads of cabbage; 300 small and savory cabbages.

Gardens also flourished at posts on the North Saskatchewan River. On his first trip up-country in 1820, George Simpson was very complimentary of the farming efforts at Cumberland House. Good cultivated fields of wheat, barley and garden vegetables were also reported at Forts Carlton and Edmonton.  

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6 Ibid., p. 8.
agricultural successes at Company posts in 1825, Alexander Ross stated that "cultivation [was] superseding fur".  

Yet, agriculture was not destined to replace the fur trade in the North-West in the first half of the nineteenth century. The traders' garden plots often fell prey to the natural hazards of the region, resulting in poor yields. In 1809, Alexander Henry, the younger, reported that his gardening efforts were less successful at the drier Fort Vermilion site on the upper North Saskatchewan River. Simpson, on his world journey in 1841, noted the crop hazards at Carlton:

In the immediate vicinity large gardens and fields, which produce abundance of potatoes and other vegetables; but wheat, though it has sometimes succeeded, has been far more frequently destroyed by the early frosts of autumn...  

In fact, most traders' journals warned about the ravages of frost, drought, floods and grasshoppers.

Agricultural endeavours were also limited by manpower demands of the fur trade. Dependent upon local initiative, farming was sporadic and conducted on a very small scale. The total cultivated acreage at the Company posts for any given year usually amounted to only a few hundred acres.  

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8 Ibid., p. 111.  
9 Ibid., p. 112.  
10 R. COLE HARRIS; JOHN WARKENTIN, Canada Before Confederation (Toronto: Oxford University Press, 1974), pp. 262-263.
that proved too successful were frowned upon by the Company.

Cumberland House developed into a model farming centre in the 1830's, only to be abandoned.\textsuperscript{11} Of the fur traders' agriculture, the historian F. G. Roe writes:

\begin{quote}
...the active participants were primarily neither "inaugurating a policy" nor greatly concerned about recording the results. First and foremost, they were either diversifying a monotonous meat diet; or, more basically still, they were trying to raise something to eat.\textsuperscript{12}
\end{quote}

The farming activities of the traders did, nonetheless, establish certain facts about the possibility of agricultural settlement. The successes of their small garden plots proved that the land in those areas of the North-West was fertile. But more important, the traders' experience suggested that climate, not soil fertility, was the decisive factor in Western agriculture.\textsuperscript{13}

These climatic hazards, however, were largely accepted and seldom acted upon. The garden plots were incidental to the fur trade and remained so up to the time of the transfer.

The experience at Selkirk's Red River colony verified the traders' findings about North-Western agriculture. Established in 1812 below the forks of the Red and Assiniboine Rivers,

\begin{flushright}
12 ROE, "Early Agriculture in Western Canada...", p. 106.
\end{flushright}
the settlement was to supply the fur trade with foodstuffs, primarily flour. Agricultural activity in the rich loam of the river banks clearly demonstrated the fertility of the soil. The colonists' efforts also fell victim to the same crop hazards experienced at the company posts; although unlike the traders, the Red River farmers confronted these problems with relative success. Through experiment, as well as natural selection, they produced a spring wheat that ripened in about 100 days, thereby lessening the chances of crop deletion through frosts. The significance of such developments, however, was diminished by inherent limitations of the colony; limitations similar to those experienced by fur trade agriculture.

During the first fifteen years at Red River, agriculture was hampered by a series of natural disasters and had to be supplemented by hunting and trading. This initial dependence on other activities resulted in a hybrid economy at Red River. The hunt and fur trade remained the principal occupations and chief sources of food, even though a series of successful crop years was experienced. They

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15 A hostile climate (1816-17) and grasshoppers (1818-21) prevented the establishment of successful agriculture until the mid 1820's. MORTON, A History of Prairie Settlement, pp. 18-20.
effectively prevented an independent agriculture at the colony.\(^\text{16}\)

This subordination to the buffalo hunt and fur trade exacerbated the other limiting factor on Red River agriculture—the relative isolation of the settlement. Lacking outside markets, the farmers' production was necessarily geared to the demands of the local population. There was little incentive to expand, as Mr. Gowler, a local farmer, explained:

> Look at that prairie: 10,000 head of cattle might feed and fatten there for nothing. If I found it worth my while, I could enclose 50, 100, or 500 acres, and from every acre get 30 to 40 bushels of wheat, year after year. I could grow... anything you wish, and any amount, but what would be the use. There are no markets...\(^\text{17}\)

Farm acreage was consequently confined to the river banks, growing from 2,000 acres in the 1830's to less than 9,000 in 1856.\(^\text{18}\) By 1870, this acreage had increased slightly with the westward expansion of agriculture along the Assiniboine River to Portage la Prairie.

The agricultural colony at Red River was, therefore, a limited success:

> The settlement proved itself a supply base for extensive settlement and as such was valuable; it did not prove, however, the starting point of a staple agricultural economy.\(^\text{19}\)

\(^\text{16}\) MORTON, "Agriculture in the Red River Colony", pp. 306; 316; 320.
\(^\text{18}\) DUNBAR, \textit{op. cit.}, p. 82.
\(^\text{19}\) MORTON, "Agriculture in the Red River Colony", p. 315.
The colony also provided evidence of the possibility of large scale agricultural development. It had shown the capacity of the land to grow wheat, while demonstrating "the difficulties to be overcome in any attempt to establish an agricultural community in the West". Even at the time of the transfer, lessons were to be learned. A series of bad crop years, coupled with the disappearance of the buffalo herds, had created a critical situation at Red River in the late 1860's. Unable to support itself, the settlement depended upon private charities and government support for its survival. By 1870, then, more than at any other time in its history, readjustments in Red River agriculture were badly needed.

Perhaps the best summary of Western agricultural knowledge around the time of the transfer is found in the debates over the Hudson's Bay Company's administration of Rupert's Land. In 1857, facing the expiration of its licence within two years, the Company applied for a renewal. In dealing with this matter, the British Government, in effect, had to make a decision on the future course of development of Rupert's Land. It consequently appointed a Select Committee of Enquiry on the Hudson's Bay Company.

20 WRIGHT, op. cit., p. 47.
The evidence collected by the British Committee made it evident that there was still little precise knowledge of the Western interior, let alone of its potential for large scale agricultural settlement. Scientific explorers who had had experience in the territory, men such as John Richardson and John Rae, claimed that the North Saskatchewan country was fertile and, thus, highly suitable for settlement. On the other hand, Company representatives played down the extent and successes of North-Western agriculture. They scorned the idea of colonization, emphasizing the climatic obstacles. Governor Simpson warned of the effects of frost at Red River:

The banks of the river are alluvial, and produce very fair crops of wheat; but the crops are frequently destroyed by early frosts; there is no certainty of the crops... It was unrealistic to expect a detailed, dispassionate appraisal of the North-West's agricultural possibilities from the fur traders. Yet, apart from their vested interest, the traders' negative outlook was based on first hand experience.

In the end, the Select Committee decided that the Hudson's Bay Company should continue to administer Rupert's Land for at least

22 WARKENTIN, The Western Interior, pp. 144-146.
23 ROE, "Early Agriculture in Western Canada...", p. 117.
one more year. It offered no conclusions about the feasibility of agricultural colonization. Supporters of settlement, nonetheless, scored a moral victory in that year with the appearance of Lorin Blodget's book, *The Climatology of North America* (Philadelphia, 1857). Blodget had combined limited meteorological data with bold generalization to produce isothermal lines for North America. He concluded that summer isotherms extended northward into the British Plains to produce a favourable climate for agriculture. Blodget's pronouncements carried great weight, for isotherms were regarded as "immutable scientific constructs". But his work remained, as with most theories concerning the North-West, essentially an untested thesis in 1870.

There also existed, at the time of the land transfer, two diametrically opposed, firmly established images of the country. It had been labelled both desert and garden. These different perceptions of the landscape were largely affected by men's

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26 Their report did, however, suggest that lands of agricultural value should be annexed by Canada.

27 DUNBAR, *op. cit.*, pp. 89; 92-93; 97. Blodget's *Meteorological Register of 1855* gave the following figures for Western Canada:

<table>
<thead>
<tr>
<th>Precipitation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern slope of Rocky Mountains</td>
<td>20 inches</td>
</tr>
<tr>
<td>Saskatchewan Valley</td>
<td>15 inches</td>
</tr>
<tr>
<td>Between Red River and the Merid. of 100 of W. Long.</td>
<td>15 inches</td>
</tr>
<tr>
<td>On east of Red River</td>
<td>30 inches</td>
</tr>
</tbody>
</table>

(from WARKENTIN, *The Western Interior*, p. 146.)
backgrounds, prejudices and expectations. Trader, explorer and politician "saw in the Northwest what they expected to see, what they wanted to see, not always what the realities of the situation tried to force them to see". They distorted the true nature of the land, further complicating the issue of agricultural colonization of the North-West.

The image of the desert coincided with the fur trade's penetration of the Western Interior. In the mid 1700's, English and Canadian traders scrambled to construct a string of competing posts westward along the water routes of the parkland and woodland groves. By 1800, this rivalry for fresh fur ground had pushed the trade in southern Saskatchewan, and south and central Alberta. Yet, activity in the grasslands was to be shortlived. In 1822, in an effort to insulate the northern fur reserves from their American rivals, the recently united Hudson's Bay and North-West Companies dispatched a 100 man expedition to the South Saskatchewan country. The Bow River Expedition (1822-23), as it became known, secured as many furs as possible, rendering future trade in the area unprofitable. No permanent posts were established, and the fur traders withdrew completely to the North Saskatchewan country in 1834. Their withdrawal left the southern plains relatively isolated.

28 Ibid., p. 80.
and unexplored. It also created a myth about their nature.

To the early explorers of the North-West, the transition from parkland to open prairie had a great psychological impact:

The sense of lonely unending distance which comes to the voyageur when day after day has gone by, the night has closed, and the morning dawned upon his onward progress under the same evermoving horizon of grass and sky.31

These wanderers were also accustomed to judging the land by its tree growth and did not know what to make of the prairie landscape. They could only conclude that the plains were generally unsuited for agriculture.32 Thus, in describing the prairie region, the fur traders used such words as 'barren' and 'desert'—logical terms for the unfamiliar ocean-like grasslands. This terminology was unfortunately construed by others to mean a sandy waste-land. It engendered a negative conception of the plains that would have to be dealt with in any future assessment.33

This pessimistic view of the region's potential was also held by French Canada. Quebec settlers at Red River suffered many hardships during the first few years of the colony's existence and reported that farming on the prairies was very hard and uncertain. This lack of confidence in the land's fertility was purposely encouraged by French missionaries, in an effort to restrict immigra-

32 WATSON, op. cit., pp. 16-17.
33 JOHN WARKENTIN, "Steppe, Prairie and Empire" in RASPORICH; KLASSEN (ed.), Prairie Perspectives 2, p. 106.
tion and underline the need for charity.  

As for the conception that the Western lands were exceedingly fertile, this image had its beginnings with Upper Canadian annexationists. In the 1850's, the province of Upper Canada was experiencing rapid, burgeoning growth. It desperately needed to expand, and the Western Interior, rather than the Shield country, could provide the type of frontier required by a dominantly agricultural society. It was only natural, then, for the North-West to receive greater attention from Upper Canadians. Usually dismissed as a frozen wilderness, it was reappraised; it now became the object of the annexationist dreams of a confident, prosperous people.

The actual campaign for the acquisition of Rupert's Land was initiated by Liberal Reformer, George Brown, in 1856. Through his Toronto Globe, Brown appealed directly to Toronto businessmen and Upper Canadian farmers. He argued that the possibilities of the region were too great to be subordinated to fur trading interests. A new agricultural frontier in the North-West would remove demographic pressures, serve Toronto's commercial interests, and make possible sea to sea nationhood. It was a very appealing vision that prompted

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36 In Eastern Canada, little agriculture existed north of the 49th parallel—the southern boundary of Western Canada.
a positive appreciation of the Western Interior's potential.

These images of desert and garden were reinforced and refined in the late 1850's. While the Select Committee was sitting, the British and Canadian governments dispatched scientific exploring parties to the Western Interior to gather reliable information on agricultural prospects and possible railway connections. The British geographical expedition, led by Captain John Palliser, investigated thoroughly the region from Lake Superior to the Rocky Mountains, spending three years in the field (1857–1859). With little meteorological data and few records of agricultural experience, Palliser's opinions of the capabilities of the North-West were necessarily derived almost exclusively from the vegetation. The expedition, nonetheless, performed a pioneering work of discovery.

The exploring party clearly distinguished the three steppes or prairie levels and designated the areas accordingly. They also defined the areas where agriculture could best be initiated:

... let us imagine a line drawn from 60 miles south of Fort Carlton, which is on the verge of the great prairies, to the Wiguatinou, and thence produced to the site of Old Bow Fort. This line marks the boundary of two natural divisions of the country, viz., the ancient forest lands and the

38 MACKINTOSH, op. cit., p. 34.
true prairie district. To the north of this line generally there is timber, a good soil for agricultural purposes up to \(54^\circ\) north latitude, and superior pasturage; to the south there is no timber, the soil is sandy, with little or no admixture of earthy matter, and the pasture is inferior.\(^{39}\)

The belt of land along the Assiniboine and North Saskatchewan Rivers was, therefore, considered most suitable for agriculture, although Palliser cautioned that climatic peculiarities, particularly the short frost free growing period made wheat an uncertain crop.\(^{40}\)

The South Saskatchewan country, on the other hand, formed a triangle of arid lands\(^{41}\) and was ruled out for settlement.

In his final report, Palliser concluded there was much excellent agricultural land in the Canadian North-West:

Between this line of the "strong woods" and the northern limit of the true prairie country there is a belt of land varying in width ... Its superficial extent embraces about 65,000 square miles, of which more than one-third may be considered as at once available for the purposes of the agriculturalist.\(^{42}\)

His reputation, however, is firmly associated today with his pessimistic pronouncement on the southern prairies.\(^{43}\) Palliser himself was to some degree accountable for this historical fate. He unintentionally employed inexact and subjective terms to characterize the Western


\(^{40}\) MACKINTOSH, op. cit., p. 35.

\(^{41}\) "...having for its base the 49th parallel from longitude 100\(^{\circ}\) to 114\(^{\circ}\), with the apex reaching to the 52nd parallel of latitude." Palliser quoted in WARKENTIN, The Western Interior, p. 178.

\(^{42}\) SPRY, op. cit., p. 538.

\(^{43}\) Ibid., p. cxiv (introd.).
Interior. By 'central desert', Palliser did not mean a complete absence of vegetation but rather a region deficient in wood, water and grass. His use of such concepts placed even greater focus on his arid triangle concept and left him open to investigators' criticism in later years.44

As for Palliser's discouraging outlook for the southern grasslands, his conclusions can to some extent be ascribed to the Captain's lack of agricultural knowledge. He regarded treeless prairie as arid.45 Western conditions, however, had not been encountered before and were in complete contrast to traditional understanding. The climatic peculiarities of the prairies posed great obstacles, especially when dry farming methods and technology were yet to be developed. It would seem only natural, then, for Palliser to advise against settlement on the southern grasslands.46

Palliser's perception of the grasslands was also influenced by American views of the trans-Mississippi Plains. In the early 1800's, explorers Zebulon Pike (1806-1812) and S. H. Long (1819-1820) assessed the unfamiliar plains environment as a great desert wholly unfit for cultivation. This illusion of an inland desert east of the Rocky Mountains was confirmed by subsequent investigators and travellers. It became a reality in the minds of

44 WARKENTIN, The Western Interior, p. 176.
45 MACKINTOSH, op. cit., p. 34.
46 SPRY, op. cit., pp. cxi-cxiv (introd.).
the American people, effectively acting as a barrier until the
Civil War. Hence, the American settlement frontier jumped
almost 2,000 miles westward to Oregon, while the people of Minnesota
looked to expand into the British North-West. Nor were the effects
of this great illusion confined to the United States. Palliser
believed in the existence of the 'Great American Desert' and
neatly extended it into British North America to account for his
famous triangle.

The Canadian expedition (1857-1858), under the leadership
of scientist H. Y. Hind and surveyor S. J. Dawson, concentrated
its investigations from Lake Superior to Red River and south-east
and south-west of present day Winnipeg. Hind thoroughly inspected
the prairie regions, particularly the southern interior, and
recognized gradations in aridity. Yet, he accepted Palliser's
simpler classifications of an arid and infertile triangle.

The boundary of the prairie country properly
so-called, may be roughly shown by a line drawn
from the great bend of the little Souris, or
Moose River, to the Qu'Appelle Mission, and from
the Mission to Moose Woods, on the South Branch.
[i.e., from about longitude 101° on the international

47 W. B. WEBB, The Great Plains (New York: Ginn and Company,
48 WARKENTIN, The Western Interior, pp. 176-177. Watson (op. cit.,
p. 20) suggests that Palliser"was supported in his conclusion
about a Canadian desert because of the illusion of an American one".
49 Ibid., p. 219.
PALLISER-HIND

VEGETATION ZONES

Scale: 1:1250000

MAP 1.1
the groundwork for future investigations which refuted or confirmed their findings in greater detail. Neither Palliser nor Hind was impressed with the southern grasslands. Both held out little hope for that region's agricultural development. Instead, they extolled the merits of the wooded fertile belt. Future detailed exploration of the Western Interior would have to take account of these concepts of good and bad land.56

Following the Palliser and Hind surveys, further detailed study of the North-West was not undertaken until the 1870's. The image of the desert and the fertile belt, nonetheless, continued to be discussed and defined. A number of British and Canadian adventurers went west during this period, travelling along the fur trade routes. These men for the most part made sweeping generalizations about the country's resources and, thus, few contributions to existing knowledge.57 Lord Milton and Dr. Creadle, on their overland trip in 1862-63, reported:

From Red River to the Rocky Mountains, along the banks of the Assiniboine and the fertile belt of the Saskatchewan, at least 60 million acres of the richest soil lie ready for the farmer when he shall be allowed to enter in and possess it.58

The appraisals, moreover, were not always optimistic, as evidenced

56 WARKENTIN, "Steppe, Prairie and Empire", pp. 118-121.
57 Ibid., p. 122.
by the comments of Archbishop Tache, a resident of the North-West for several years:

> At the risk of appearing to be unreasonably retrograde, I dare positively affirm that not more than one-half of the area of the prairie... called the Fertile Belt... is fit for settlement, and that this half has not all the advantages attributed to it.59

In light of the region's climatic hazards, Tache designated the fertile belt for grazing, the forest region for cultivation.60

As for the Canadians, acquisition of Rupert's Land became one of the main themes of Confederation. The promoters of union read and emphasized the optimistic portions of Palliser's and Hind's scientific assessment. They did not mention the discouraging outlook for the southern plains or the peculiar climatic factors that played havoc with Western agriculture.61 Canadians were determined that those Western lands suitable for agriculture should be opened to settlement. The Fathers of Confederation also saw the acquisition and settlement of Rupert's Land as the first step in the achievement of a truly transcontinental nation—a 'sine qua non' if Canada was to maintain its independence in North America.62 Canadians in 1867, therefore, held the idea

59 A. A. TACHE, Sketch of the North-West of America (Montreal: John Lovell, 1870), p. 19.
60 Ibid., pp. 10-12; 28.
that the Western Interior was a great, fertile land waiting to become the granary of the new Confederation.

Two years later, this vision came one step closer to reality. The Hudson's Bay Company was "required to accept a kind of 'manifest destiny' that the agrarian frontier must move into all territories suitable for cultivation"\(^{63}\), and surrendered to Canada its proprietary rights in Rupert's Land.\(^{64}\) The transformation of prairie wilderness into a great grain producing region, however, was still some distance away. Although the land was soon to be opened to settlement, this did not necessarily mean that a new era in the Canadian West had been ushered in. The 1870's were to be a decade of transition in the North-West: a transition from a fur trading to an agricultural frontier.\(^{65}\) The fur traders withdrew northward, the Indians and Metis were relegated to certain areas and the buffalo were virtually eliminated:

...making way for a new civilization that viewed the land in a very different way and tackled it with very different techniques.\(^{66}\)

Canadian knowledge and understanding of the Western Interior were also to undergo great transformations. Rupert's

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64 In the deed of surrender, all the country from the North Saskatchewan to the border was referred to as the fertile belt.
66 HARRIS, _op. cit._, p. 241.
Land had been acquired under the simple assumption that some, perhaps all, of the land was fertile. There had been no mention of the regional peculiarities. Yet, settlement of the West in 1870 was anything but certain; it would be a matter of trial and error. The land was perceived both as desert and garden.

Fundamental problems of agriculture existed and could only be solved by the settler after years of experience. The 1870's and 1880's were to be spent investigating the agricultural possibilities of Western soils and rediscovering the hazards experienced during the fur trade years:

...the attempts to identify and locate a Fertile Belt and decide whether or not a desert existed in the southern interior were just beginning. There were great latitudinal shifts in the location of the Fertile Belt, and the very idea of the existence of a desert was to come and go.67

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Chapter Two

NEW FORMS

Botany and a Canadian Botanist

I can understand your delight in examining what may be new to you as I can only feel my earlier sensation when I stand in a new field and see around me new forms and know that almost every step will add to my enjoyment. This brings up the days of yore when a young man I tramped the woods alone yet not alone for all around were friends that remind me of even earlier days when I trowel in hand but without knowledge dug up the primroses and violets for my garden in the far off time in Ireland.

Macoun to Bebb, December 5, 1887.

The transfer of Rupert's Land to Canada, and Canada's determination to open this vast area to agricultural settlement and development, made it essential that a clearer, more detailed knowledge of the region be acquired. Reinterpretation of the country's capabilities was necessary to select the lands best suited to agricultural settlement and to determine the most suitable route for the proposed Pacific Railway. Western Canada was consequently re-explored in the 1870's but under completely different circumstances and with entirely different objectives than attended earlier explorations.
The major responsibility for these post-1870 investigations fell to the Geological Survey of Canada. Created in 1842, the Survey had been devised by the Province of Canada expressly for the sake of investigating and aiding in the development of the mineral resources of the country.¹ The basic responsibilities of the Survey were geological, but it displayed, from the beginning, broad scientific interests which transcended the bounds of traditional geology. It was the only organization of its kind in Canada, governmental or otherwise, concerned with acquiring exact scientific knowledge of natural resources. Many of the country's outlying regions had not been thoroughly explored. Adequate topographic maps, essential to geological survey work, were lacking. The Survey was, therefore, charged with more work than was implied in its official title.² Its operations consisted of reconnaissance surveys, general exploration, systematic mapping and description.

The work load of the Geological Survey increased immeasurably with the land transfer. It was not only the organization best qualified to locate, examine and report on the resources of the Western Interior, but Canadian Government plans, particularly the

railway line, added an element of urgency to these duties. The Survey thus concentrated the greater part of its field efforts in Western Canada in the 1870's, cooperating informally with the Canadian Pacific Railway (CPR) surveys. The financial and manpower resources of the Geological Survey, however, were entirely disproportionate to the immense area requiring examination. The problem of limited funds existed prior to the addition of the new territory and was greatly exacerbated by the enormous, new responsibilities assigned to the Survey after the transfer. Many areas of the North-West needed general exploration as well as detailed survey work. Much depended on the initiative of energetic, more highly trained men working in difficult and oft'times hazardous conditions in remote areas. John Macoun, a botanist who determined the climate and soil conditions of a region from its vegetation, was such an individual.

Born in the ancient parish of Maralin, Northern Ireland, April 17, 1831, Macoun had always had a love for the outdoors and adventure. Because of the death of his father, a member of the Princess Royal's Regiment, six years after his son's birth, John

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3 ZASLOW, Reading the Rocks, pp. 105; 107-108.
spent his adolescence working the family land. This situation was not a burden to him, however, for he apparently loved hard work, revelling in the natural world of the fields and gardens. He prided himself on seeing what other boys failed to notice and knowing out-of-the-way places. Educated in the parochial school of the Presbyterian Church, Macoun attributed his moral courage to such schooling; he always told the truth and often stoically took a whipping for a weaker boy. He was also very stubborn, almost self-righteous, and fought to have his own way. Some of these attributes, apparent in his youth, became characteristic of the man and his later work.

In May, 1850, the Macoun family emigrated to Canada, settling near relatives in Seymour Township, Northumberland County, Ontario. John spent his first six years in Canada as a hired hand and then became a farmer himself. During these years, while working in the fields and forests of backwoods Ontario, young Macoun made his initial acquaintance with Canadian plant life. This passing interest in strange wild flowers developed into a fascination with

5 JOHN MACOUN, Autobiography of John Macoun, M. A. (Ottawa: Ottawa Field Naturalists' Club, 1922), pp. 7-13. The accuracy of this source is questionable. The book, started by Macoun in his 89th year, was hurriedly completed and edited by his son, William, who had little direct involvement with his work.

6 90 miles east of Toronto.
Canadian botany, with the enthusiastic encouragement of a local farmer. They talked together of flowers every Sunday, and John was presented with an old book listing the plants of Northumberland and Durham counties in England. Macoun secured his basic knowledge from this and other English books following the Linnaean classification system. He would take a particular plant and attempt to name it. This painstaking process constituted his first botanical studies and influenced the direction of his work in later years.

In 1856, desiring to study botany in greater depth, Macoun decided to teach school. After three days' grammar study, he walked forty-three miles in winter to the County Inspector's home and was granted a teaching certificate. John's first appointment was in Brighton, where he continued to collect and describe plant specimens. After spending two and a half years in Brighton, Macoun enrolled in a teacher education programme in Toronto in August, 1859. Here, he spent most of his free time botanizing with a University of Toronto student who made him aware of the fundamentals of structural botany and classification. John graduated from the Normal School with a first class certificate, and on November 1, 1860, became

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7 MACOUN, Autobiography, p. 22.
8 The Linnaean classification used binomial nomenclature and was based on the simple procedure of counting the male and female parts of a flower.
9 MACOUN, Autobiography, p. 32.
a teacher in Number 1 School, Belleville. Macoun credited this appointment as the real turning point in his life for he decided to devote all of his available time to natural history study. 10

This resolution came at a significant point in the history of natural science. Prior to 1800, there had been little Canadian botanical work. The beginnings of Canadian activity coincided with the origin and development of the science in the Old World. 11 The early botanists, usually observers educated in the sciences of the day, had been either explorers or naturalists to British expeditions in Canada. Since the purpose of these expeditions was essentially topographical, and not scientific, the collecting of Canadian plant life was secondary and specimens were often carried back to England for examination. 12

Dependence upon foreign advances and techniques continued well into the middle of the nineteenth century. Canadian botanical work rested largely in the hands of amateurs and was chiefly concerned with the collection and description of flora and their comparison with European or American species. 13 Any distinctive

10 Ibid., pp. 37-38.
12 Ibid., p. 46.
local study was severely handicapped by the subordination to foreign enterprise, and more particularly, by the lack of correspondence and exchange of specimens among Canadian collectors. There was little organization of Canadian species knowledge on a national or even regional level. A botany of Canada was almost completely dependent upon the compilation efforts of British and American investigators. 14

The 1860's, however, witnessed a significant departure in the history of Canadian botany, which was, to a large extent, a result of the publication of Charles Darwin's *The Origin of the Species* in 1859. Up until this time, botany had been little more than a science of names. 15 Botanists were preoccupied with the identification, description and ordering of plant species, in accordance with the prevailing classification systems (systematics). These schemes, the Linnaean and Natural systems 16, were essentially non-dimensional. 17

They saw species as constant, defining only their external

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16 Unlike the Linnaean system which considered only the reproductive parts as the basis for grouping, the Natural system studied the whole plant.
characteristics (morphology). There was no attempt to consider
the internal structure of plants or possible geographic or genetic
variations.

The enunciation of Darwin's theory of Natural Selection
had a fundamental effect upon scientific thought and conceptions
of life. Attention became focused upon changes within species
and inter-relationships between populations. At the same time,
systematics was given new meaning. Before the question of evolution
could be grappled with, taxonomic data had to be collected. Plant
morphology provided the clues to variation within and between species.18

The theory of Natural Selection, therefore, initiated a great period
of exploration for new species on a world wide scale, and brought
about classification adjustments which would better reflect the
order of nature.19 Acceptance of the ideas themselves was not
a prerequisite.

Canadian scientific circles were directly influenced by
the trends of the period and became extremely active in botanical
studies and developments. The amateur had to make room for professionals
located in universities; men who undertook independent research

p. 386.
19 G. F. HOLLAND, "L'Abbe Leon Provancher, 1820-1892", in
G. F. G. STANLEY (ed.), Pioneers of Canadian Science (Toronto:
into some of the more specialized aspects of the science, such as reproduction. The contributions to botany made by the amateur collector, nonetheless, remained important, and his ranks increased.  

Indeed, in the 1860's, botany was not only a significant science in Canadian universities, but a very popular hobby among laymen. As in England and the United States, these years also saw the beginnings of specialized scientific societies, in particular the Botanical Society of Canada founded in Kingston, Ontario, in 1860. The society's purpose was to place Canadian botany on a more satisfactory footing by encouraging further study and exploration. There were great possibilities for new discoveries because Canada was a relatively unexplored country. Botanical study was also important for industry and the country's well being. It assumed severely utilitarian overtones. In the newspaper advertisement calling for the formation of the society, it was noted:

But its relations to industry are so important that no civilized land can allow it to fall to neglect without suffering thereby in its material interests. ...a great agricultural and timber-producing country like Canada (young as it is), is pushing on its industry in ignorance of the very science by which that industry ought to be guided.

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21 Macoun attended the first meeting of the society and was made a council member.  
23 Ibid., p. 128.
This sense of connection between pure and practical science characterized scientific investigation in mid-Victorian Canada and became an integral part of John Macoun's personal development.

Upon deciding to pursue his studies of natural history in greater depth, the young teacher did so with enormous energy and dedication. He firmly believed in self-education. He read the standard texts on physical geography, such works as Humboldt's *Cosmos* and Lyell's *Principles of Geology*. These readings he combined with first hand knowledge in attempting to understand natural phenomena. Macoun believed that the development of a well informed scientific investigator required an initial knowledge of basic laws but primarily field work. Wilderness was the great teacher. Within a short time, he was "ready with an answer for almost any natural cause, right or wrong".

Meanwhile, Macoun kept up his botanical studies, rising at four in summer and making a large collection before breakfast. These specimens were classified, described and then added to his own permanent herbarium which he started in 1862. The study of their life histories did not concern him. The young collector was also aware of his own shortcoming and attempted to remedy these

25 These books explained geographic distribution of vegetation as a direct result of climate.
deficiencies by availing himself of the knowledge and assistance of specialists — a common practice among botanists. Macoun had never received a formal lesson in structural botany and classification as then taught in the schools. His botanical studies were based upon observations in the woods and fields; every published list of plants and their location was copied into his notebook for reference while botanizing.27 Macoun made great progress in collecting and classifying using these guides but found that he could not name a number of his species or knew very little about them. He consequently began to correspond with a number of prominent botanists.28 These specialists greatly and permanently assisted Macoun in classifying, and often exchanged specimens with him. They also influenced the direction of his work, particularly the eminent British botanist, Sir William Hooker, who advised the amateur collector that the geographical distribution of plant species was as important as the discovery of new ones.29

27 Ibid., p. 212.
28 These men included: Sir William Hooker, Royal Kew Gardens; Professor Charles Dewey, Rochester; William S. Sullivant, Columbus; Dr. Asa Gray, Harvard University; Coe F. Austin, New York; Professor Edward Tuckerman, St. Louis; Dr. Robbins, Vermont; George Barnston, Montreal. Many of the American specialists had been involved in examining the specimens collected during the American railroad surveys of the 1850's.
29 Public Archives of Canada (hereafter referred to as PAC), John Macoun papers, Hooker to Macoun, August 7, 1862.
This tremendous activity and study in the early 1860's quickly established Macoun's standing as a botanist in the Belleville district. He became a recognized lecturer in the city, contributed a chapter on botany and geology in The Hastings County Directory for 1864 30 and assumed the new position of Professor of Natural History at Albert College in 1868. Macoun also undertook more extensive botanical excursions into the Northern Ontario wilderness, with the financial assistance of specialists. In 1869, for example, he travelled by canoe with Indians along the shores of Lake Superior for the better part of a month. These botanical outings yielded many large collections, including several rare species, and revealed to Macoun those combinations of soil and climate that produced particular species. 31 They were a testimony to the great progress made by both the science and the amateur collector over the past decade. Botany had become a widely studied science with practical uses, Macoun an expert on the habitat and range of many Canadian plant species. Both would assume an all-important role in the opening and settlement of Western Canada.

30 MACOUN, Autobiography, p. 41.
31 On the Lake Superior trip, Macoun distinguished a change in the flora a few hundred yards back from the lake.
Chapter Three

THE BOTANIST

John Macoun's Early Western Expeditions

At whatever point the steamer touched the first man on shore was the botanist, scrambling over the rocks and diving into the woods, vasculum in hand, stuffing it full of mosses, ferns, liverworts, sedges, grasses and flowers, till recalled by the whistle that the captain always fortunately sounded for him... This morning the first object that met our eyes on looking out the stateroom window was our botanist on the highest peak of the rugged hills that enclose the harbour of Gargantua.

G. M. Grant, Ocean to Ocean.

John Macoun's first opportunity to use his skills as a plant geographer occurred when he met by coincidence the famous Canadian surveyor, Sandford Fleming, in Owen Sound in 1872. It was a fortunate meeting for both men. With the Canadian Government decision to build the Pacific Railway, Fleming had been appointed engineer-in-chief and given the task of determining the best possible route. The locating of the rail line was not a simple matter of noting and overcoming the engineering problems. The line had to be directed through or near those regions best suited
for immediate settlement.\textsuperscript{1}

Fleming himself realized the importance of a thorough prior survey both for a sound rail line and an efficient use of the country.\textsuperscript{2} It was for this reason that he was going west in 1872 to acquaint himself with the country and its resources. This concern was also reflected in his initial choice of route for the railroad. Aware of the Palliser-Hind conclusions on the future course of agricultural settlement in Western Canada, Fleming thought the railroad should pass along the so-called fertile belt of the North Saskatchewan to Edmonton and then through the Yellowhead Pass\textsuperscript{3} --- the same route he now proposed to travel. A man like Macoun would therefore prove invaluable to Fleming's purpose.

He was consequently hired by the surveyor to make a collection of the plants of the North-West and determine the agricultural prospects of various interior tracts.\textsuperscript{4} Indeed, because of Fleming's concern for thorough prior survey, the botanist's duties were more extensive and prolonged than otherwise might have been expected.

\textsuperscript{1} WARKENTIN, The Western Interior, p. 245.
\textsuperscript{3} WARKENTIN, "Steppe, Prairie and Empire", p. 124.
\textsuperscript{4} JOHN MACOUN, "Botanical Report, Lake Superior to Pacific Ocean" in S. FLEMING (ed.), Canadian Pacific Railway Report of Progress on the Explorations and Surveys up to January, 1874 (Ottawa: MacLean, Roger and Company, 1874), appendix c, p. 56.
John Macoun, for his part, was returning to Lake Superior for further botanical work when he met the Fleming party. For several summers now, the Professor had undertaken extensive surveys in the lesser known regions of Ontario. He was not then one to turn down an opportunity to collect specimens in the North-West and obtained leave from Albert College. As he reportedly confessed to Rev. G. M. Grant, secretary to the party, "This expedition ... is going to give me a lift that will put me at the head of the whole brigade." The prophecy held much truth. Macoun's work on the Fleming expedition was so well received that within five years he was a recognized expert on the agricultural capabilities of Western Canada.

From the outset of the Fleming expedition, Macoun carried out his assignment with infectious enthusiasm and untiring energy. Few men were better suited for the task. He was continually employed in collecting specimens as graphically portrayed in Grant's account of the expedition, *Ocean to Ocean*:

> The sight of a perpendicular face of rock, either dry or dripping with moisture, drew him like a magnet, and, with yells of triumph, he would summon the others to come and behold the trifle he had lit upon. Scrambling, panting, rubbing their shins against rocks, and half

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5 While teaching at Albert College, Macoun acquired the title 'Professor' and retained it for the rest of his life.

6 G. M. Grant, *Ocean to Ocean* (Toronto: James Campeil and Son, 1873), p. 35.
breaking their necks, they toiled painfully after
him only to find him on his knees before some "thing
of beauty" that seemed to us little different from
what we had passed with indifference thousands of times.  

On reaching Thunder Bay, the Professor combined this search
for new species with a careful inspection of the vegetation
along the land and water links of the Dawson Road, the new Canadian
route from Lake Superior to Red River. For Macoun, the natural flora
of a district indicated the area's agricultural capabilities:

... the botanist [can] determine, by inspection of plants
from a certain locality, the character of the soil
and of the climate, and the consequent adaptability
of the district for the growth of certain varieties
of cultivated plants ... this botanical test was the
only true criterion by which the agricultural status
of any district should be judged.  

This procedure in examining the land was used through this and
subsequent explorations, effectively determining his conclusions.

The party reached the open prairie country at Oak Point
Station after a long forced march in the early morning hours of
July 31. Macoun, amazed by the colourful flora, announced their
arrival later that day:

Awakened at eight a.m. by hearing a voice exclaiming
"Thirty-two new species already; it is a perfect floral
garden."  

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7 Ibid., p. 23.
8 JOHN MACOUN, "The Capabilities of the Prairie Lands of the
Great North-West, as shown by their fauna and flora", Ottawa
9 GRANT, op. cit., p. 62.
The men then quickly travelled the remaining 30 miles to Fort Garry. Here, while preparations were being made for the next stage of their journey, they discussed the capabilities of the land with many prominent citizens. Everyone interviewed praised the qualities of the fertile belt, except Archbishop Tache who remained firm in his support of the country further north. 10

The party resumed its march westward August 2, now as a caravan of six Red River carts, two buckboards and 40 horses. The trail followed the north bank of the Assiniboine River, and for the first couple of days, they visited the few existing farms in the vicinity of Portage la Prairie and Rat Creek. They then left the level prairie country and ascending to the second steppe, made for Fort Ellice near the junction of the Assiniboine and Qu'Appelle Rivers. During that time, they crossed a parkland section, succeeded by monotonous plains, and finally a drier broken country. The vegetation throughout this distance, although indicating a drier climate, remained unchanged, while the soil was a light sandy loam. There was at the same time concern expressed about the increasing prevalence of brackish water, the absence of mosses and the continual evidence of prairie fires. Macoun believed that these problems

10 Ibid., p. 71.
could be remedied by stopping the fires and promoting tree growth, thereby preventing the loss of moisture through evaporation.\textsuperscript{11}

On August 7, the party reached the river junction, having travelled the 315 miles from Fort Garry to Fort Ellice in five days. Next morning, after fording the Assiniboine, they followed the gravelly north bank of the Qu'Appelle westward for a few miles. Macoun examined the flora among the sand hills of the river valley and returned with half a dozen new species. The expedition then turned in a more northerly direction continuing at the rapid pace of the previous week's travel; Fleming was determined to average at least 40 miles per day. The land greatly improved as they left the vicinity of the river. For the next eighty miles, they rode over an undulating prairie, where wood and fresh water were both scarce, the soil varied in quality, but the grass surprisingly green. Climbing into the Touchwood Hills, they passed by a series of little lakes and poplar forests and then descended to the seemingly endless level landscape of the "Great Prairie". A few days' march over the treeless plain — the driest country they had yet seen — brought them to a succession of ridges, depressions and plains. This broken country continued all the way to the South Saskatchewan River which they reached on August 15. Here, while

\textsuperscript{11} MACOUN, "Botanical Report...", pp. 61-62; 64-65. GRANT, \textit{op. cit.}, pp. 100-103.
waiting for the scow to take them across the river, Macoun hunted
diligently for new species but without success. His search at
Fort Carlton, 18 miles distant on the north branch of the Saskatchewan,
produced the same disappointing results. 12

The party's stay at the widely renowned Hudson's Bay
Company post was limited to an evening visit with local traders
and they left the following morning, taking the northern trail13
to Edmonton to avoid possible Indian trouble. The first part
of the road led them through the rugged Thickwood Hills district
and then across an alternatingly hilly and level country to Fort
Pitt. Herbaceous plants of a more northern type began to appear,
indicating to Macoun a cool, moist climate. 14 Continuing along
the North Saskatchewan to Victoria Mission, they entered upon a
country "of varied beauty, rich in soil grasses, flowers, wood
and water; infinitely diversified in colour and outline". 15 Yet, the
Professor foresaw crop injury through summer frosts as a probability
and thus considered the region best suited for pasture land. 16

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12 GRANT, _op. cit._, pp. 130; 136.
13 The southern route followed the course of the North Saskatchewan
    River which flowed southwesterly and then northwesterly. The
    northern trail cut across this arc rejoining the river just
    north of Fort Pitt.
14 These plants, however, were generally of the same species that
    had dominated the flora since Oak Point Station. MACOUN, "Botanical
    Report...", p. 66.
15 GRANT, _op. cit._, p. 153.
From Victoria Mission to Edmonton, the soil throughout the heavily pastured, well watered 80 mile section was exceedingly fertile, making it a much superior agricultural country than that around Fort Garry. 17

Upon reaching Edmonton on August 27, Fleming decided that Macoun and the expedition's outfitter and surveyor, Charles Horetzky, should make a reconnaissance survey of the Peace River Country while he and George Grant continued westward through the mountains via Yellowhead Pass. This decision was prompted by Malcolm McLeod's recently published pamphlet Peace River, which projected the railway line through the Peace River Valley. 18 Horetzky was then to examine the elevation and grades of the pass, whereas the Professor would continue his botanical studies. The Peace River district, however, was currently subject to many conflicting reports. To many Canadians, it was simply perceived as an exciting land of mystery and riches. Thus, when the two men left Edmonton in early September, they "were in complete ignorance of the proper means of procedure and the time necessary to accomplish the journey". 19

17 Ibid., p. 68
18 M. McLEOD, Peace River (Ottawa: J. Durie and Son, 1872)
19 C. E. HORETZKY, Canada on the Pacific (Montreal: Dawson Brothers, 1874), p. 3.
The first leg of their journey to Little Slave Lake post was an arduous traverse through a broken, swampy land. The pack train made slow progress becoming mired, losing the trail or coming upon several large creeks along the way. Their advance was further checked by frequent wind and rain storms. They finished each day's long march cold, wet and tired. Beyond the post, the dreariness of the country rapidly improved as they made their way to Peace River Crossing. For 70 miles they followed a much better trail through an exceptional park-like country of spruce and light aspen. Reaching the Peace River Valley, a few miles below the mouth of the Smoky River, on the morning of October 1, the pair gazed longingly at the mighty river flowing some 800 feet below them.

Horetzky then took the trail upriver to Dunvegan, while Macoun and the expedition's supplies were brought up to the post in a Hudson's Bay Company barge.

At Dunvegan, their plans had to be changed. Because of the great rise in the water level and loss of boats, the Hudson's Bay Company people discouraged any further river travel. Furthermore, an experienced traveller, Horetzky considered the botanist an encumbrance and was determined to proceed alone. Learning that

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20 According to Macoun (Autobiography, p. 69), the country "was a muskeg with islands of spruce through it, and our trail led through the islands."
two Company clerks had decided that it was too late in the season
to cross the mountains and were returning to Edmonton, he tried
to convince the Professor to return with them. He was given a
flat refusal. 21 The pair consequently crossed the river on
October 6 and took the trail overland to Fort St. John.

For the next ten days, the trail carried them through
a great prairie parkland which produced plant species common to
the Saskatchewan country. 22 Macoun lauded the country as being
ahead of almost everything he had yet seen in beauty and fertility:

I would prefer risking wheat on any part of the prairie
passed over today than either in the neighbourhood
of Victoria or Edmonton. Nothing in either soil, plants
or climate would cause me to hesitate in giving this
opinion. It is said summer frosts never do harm
on this prairie and I can well believe it... Since
leaving Dunvegan I have seen the best land, except
a part of the way between Slave Lake and Smoky River,
which came under my observation anywhere. 23

There were also many hazardous moments, including Macoun's encounter
with a grizzly "as large as a good sized ox, and as having a most
sinister expression of countenance". 24

21 MACOUN, Autobiography, p. 72.
23 These comments are interesting in that their route always kept
to the north of the exceedingly fertile 'Grande Prairie'
country. The exception probably refers to this region. PAC
John Macoun 1872 field notebook, October 4, 1872.
24 HORETZKY, Canada on the Pacific, p. 45.
At Fort St. John, tensions between the two men increased. Macoun now learned of Horetzky's intention to ascend the North Pine River in search of a new pass reported by the local Indians. He, in the meantime was to take the proposed route through the mountains by the Peace River Pass and meet the surveyor at McLeod's Lake. Horetzky, however, could secure neither guides nor boats for the ascent of the river.\(^{25}\) He was therefore forced to rejoin Macoun at Hudson Hope, the botanist having made the 50 mile trip upriver in a cotton wood dugout.

Leaving Hudson Hope on October 24, they ascended the river to the junction of the Finlay and Parsnip Rivers, having paddled through a snowstorm as they passed through the real Peace River Pass or 'Hell's Gate'. Turning into the Parsnip, they continued upriver amid ice floes some 80 miles to Fort McLeod and then struggled another 70 miles in sub zero weather over snow covered trails and half-frozen lakes to Fort St. James on Stuart's Lake. Here, the beleaguered Macoun took leave of Horetzky as originally planned\(^ {26}\), and fled south with two Indian companions, following the old Telegraph Trail line to Quesnel and Yale on the Fraser River. On

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\(^{26}\) Horetzky was to explore the country westward to the Skeena River.
December 12, he reached Victoria. Apart from the wealth of
information acquired, the escapade had been an impressive feat
challenging the mettle of any man.

Several weeks before Professor Macoun had been engaged by
Fleming to accompany his expedition, James Brown, a member of
Parliament, had written to the Under Secretary of State for the
Provinces recommending Macoun's appointment as botanical explorer
to the Geological Survey. The letter was forwarded to the new Survey
director, Dr. A. R. C. Selwyn, who replied:

... I beg to state that I do not think such an appointment
is desirable in connection with the Geological Survey.
The Geological Survey Act, moreover, makes no provision
for botanical exploration. If such a survey is considered
desirable, a separate appropriation should be made
with that object in view and a competent person
appointed to conduct it. No useful purpose could be
served by connecting it with the Geological Survey;
the objects and requirements of the two are entirely
distinct, and I could not be responsible for botanical
work of which I have no knowledge or experience.27

Brown's request was not new. The question of attaching a botanist
to the Survey had been raised as early as 1858, when the natural
history reports of the American Pacific Railway Surveys had first
been issued. 28 It was now seen by many to be a most logical step

27 PAC, Geological Survey of Canada Director's Letterbook, n. 2,
p. 198, Selwyn to Meredith, June 11, 1872.
28 "Why is there not a Zoologist and Botanist attached to the Canadian
Geological Survey? is a question that has often occurred to me. The
critic who gives just praise to the American Government... but what has been done by our Canadian Geological Survey...", The Canadian Journal, v. 3, n. 17, September 1858, p. 461.
for the Survey. Dr. Selwyn, however, was in a difficult position. He evidently wanted to make the Survey as wide a service as possible.  

At the same time, botanical investigation was seen to have no direct relationship to geological work and would require special parties to conduct field work — parties for which there were simply no funds. Moreover, the Survey under its first director, Sir William E. Logan, had been grounded in the philosophy that sound scientific investigation was to be used for practical and immediate results; it did not believe in developing scientific knowledge for its own sake. This philosophy had justified to Canadian legislators each year's Survey expenditures, and Selwyn could not see botany as meeting this requirement. He therefore had little alternative but to respond to the suggestion along lines similar to those of his predecessor.

Meanwhile, after returning from the west coast in January, 1873, Macoun resumed his teaching duties at Albert College as well as his own scientific studies. Many of the botanical specimens collected during the North-West trip were sent to the curator of the

29 ZASLOW, Reading the Rocks, pp. 125-127.
30 THOMSON, Men and Meridians, v. 2, p. 288.
32 ZASLOW, Reading the Rocks, p. 101.
Grey Herbarium, Sereno Watson, for exact identification. Watson, having accompanied the Clarence King survey of the 40th parallel in 1868, was an expert taxonomist on the flora of the American Great Basin and thus, and ideal man for Macoun's purposes. The Professor also began to prepare, at Fleming's request, a written report of his scientific investigations of Western Canada which was subsequently published in full in the 1874 railway report.

In this report, Macoun related the agricultural prospects of the North-West to the various plant forms he had observed. Throughout the course of the 900 mile journey from Fort Garry to Edmonton, he had detected little change in the country's flora.

The same species were found in similar environments:

The hill-top, the plain, the marsh, the aspen copse, the willow thicket --- each had its own flora throughout the whole region, never varying and scarcely ever becoming intermixed.

These conditions led him to conclude that the vegetation's unvarying character was caused by a regional uniformity in soil conditions and climate; he suggested that grazing would be profitable wherever conditions were not suitable for grain. As for Macoun's botanical

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33 DUPREE, Asa Gray, p. 352.
34 MACOUN, "Botanical Report...", p. 65.
35 Ibid., p. 66.
investigations in the Peace River district, they revealed plant
species that were also found around Edmonton. These findings,
coupled with observations at meteorological stations and a reading
of Blodget's *Climatology*[^36], convinced him of the northward extension
of summer isotherms into the region and the irrelevance of winter
temperatures.[^37] He therefore considered the Peace River country
as but a continuation of the prairie with a climate sufficient
for grain production. He reasoned:

> The prairie vegetation [Dunvegan to Fort St. John] is
almost identical with that of Edmonton, except a
few Eastern species. This being so, can we not, with
justice, say that what they raise at Edmonton can
likewise be raised on the plains bordering Peace River.[^38]

Macoun strongly favoured the agricultural potential of this district
above all other regions.

When this report was received, Selwyn's attitude towards
hiring the botanist changed considerably. He now thought in
terms of a permanent appointment:

> When last in Ottawa I had the pleasure of reading
the proof sheets of your report to Mr. Fleming and
I then mentioned to him how pleased I should be if
you could accompany me next year on an exploration
through the Upper Peace River region from British
Columbia eastward... The act establishing and making

[^36]: Macoun (*Autobiography*, p. 88) read Blodget's book upon returning
from the expedition.


provision for the Geological Survey does not include botanical investigations as part of the work for which the money is appropriated and hence the fact of nothing having hitherto been done in that direction. I have however today written to the Minister of the Interior suggesting that a sizeable sum of $2500 Two thousand five hundred dollars per annum should be made to the Survey appropriation, for botanical purposes, and that you should be appointed Botanist.  

Macoun, in his report, had made botany relevant to one of the national tasks at hand. He had demonstrated how it could provide practical knowledge of the resources of the West. The potential applications of the botanist's work could no longer be ignored.

Professor Macoun was very receptive to Selwyn's offer. The 1872 experience had cultivated in him a desire to study Canadian flora systematically from coast to coast. Yet, he realized that only by becoming botanist to the Survey could he devote himself exclusively to this task. Writing to Fleming, he said:

With what I could collect this year and the larger stock available from my former collections (during the coming winter) I could lay the foundation of a Dominion Herbarium that in a very short time would be a credit to the country. In conclusion I may state that whenever my services are required I will be forthcoming. I sincerely hope you will be able to put in the 'word in season' and that through your instrumentality the dream of my life may be fulfilled.

In this regard, then, science and government policy had a reciprocal

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39 PAC, Geological Survey of Canada Director's letterbook, n. 3, p. 158, Selwyn to Macoun, April 27, 1874.
relationship. Science served as an instrument of government policy, whereas government policy provided the funds necessary for pure scientific research.

Securing Macoun a permanent position on the Survey staff, however, was not an easy matter and Selwyn suggested that he enlist the aid of any friends in government. In fact, it was uncertain whether funds would be made available so that Macoun could accompany the Survey expedition to the Peace River district. The Professor consequently began to make his own plans for the summer of 1875, intending to return to the north shore of Lake Superior if he was guaranteed sale of enough specimens beforehand to meet his expenses. Finally, in March of 1875, his appointment as botanist to the Selwyn expedition was made official. A permanent position was still not possible.

Dr. Selwyn's proposed survey of the Peace River district was largely a response to the support recently received by the area. In addition to Malcolm McLeod and Professor Macoun, Charles Horetzky had also become convinced of the advantages of the region for

41 PAC, Geological Survey of Canada Director's letterbooks, n. 3, p. 205, Selwyn to Macoun, June 10, 1874.
42 The Gray Herbarium of Harvard University, John Macoun correspondence, Macoun to Gray, November 21, 1874; Macoun to Gray, January 9, 1875.
settlement, projecting the railway north from Lac la Biche through the Peace River district to either the Peace River Pass or the yet undiscovered Pine River Pass. A further voice was added to this cause by Captain William F. Butler, renowned author of The Great Lone Land. In the account of his journey up the Peace River in the spring of 1872, he also argued in favour of a northern pass for the rail route. The Selwyn expedition was therefore dispatched to ascertain these claims about the character of the country and explore the two mountain passes. Macoun would be responsible for making notes on the region's flora, climate and agricultural possibilities.

The expedition was officially to begin at Quesnel, British Columbia, on the Upper Fraser River. Macoun, however, was sent west to Victoria on April 14, two weeks ahead of the main party, to examine the flora of Vancouver Island. When the other party members arrived, he continued these botanical studies up the Fraser River Valley to Quesnel. Many species Macoun had found in the East or north of Lake Superior were observed along the way.

43 HORETZKY, Canada on the Pacific, pp. 198-199.
At Quesnel, the party secured its pack train, crossed the Fraser River on June 5, and headed overland to Fort St. James, some 150 miles away. For the next ten days, they crossed a slightly undulating land which varied from marsh to meadow to forest. The Professor, preferring to examine the country on foot rather than ride, detected no change in the vegetation and found the soils to be light and sandy, at times gravelly. Further on, after crossing the Nechaco River, they passed through an almost level prairie parkland with richer, drier soils and thick meadow grasses. Macoun recorded his delight as follows:

...I sat down in my loneliness — but not alone — and drank in the surpassing beauty of the scene; hunger and weariness were forgotten and I resumed my march with the light joyous step of the morning, feeling that in the realm of Nature, God's hand was ever open to strew one's path with beauties and fill one's heart with praise.... For nearly one month, I had kept travelling with spring, but now, with one bound, we had passed its portals and stood on the verge of summer.

This improved country continued for most of the remaining distance to Stuart's Lake.

At Fort St. James, the party devoted two days to a general

46 The crossing was accomplished in a collapsible canvas boat that Selwyn had brought along as an experiment.
exploration of the neighbouring country. Macoun and Selwyn used the occasion to climb Pope's Cradle or Stuart's Lake Mountain, being rewarded with an extensive view and several alpine plant species.

The men then struggled over a wet, burnt over trail to Fort McLeod. There were few incidents along the way — a halt always found Macoun drying, packing and labelling his plants — and the party arrived safely at the post. Preparations were then made to continue by water, as there was no trail beyond McLeod.

On July 3, the men set off in three frail boats for Fort St. John. Passing into the Parsnip, they paddled down the swiftly flowing river for several days to the Finlay Forks, where they turned into the mighty Peace and camped at the entrance to 'Hell's Gate'.

The following morning, July 11, some of the men, including Macoun, climbed the highest mountain in the range and named it in honour of the expedition's leader (Mount Selwyn). They then proceeded down river through the mountains by Rocky Mountain Canyon and the Buffalo's Head to Hudson Hope. At the post, Macoun's suspicions about a change in the flora from that west of the mountains were confirmed. The vegetation in the dry, warmer climate was more advanced and luxuriant and was composed of several common Eastern species. He reported:
... I have been extremely surprised at the rankness of the vegetation around here.... Growth is extremely rapid, owing partly to the length of the day and cloudless skies supplemented by heavy dews, and possibly also in part to the great range of temperature during the twenty-four hours, from about 45° at sunrise to 80° Fahr. at noon.48

These findings were verified at Fort St. John, which they reached on July 26.

At Fort St. John, Dr. Selwyn decided to make another attempt at locating the elusive Pine River Pass. He had first tried following an indistinct Indian trail eastward from the junction of the Parsnip and Pack Rivers but turned back after only a few miles. He now planned to build a large canoe and continue his explorations up the Pine River with a few members of the expedition.49

In the meantime, Macoun was permitted to descend the Peace River with a Mr. King, who was going to meet the Hudson's Bay Company boats bringing up the next year's supplies for the posts on the river. The Professor was to return within forty days and was supplied with enough provisions for that period.

Believing that their journey would be a leisurely three hundred mile drift downriver, Macoun and King cheerfully set off

48 Ibid., p. 152-153
49 This second attempt by Selwyn also failed because of difficulties encountered in the ascent of the river. The pass was finally discovered in 1877 by Joseph Hunter, a CPR location surveyor who had been secretly sent to the region by acting engineer-in-chief, Marcus Smith.
in an old cottonwood canoe on August 4. On the evening of the second day, the pair reached Dunvegan where they generously gave the near starving inhabitants some of their provisions. They then continued rapidly downriver, visiting the posts at the mouth of the Battle and Smoky Rivers. The trip, however, soon developed into a hazardous, exhausting venture. Because strong headwinds whipped up the ever widening river valley, they had to paddle constantly under the threat of capsizing. Furthermore, upon reaching Fort Vermilion, the men learned that the boats, which they had expected to meet before now, were delayed for at least two weeks. This same warning was repeated at Little Red River, along with the suggestion that they should best wait their arrival. They were 200 miles from Fort Chipewyan and it appeared doubtful whether the boats had ever left the post. Macoun and King, nonetheless, foolishly pushed on, intending to keep going until they met the boats. For the next four days, they watched for the boats at every turn in the river. It was not until they were still some sixty miles from Chipewyan and their supplies virtually exhausted that they finally realized their predicament. Yet, time was quickly

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50 As they expected to meet the boats soon, they saw no need to replenish their supplies.
running out. Days without proper food and long hours of hard work began to have their effect. Macoun wrote as follows:

My stomach had now become so weak that tea would not remain on it, so I drank water and ate a few high-bush cranberries. We discovered that our united energies would not propel the canoe against the current, so, fastening a line to the bow, I went on shore and hauled the canoe...floundering through mud and water, knowing that the goal was drawing nearer every step.51

Sick, tired and starving, the pair eventually reached the safety of Quatre Fourches fishery on the evening of August 22.

The following morning, the Professor travelled the few remaining miles to Chipewyan where he met traders from the various districts who had assembled to receive their year's supplies. In conversation with these men, he claimed to have"obtained more accurate knowledge of the vast interior than had been obtained by any former explorer".52 They assured him that the whole country, including the region north of 60° latitude, was fit for cultivation. The Professor also resumed his studies of the soil and its productions. During the descent of the Peace, he had made a thorough inspection of the gardens at each of the posts. He came across prolific crops of grains and vegetables, despite an unusually dry summer.53

52 Ibid., p. 164.
53 PAC, John Macoun 1875 field notebook, August 12; 16, 1875.
he obtained samples of the finest crops of barley and wheat he had ever seen. He reflected upon the implications of these findings in his journal:

...the soil wherever tried throughout the whole extent of this vast region gives enormous returns for little labour, giving promise of the day when the land will be filled with a busy multitude who instead of living by the chase will cultivate the rich soil and develop the unbounded resources of this wonderful land.54

The perilous 700 mile river journey had had its benefits.

Having been advised by the traders to return eastward, Macoun left Chipewyan September 2 with three Hudson's Bay Company boats headed for Methye Portage. The ascent of the Athabasca was relatively easy, owing to the wind at their backs, and they made good progress. After some 50 miles, the mud and sand of the delta gave way to a reddish clay soil with drier vegetation. Pebbles composed of sand and the conglomerate also began to be noticed along the banks of the river, eventually forming deposits nearly two feet thick in the shale beds below Point aux Trembles.

At their campsite that night, Macoun wrote:

Long after the noises ceased I lay and thought of the not distant future when other sounds than these would wake up the silent forest and the whiteman with his

54 PAC, "Geological Notes on Peace River", John Macoun 1875 Field notebook.
ready instrument steam would be raising the untold wealth which lies hidden underneath the surface. It has never entered into the brain of our most enthusiastic citizen or statesman the wealth that lies hid in this land. 55

The men then entered Clearwater River and passed through a country which Macoun judged capable of meeting the agricultural needs of the northern posts. 56

Reaching Methye six days later, a boat was waiting for the Professor to take him to Fort Isle-a-la-Crosse, 130 miles away. He consequently started for the post the next morning and although delayed by strong headwinds as they paddled across a series of lakes, reached there without mishap on September 21. He then took passage with Edward Big Belly, a Chipewyan Indian, who was going to Green Lake to trade. Here, Macoun was warmly received by the local trader, as had been the case at every Hudson's Bay Company post, and generously assisted in his studies and travel arrangements. 57

The next stage to Fort Carlton was to be covered on foot.

Securing a young Cree guide and an old ox and cart, the Professor

55 PAC, John Macoun 1875 field notebook, September 7, 1875. These deposits are the modern day Athabasca oil sands.
56 Ibid., September 9, 1875.
57 As J. N. Wallace ("Early Explorations along the Bow and Saskatchewan Rivers", Alberta Historical Review, v. 2, n. 4, spring 1961, p. 18) aptly notes: "while frequent accusations...have been brought against the Hudson's Bay Company, that it opposed any effort to make known western conditions, every traveller and explorer bears testimony to the assistance he has received at the hands of the Company's officers".
set off on September 27. For the first few days, travelling to the Star Mission, they passed through a wet, heavily timbered land, evidently a watershed. Beyond the Mission, the country became drier, at first part prairie and part woodland, and then an almost dead level plain. Macoun considered this country excellent for railroad construction and agricultural purposes. From Carlton, he took the trail eastward on October 9, travelling by wagon with a group of halfbreeds who were returning to Fort Garry. It was an uneventful trip, except for a bad snowstorm that came upon them at Shoal Lake. Macoun reached Winnipeg on November 1 and Belleville, twelve days later.

Upon his return from the Peace River country, the Professor was still unable to secure a salaried position with the Survey. The 8 month, 8,000 mile trip, however, had great repercussions for his botanical studies, as some of his ambitions began to be realized. In 1876, he was commissioned by the government to prepare a display of Canadian plants for the Philadelphia Centennial Exhibition where he was awarded a bronze medal for his exhibit

58 PAC, John Macoun 1875 field notebook, October 6, 1875.
59 PAC, Geological Survey of Canada Director's letterbooks, n. 3, p. 719, Selwyn to Macoun, December 18, 1875.
60 PAC, Roderick Macfarlane Papers, p. 500, Macoun to Macfarlane, December 19, 1875.
of Chipewyan wheat and barley. He also commenced work on his
own scheme of cataloguing the various Canadian plant orders,
believing that he now possessed the necessary background knowledge
for such an undertaking. In the fall of 1876, for the purpose of
comparing specimens, he visited the famous American botanist,
Dr. Asa Gray, at Harvard University.61 This visit, combined with
the assistance of other American specialists through correspondence,
resulted in the publication of his first plant catalogue62, as
well as the creation of several exhibits for the 1878 Paris
Exposition.63

The expedition also strengthened Macoun's support for
the northland's agricultural potential, and he earnestly set about
making his findings known. In his report for the Geological
Survey, he declared the district better suited for settlement
than the region around Edmonton and suggested a northern pass for
the rail route. He had once again found that the flora of the
whole region was common to the prairies and Central Canada: of the
591 species he had collected, 434 were native to the prairie

61 The Gray Herbarium of Harvard University, John Macoun correspondence,
Macoun to Watson, August 12, 1876.
62 JOHN MACOUN, Catalogue of the Phaenogamous and Cryptogamous
Plants of the Dominion of Canada (Belleville, Ontario: 1878).
63 Macoun won gold, silver and bronze medals at the Exposition.
region, 411 to Ontario and 412 to Quebec.  

He reported:

I have come to the conclusion that the geographical distribution of plants in Canada is determined far less by latitude than it is by the aqueous vapour in the atmosphere, and of the moisture in the soil.

The Professor had also observed wonderfully luxuriant crops and deduced that yields were greater near the northern limits of successful growth. Even Dr. Selwyn, who had lauded the fertility of the North Saskatchewan country two years earlier, stated that the Peace River district was a "magnificent agricultural and pastoral country", deserving of thorough examination. It was Macoun, nonetheless, who provided the scientific argument for the region's potential.

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64 MACOUN, "Report on the Botanical Features...", p. 166.
65 Ibid., p. 167.
66 Ibid., p. 163. This theory did not originate with Macoun, but had been an accepted botanical law since the 1860's.
69 George Dawson confirmed Macoun's statements in 1879, when he carried out a detailed survey of the region. He reported the existence of over 15 million acres of good land. GEORGE DAWSON, "Report on an Exploration from Port Simpson on the Pacific Coast to Edmonton on the Saskatchewan", Geological Survey of Canada. Report of Progress for 1879-80 (Montreal: Dawson Brothers, 1880), part B, section iii, p. 68.
The Professor also began to meet with various government figures. He called on the Minister of the Interior, David Laird, who in turn secured him a greatly desired interview with Prime Minister Alexander Mackenzie.\(^7^0\) The Scotsman apparently refused to believe the botanist's statements about the value of the North-West. Yet, who would not be skeptical of the assertion that one could travel two hundred miles without seeing one acre of bad land?\(^7^1\)

Macoun gave a more reliable assessment of his own knowledge of Western Canada before the House of Commons Select Committee on Immigration and Colonization in March 1876. In his evidence, he stated that he was most acquainted with the capabilities of the Peace River district as compared with the North Saskatchewan country or the southern territory.\(^7^2\) He nonetheless suggested that the prairie interior was not completely desert but refrained from stating what proportion was suitable for agriculture.

He could not give a satisfactory estimate.\(^7^3\) Unfortunately, these remarks were overshadowed by a subsequent report.

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70 During his stay at Chipewyan, Macoun wrote: "Have decided to obtain an interview with the head of the government to lay before him the immense value of this region so that he may at once set about extinguishing the H. B. C.'s right to one twentieth of the arable soil before the value of the country is known." \(\text{FAC}, "\text{Geological Notes on Peace River"}, \text{John Macoun 1875 field notebook.}\)

71 \text{MACOUN, Autobiography, p. 152.}

72 \text{CANADA. House of Commons Journals, v. 10, 1876, "Report of the Select Committee on Agriculture and Colonization", appendix 8, p. 24.}

73 \text{Ibid., p. 26.}
In 1876, the Prime Minister seemingly overcame his earlier skepticism and asked Macoun to write about the North-West lands in the 1877 railway report. In response, the Professor wrote as much truth as he dared\(^{74}\), drawing upon the work of other Western explorers as well as his own experience. He outlined the boundaries and characteristics of the various regions and commented very favourably on their agricultural prospects, including the semi-arid third prairie steppe. He declared:

None of the prairie country, except that south of the Missouri Coteau, is naturally so deficient in rainfall to prevent forest growth.... It is to be doubted... that any deficiency exists.\(^{75}\)

Macoun also felt capable of making reliable estimates and developed his own triangle of lands:

If a line be drawn from the Boundary Line where it is intersected by the 95th meridian in a north-westerly direction to where the 122nd meridian intersects the 61st parallel, we shall have the base of an isosceles triangle, which has its apex on the 115th meridian, where it intersects the 49th parallel, one side being the Boundary Line and the other the Rocky Mountains. This triangle encloses at least 300,000 square miles, or over 200,000,000 acres of land.\(^{76}\)

Of these 200 million acres, he roughly classed 80 million as arable land and 120 million as pastures, lakes and swamps.

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\(^{74}\) MACOUN, *Autobiography*, p. 158.

\(^{75}\) JOHN MACOUN, "Sketch of that Portion of Canada Between Lake Superior and the Rocky Mountains, with Special Reference to its Agricultural Capabilities" in S. FLEMING (ed.), *Report on Surveys and Preliminary Operations on the Canadian Pacific Railway up to January 1877* (Ottawa: MacLean, Roger and Company, 1877), appendix x, p. 334.

\(^{76}\) Ibid., p. 335.
These figures were highly questionable when one considers the extent of detailed Western exploration up to that time; Macoun's own explorations had been confined to the fertile belt and the region to the north. Mackenzie was not pleased. At the outset, he had characteristically cautioned the botanist not to draw upon his imagination. In any circumstance, the report had little effect upon government endeavours in Western Canada and failed to secure for Macoun a permanent position. The Liberals continued to pursue their limited railway policy, while the Professor returned to his floral studies full time. Increased exploration in the Western Interior involving Macoun would have to await a change in administrations.

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77 MACOUN, Autobiography, p. 158.
Chapter Four

EVEN HIGHER FLIGHTS

Western Explorations of 1879, 1880 and 1881

I confess that this last discovery has again unsettled my views regarding this country and I am now prepared to take even higher flights than I have taken before. The matter of soil and rainfall may now be left out of the question. Fuel is really the great question of the future and if the lignite deposits turn out well the limit to the extension of the settlements and the production of grain southerly is one that no one can now predicate [sic] but of this I am sure that I am far within the truth.

Macoun to Fleming, August 14, 1880.

In the 1878 fall federal election, the Conservative party under their new 'National Policy' banner were returned to office. Immediately, the Macdonald administration made plans to step up the Canadian Pacific Railway exploration program and began assembling field parties for the 1879 field season. Settlement of Western Canada was fundamental to the success or failure of the Conservative's new policy and could only be accomplished with a railway. The railway was the great colonizer, for it provided access, promoted development and afforded economic links. Western
lands would never be permanently settled without a railroad.

John Macoun was approached to head one of these parties but hesitated to accept. In 1877, the new Geological Survey Act had greatly enlarged and clearly defined the functions of that government organization. In addition to its regular duties, the Survey was now responsible for making botanical and zoological investigations¹ — an ideal situation for Macoun's talents. Yet, despite the additional workload, the level of appropriations for the Survey remained the same, and the botanist was not hired. Dr. Selwyn did, however, return to Macoun in many instances for help in classifying the specimens collected by geologists in various parts of the country.² The Professor undertook this voluntary work largely in the interests of his own studies, as well as to enhance the possibility of future employment with the Survey when additional funds became available.

The chance to become directly involved in official field work again was an improvement on this situation. But in Macoun's eyes, it was still inadequate. The nature of the work was strictly

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¹ ZASLOW, Reading the Rocks, pp. 122-123.
² PAC, Geological Survey of Canada Director's letterbooks, v. 78, Selwyn to Macoun, December 11, 1880.
seasonal. He consequently refused his services unless offered a permanent position. Fortunately, the government acquiesced.

In the spring of 1879, Macoun was made explorer for the Canadian government in the North-West Territories, an informal arrangement to be in effect as long as the Conservatives remained in power. He then resigned his position at Albert College and immediately began preparations for his first assignment. This trip was followed by two other explorations in the Western Interior, culminating in his appointment to the Geological Survey in January, 1882.

In May, 1879, Professor Macoun and a party of five were dispatched to explore the country south of the located railway line and north of the 51st parallel, and between the Assiniboine River and the Rocky Mountains. They were the only group commissioned by the Survey to re-examine the southern prairie district. From MACOUN, Autobiography, p. 135.

3 Upon resigning, Macoun was made Emeritus Professor.
4 The projected railway line ran north from Selkirk (near Winnipeg), across the Narrows of Lake Manitoba, up the Swan River Valley to Livingstone and then westward along the North Saskatchewan via Battleford, Hay Lakes (Edmonton) and Jasper House.
5 Macoun's group was the only party sent to explore the southern territory because the rail line was still being projected through the fertile belt. It is not clear, however, despite the botanist's claims (MACOUN, Autobiography, p. 151.), whether they were to verify Palliser's conclusions about the aridity of the district. Fleming, in the 1880 Railway Report (S. FLEMING (ed.), Report and Documents in Reference to the Canadian Pacific Railway, 1880 (Ottawa: MacLean, Roger and Co., 1880), p. 13.), simply stated that the prairie region required further exploration. In any circumstance, F. G. Roe ("Early Opinions on the 'Fertile Belt' of Western Canada", CHR, v. 27, 1946, p. 134) finds the government decision to send Macoun astounding, for he was essentially being asked to pronounce upon his "bête noire", Palliser. A reversal of Captain Palliser's findings was only natural.
Winnipeg, because of bad spring roads, they ascended the Assiniboine River by stern wheeler. The boat made slow progress, having difficulty navigating the short bends of the river. The ever keen Macoun took advantage of the situation; by landing and cutting across the bends of the river, he was able to examine the valley while keeping ahead of the steamer. As they advanced upriver, he found the soil progressively sandier and the trees fewer. The continual presence of good water and excellent grasses, however, caused him to conclude that the whole valley was well suited for settlement. 7

From Fort Ellice, travelling by buckboard and ironbound carts 8, they followed the Carlton trail until they reached the 102nd meridian near Big Cut Arm Creek. Here, they left the road, as instructed, and struck out by compass for Long or Last Mountain Lake. Proceeding westward amid steady downpours, they crossed a broken prairie sparsely wooded and strewn with boulders. The soil, nonetheless, changed slightly: a nine to fifteen inch black loam topsoil with lighter, gritty clay subsoil, rich in calcium carbonate. 9

7 PAC, John Macoun 1879 field notebook, June 17, 1879.
8 These ironbound carts were evidently the first to be used on the prairie. MACOUN, Autobiography, p. 137.
9 PAC, John Macoun 1879 field notebook, June 28, 1879.
Further on, as they passed north of the Pheasant Hills, the ridges and valleys assumed a more rounded contour and were covered with clumps of small trees. Similar vegetation was found two days later in the southern part of the File Hills.

Beyond the hills, for the remaining distance to Long Lake, they came across another gravelly, treeless plain. Yet, whenever Macoun dug into the ground, as he had done every mile since leaving the trail, the soil was first class:

I had a pit dug in the very driest part of the hill, and found first class soil, although the surface was covered with pebbles. After a few trials, I discovered that the pebbles were no proof of a gravelly soil, but were only a remnant of the prairie fire. All travellers throughout the Northwest, having seen indications of gravel, have invariably noted the soil as being gravelly, where in reality hardly any could be found in the soil by digging.  

These same fires were also responsible for the plain's vegetation.

In areas that had escaped last season's fires, Macoun found luxuriant wild pea and vetch and knee-high grass that was going to seed.

Burnt-over areas, on the other hand, featured short prairie grass.  

From Long Lake, the party continued southwestward towards the Elbow of the South Saskatchewan River — a landmark seen by

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11 PAC, John Macoun 1879 field notebook, July 6, 1879.
very few white men. At first, they crossed a rolling country
where good soil and long thick grasses characterized the low hills
and alkaline marshes filled the depressions. Yet, as they passed
north of the constantly shifting sand hills of Eye Brow Hill Ridge,
the land became exceedingly dry with poor gravelly soil. Upon
reaching the South Saskatchewan, Macoun remarked that the mighty
river was "altogether out of place in this arid region". At the
Elbow, the party's surveyor checked the feasibility of building a
canal to carry water from the Saskatchewan to the Qu'Appelle River
but found the latter to be 87 feet higher. The men then tackled
the difficult task of crossing the Saskatchewan which at this point
was nearly half a mile wide with a considerable current. It
required two days of shuttling back and forth in a makeshift boat
to get everything across.

The expedition's next objective was the Hand Hills, located
200 miles westward on the third prairie steppe. Leaving the river,
they crossed a range of sand hills and then a level prairie,
deficient in wood and water but producing tall green grass. This

12 The Elbow was a buffer zone between the Blackfoot and Cree
Indians.
13 Macoun quoted in RIDOUT, "The Physical Character of the Prairie
Region...", p. 216.
14 This idea was part of the former Liberal government's scheme
to connect British Columbia with Central Canada by a series
of water and rail links.
tract was succeeded by the richly pastured hills of the Red Deer Lakes region. Here, the Professor decided to proceed north to Battleford with his outfitter, John Matheson, and pick up the balance of their supplies. The remainder of the party was instructed to march directly to the Hand Hills and camp.

Immediately north of the Red Deer Lakes, Macoun and Matheson came upon a slightly undulating prairie again lacking in wood and water. Captain Palliser had surveyed this region several years earlier, finding great numbers of buffalo and the grass eaten so low that he could not obtain feed for his horses. Now, twenty-two years later, the herds were gone and the land produced a very luxuriant grass. Macoun concluded that the heavy grazing of the once great buffalo herds had influenced Palliser's impression that the land was arid. Indeed, the rank vegetation of the region indicated to Macoun that the climate was moist and that the topography of the land must be a factor determining the presence of waterholes:

We have now discovered that want of rain is not the cause of water being scarce, but the levelness of the prairie. Wherever the country is rolling there is water to be had in abundance.

15 JOHN MACOUN, "General Remarks on the Land, Wood and Water of the North-West Territories, from the 102nd to 115th meridian, and between the 51st and 53rd parallels of latitude" in FLEMING (ed.), Report and Documents in Reference to the Canadian Pacific Railway, 1880, appendix 14, p. 136.

16 Macoun quoted in RIDOUT, "The Physical Character of the Prairie Region...", p. 217.
Continuing northward, they passed through the well watered yet treeless Bear Hills, eventually reaching the main trail to Edmonton. They then followed this trail through the rounded Eagle Hills to Battleford. The land became progressively drier and sandier as they drew near the North Saskatchewan.

At Battleford, the new capital of the North-West Territories, Macoun examined the gardens at the police farm and Governor David Laird's mansion. He was amazed to find that the sandy, seemingly barren alluvium of the area produced a good crop of oats, barley, potatoes and turnips. He consequently began to attach greater importance to climate in the success of Western agriculture, particularly the action of winter frost:

I am more and more convinced that it is not the soil which is the cause of the astonishing crops produced in the west, but the peculiar climate. When digging up the prairie soil, even in the hardest clays, I could never get below the roots of grass, and these were so numerous that they seemed to fill the soil. Owing to the severe winter frosts and the light rainfall in spring, the young roots are enabled to penetrate the soil to a depth wholly beyond the belief of an eastern farmer. They seem to follow the pores opened by the frost right into the subsoil and hence, instead of drawing their nourishment from four or five inches of soil, they draw it from eighteen to twenty-four inches. 17

Further discoveries about the soil and the climate were made when

17 Ibid., p. 205
Macoun crossed the Great Plain to Hand Hills.

Heading southwest from Battleford on July 31, the two men crossed a rolling plain with a rich black loam or friable clay soil, lush grasses but little surface water. Beyond the 111th meridian of longitude and 52nd degree of latitude, the character of the land changed abruptly. They found a baked Cretaceous clay surface covered with small cacti, artemisia and stunted vegetation. There were also more waterholes and flowing creeks here than in any other part of the plain. Macoun deduced that the region's apparent aridity resulted from the heavy Cretaceous clay and not from the climate. Crossing the Great Plain, he had discovered that excellent grasses grew throughout the region, even in sandy or gravelly soil, but not where the "banded clays" came to the surface. There, saline plants dominated. 18 These same clays were also responsible for brackish water. Rain, which was evidently abundant because of the existence of running streams and pools, could not penetrate the surface and quickly ran off or evaporated. 19

At Hand Hills, an oasis in relation to the unpromising region they had just passed through, the Professor's work was now

18 Ibid., pp. 219-220.
officially complete. Yet, there was still ample time to undertake further exploration, and he decided to proceed westward to the foothills. Travelling southwest along the Red Deer River to Blackfoot crossing, Macoun entered upon a dry parched country with a withered grass cover — the most arid country he had yet seen. His initial impressions of the land, however, were nullified by his findings at a local trader's farm. Within Mr. French's field, where the soil had been broken up in the spring, the crops were very green and luxuriant. 20 The Professor consequently argued that rainfall, although limited in quantity in the southern plains, was quite sufficient for the purposes of agriculture. The land would yield a good crop if rains were allowed to penetrate the soil. The whole question of aridity then became one of the nature of the surface cover. 21

From Blackfoot Crossing, Macoun and his companions continued northwest along the Bow River towards Calgary, passing through a rolling country nearly all fit for the plough. 22 During this traverse, Macoun visited Chief Crowfoot's encampment and found, to his sorrow, the Blackfeet dying of starvation. Reaching Calgary, September 1, the Professor briefly inspected the farming efforts of the fort

20 Macoun quoted in RIDOUT, "The Physical Character of the Prairie Region...", p. 230.
22 Macoun quoted in RIDOUT, "The Physical Character of the Prairie Region...", pp. 223-224.
and then proceeded over a hilly pastureland to Morleyville
to Old Bow Fort. After exploring the Bow River Pass area,
they headed north across a prairie parkland to Hay Lakes, some
30 miles from Edmonton. It was well watered, covered with willow
thickets and poplar copse and featured a rich, heavy loam soil.

At Hay Lakes, Macoun telegraphed a preliminary report
to Ottawa before starting eastward for Battleford. As they left
the Edmonton area, the country became noticeably drier, eventually
giving way to a treeless plain beyond the Dried Meat Hills. They
travelled across this tract for 60 miles before locating their
first running water in the broken country bordering Battle River.
All of the land between Hay Lakes and the river, nonetheless,
was declared fit for agriculture because of its black, clay loam
soil.23 Crossing the Battle River, they marched southeast to
Sounding Lake near the Neutral Hills and found the country to
be very poor and sandy. Curiously, all the best tracts were
devoid of timber, whereas trees covered all the poorest sand hills.24
This country improved greatly when they turned northeast and entered

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23 Ibid., p. 209.
24 Ibid., p. 209.
the plateau containing Manitou Lake. For 10 miles, they crossed an almost dead level plain with tall grass and poplar and willow clumps. "This was the first land seen," Macoun wrote, "that showed an excessive rainfall during this expedition."25 The country then resumed its dry, broken character for the remaining few miles to Battleford.

During Professor Macoun's short stay at Battleford, he was interviewed by the Saskatchewan Herald on his summer travels. A similar demand was made upon him at Winnipeg in the form of a public lecture. In addressing the large audience assembled in the Winnipeg court house on the evening of November 20, Macoun's teaching background came to the fore. His entertaining talk was spiced with amusing anecdotes and lessons for young men intending to head west. His uncontrolled enthusiasm for Western Canada was also evident. He informed his audience that the Assiniboine River was navigable to Fort Ellice and predicted rapid immigration to the Souris Plain the next season.26 Speaking of the agricultural resources of this region, parts of which he viewed only from the steamer, he

25 Ibid., p. 207.
announced:

In the country lying to the south of the Assiniboine, south of the Qu'Appelle and east of meridian 103 there are at least 6,000,000 acres of first class land.... Passing up still, we find another great block of land extending to meridian 105 and north of the Qu'Appelle which will contain not less than 10,000,000 acres. There is no finer region in the world. And these 16,000,000 acres of magnificent land, in two blocks, only take us to meridian 105! A year hence I may be able to tell you of other and just as valuable tracts which I myself shall have explored.27

He was even complimentary of the Great Plain, failing to mention the tract of bad land he had encountered northeast of the Hand Hills.28 Macoun did, however, provide a more sober assessment of the Indian situation; the Blackfeet were not a force to be feared but unfortunate victims of government bumbling. His thoughts on the western climate were also closer to the truth. He stated:

During the past season I have been studying the climate of the country, ciphering on it in fact, and I will tell you what kind of a climate you have. It is of an exceptional nature. From April to August there should be more or less rain but the greater part of our rainfall should come during June or July. Slow growth in spring, quick progress in summer — that is the secret of vegetation in the North-West.29

Whatever its exaggerations, the lecture was printed verbatim on the front of the Free Press the following day.

27 Ibid., p. 1.
28 Ibid., p. 1.
29 Ibid., p. 1.
Upon returning eastward, Professor Macoun began to work in Sandford Fleming's Ottawa office, assisting in the preparation of the various summer field reports for publication. His own contribution to the 1880 railway report was primarily devoted to some general comments on the resources of the Great Plain. Despite the total absence of wood, the presence of cacti, and the rare occurrence of running streams or pools, Macoun believed that the great treeless expanse was not arid. Lack of rainfall was not responsible for the absence of trees or brush. If so, he argued, why were sand hills in the region, where the ground was undoubtedly dry, covered with wood, while tracts of good soil treeless? The real cause of the absence of brush was the annual prairie fires which swept freely over most of the plain:

The rich soil with its abundance of grass affords, when dry, fuel for flame, which destroys any seedling that may spring up, while the sand hills, being unable to carry fire through their extreme poverty, save it alive.30

As for the presence of cacti and artemesia, these plants were restricted to areas where Cretaceous clays came to the surface.

It was evidently too moist on other parts of the plain for them to exist. Macoun therefore concluded that aridity was a matter of soil and not climate.31

30 MACOUN, "General Remarks on the Land, Wood and Water...", p. 239.
31 "Popularly, sand and aridity are classed together; instead, it should be sand and unfruitfulness. It is impervious clays that are arid through the region explored by me." Ibid., p. 239.
This conclusion was further borne out by his examination of the Great Plain's water supply. Numerous creeks, as well as alkaline marshes, ponds and lakes, had been observed where Cretaceous clays were the prevailing surface material. Yet in other parts of the plain where the grass formed a thick sward, the summer rains were prevented from running off in small streams or collecting in hollows and entered almost immediately into the soil. Once in the ground, the water passed down to a great depth because of the pulverizing effect of the winter's frost on the soil. Here, it was either absorbed by roots, which also penetrated several feet, or remained in the subsoil.\(^{32}\)

The Professor confided:

\[
\text{I consider the absence of water a good sign on the prairie. It shows the soil well suited for farming purposes, but it is no proof that water cannot be had by digging.}^{33}\]

He also warned that if the grass sward was removed, the rains would run off and the land become drier. The plain, then, must either be covered with thickly matted grass or broken up to receive water.\(^{34}\)

In the same report, Macoun estimated the land available for settlement, boldly declaring:

\[
\text{I am quite safe in saying that 80 per cent of the whole country is suited for the raising of grain}\]

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33 Ibid., p. 243.
34 Ibid., p. 242.
and cattle, and would not be the least surprised if future explorers formed a more favourable estimate. Only two points in the country explored were noted where it was probable the rainfall was too light for successful raising of cereals; viz: At the Elbow of the South Saskatchewan, and the Blackfoot Crossing.35

This 80 per cent was put into acreage figures in the report's conclusion, as an update of Macoun's 1877 estimates. The Professor felt that his recent exploration and a knowledge of the work of others enabled him to classify lands with a "greater general accuracy" and he focused his attention on the region between the Rocky Mountains and Manitoba and the International border and the 57th parallel. He estimated that within the 180 million acre area, there were at least 150 million acres of land suitable for agriculture and stock raising. Of the remaining 30 million acres, only a third could be considered sterile or irreclaimably wet; the other 20 million acres represented swamps, sand hills, banded clays and gravelly tracts.36

In addition to his work on the railway report during the winter of 1879-1880, Macoun dutifully attended the House of Commons' debates on the North-West. He also found himself regarded as a

36 Ibid., p. 245.
public figure, being invited to lecture throughout Ontario
on his travels and impressions of the Western country. The
most notable of these lectures, in which he brought together his
earlier ideas on the length and warmth of the growing season with
his recent work on moisture conditions, was delivered before the
Canadian Institute in Toronto. At the opening of his address,
the Professor explained how his early floral studies in Western
Canada had indicated a high and uniform distribution of heat
throughout the entire region and that special conditions must
exist to produce such a climate. In seeking an answer to this problem,
he consulted the work of geologist Charles Lyell and climatologist
Lorin Blodget. These readings suggested that the large desert
plateau within Central United States would exert an influence
on the climate of the Canadian North-West. This theory was confirmed
by the meteorological report for 1878, which demonstrated a fairly
equal summer temperature throughout the region. The summer
isotherms of this report, however, also showed that the warm currents
from the Gulf of Mexico curved upwards in a northwesterly.

JOHN MACOUN, "Notes on the Physical Phenomena of Manitoba
and the North-West Territories", The Canadian Journal,
direction instead of normally bending eastward. Macoun concluded that this phenomenon was also caused by the Great American Desert. The warm inland body attracted the currents from the Gulf of Mexico towards itself and northwestward of their natural course. Here, they met with currents from the Gulf of California somewhere near the Hand Hills and dispersed a high temperature over the Canadian plains. In winter, the situation was reversed.\(^{38}\)

Professor Macoun then turned to the matter of humidity. He noted that the seasonal distribution of rainfall in the North-West was exceptional; rains came in the late spring and ceased at harvest time. Moreover, an examination of rainfall levels during the months of vegetation (May, June, July, August) and harvest (September, October) in Winnipeg; Fort Riley, Kansas; Toronto and Rochester, New York revealed that this cycle was peculiar to Western Canada.\(^{39}\) These conditions were again attributed to the Great American Desert. The moisture of the southeastward winds from the Gulf of Mexico was not deposited further south because of the warm air rising from the Desert but was carried into Western

\(^{38}\) Ibid., pp. 155-156.  
\(^{39}\) Ibid., p. 157.
Canada. This effect was absent in winter. Macoun had therefore combined his work on temperature and rainfall, two rather different concerns, in an impressive and concise manner. He had scientifically demonstrated the North-West's grain growing and stock breeding potential.

These ideas were further developed and broadened to include soil conditions during Macoun's return to the southern prairie region in the 1880 field season. This time, he was given a "zig-zag" itinerary of all the areas poorly regarded in previous reports. From Winnipeg, the Professor and his party of four ascended the Assiniboine River by steamer to Grand Rapids, near the newly located city of Brandon. Proceeding westward by cart, they found the land on the south side of the Assiniboine to be sandy and gravelly, certainly not first class. Beyond the junction of the Souris River as they neared Boss Hill Creek and Oak Lake, it changed to a marshy plain interspersed with sand hills which extended far to the south. Macoun considered the region altogether unfit for farming but excellent for grazing. The

40 Ibid., p. 158.
41 In 1879, the projected railway line was rerouted south of the Manitoba Lake region along the Assiniboine Valley to Brandon and then northwestward through the fertile belt.
group then left the trail and struck out for Moose Mountain at the 102nd meridian, passing through a good farming country with a black loam or sandy clay soil for most of the 60 mile distance. 42

At Moose Mountain, Macoun surveyed the gently sloping wooded hills, estimating that they contained at least 100 square miles of balsam and aspen poplar. The party then continued out onto the Great Souris Plain. As the men worked their way southwestward, the land gradually became a perfectly level short grass prairie. Good water, nonetheless, was easily obtained from pools, and the soil, although more difficult to penetrate, was first class. The first eight or more inches of plain's surface were almost completely solid roots. 43 As the men approached the Qu'Appelle Trail that ran south to Wood Mountain, the character of the plain changed again. Surface water was now scarce, birds almost disappeared, and the surface material became very broken clay, identical to that Macoun had encountered southwest of Battleford in 1879. The Professor reported that the surface was so rough "our carts were nearly shaken to pieces, and patches of skin were jerked off the necks of our

43 Ibid., p. 10.
horses by the twisting caused by the hummocks and hollows.\textsuperscript{44} The vegetation also changed, the short grass being replaced by tall rich varieties and small delicate roses.

At first, the Professor was puzzled by such growth on the plain.\textsuperscript{45} His practice of digging pits in the soil, however, provided the explanation. Each day, Macoun dug numerous pits to test the water table and mineral content of the soil. He found that a spade would dig easily into the apparently rough surface of the plain to about 18 inches, but he could only penetrate the impervious clay below this point with great difficulty. Macoun concluded that winter frosts softened the surface soil and allowed rain water to enter the ground where it was retained by the hard clay.\textsuperscript{46} He wrote:

\begin{quote}
The soil for nearly 100 miles is a strong friable clay which is much cracked and heaved by frost—not by the sun as other explorers make out. It is absurd to talk of sun cracks where the grass is as green in the middle of July as it is in Ontario in early June. As I have said the frost heaves and cracks the soil and the rain is absorbed as quickly as it falls. About 15 inches of the surface was finely pulverized and beneath that the soil was more
\end{quote}

\textsuperscript{44} \textit{Ibid.}, p. 10.
\textsuperscript{45} \textit{PAC}, Sandford Fleming Papers, Macoun to Fleming, August 14, 1880.
\textsuperscript{46} MACOUN, "Extract from a Report of Exploration...", p. 10.
compact but we all saw that the winter's frost was
the salvation of this region as it softened the
soil and enabled the roots to penetrate.47

Thus, as evidenced by the plain's vegetation, rainfall was sufficient
but absorbed immediately into the ground, making surface water
difficult to locate.

Because of these conditions, the party secured water
only four times over a 45 mile section of the plain.48 In fact,
water became so scarce as the Missouri Coteau escarpment came into view
that they turned northwest and headed for the junction of Moose
Jaw and Thunder Creeks. The men reached the Moose Jaw after
travelling 30 hours without water over a very dry but heavily
grassed country.49 Here, within a 140 foot deep valley, they found
a most welcome four inch deep stream. West of Moose Jaw Creek,
the Macoun party crossed a very broken country to the head of
Old Wives Lake. At first, sand and gravel ridges dominated, but
as they approached the base of the third prairie steppe (the Coteau),

47 PAC, Sandford Fleming Papers, Macoun to Fleming, August 14,
1880. In an earlier exploration of this area, Robert Bell
stated that the fissures were caused by a drying up of the land.
ROBERT BELL, "Report on the Country between Red River and
the South Saskatchewan", Geological Survey of Canada. Report
of Progress for 1873-1874 (Montreal: Dawson Brothers, 1875), p. 76.
48 JOHN MACOUN, Manitoba and the Great North-West (Guelph, Ontario:
49 The party went without water as a disciplinary measure for
one man's carelessness. MACOUN, Autobiography, p. 175.
saline soil and alkaline plants became more common. Continuing southwestward to the Cypress Hills, they worked their way over a series of high rolling hills that alternated from well watered pastureland to clay outcrops with sagebrush; conditions cited by Macoun as further proof that aridity was not a question of climate but soil.50

Climbing the eastern face of the Cypress Hills, the men travelled along their summit until they came upon the police trail leading to Fort Walsh. They then turned south, following the trail over a sand and quartzite gravel plain to the post. Macoun spent the next few days examining the surrounding country and although the heavily timbered hills were the most beautiful spot the party had come across, he doubted the region's potential for agriculture. Writing to Sandford Fleming from Fort Walsh, he said:

On every part of the hills we found first class pasture and in the coulees excellent spring water, but with possibly the exception of the eastern end the hills are in my opinion too high for agriculture. The plants indicate a cool climate such as I found above Morleyville. My Aneroid makes the altitude at least 3500 feet and the plants make it as high as Old Bow Fort 3,900 .... I believe less in the future of the Cypress Hills and the country around them than anywhere I have been. Farming in the neighbourhood of Fort Walsh is simply impossible both on account of soil and climate.51

51 PAC, Sandford Fleming Papers, Macoun to Fleming, August 14, 1880.
His findings at a farm north of the hills were more encouraging.

On August 13, Macoun and his assistant, William Jukes, rode 30 miles northwest to inspect a homestead recently located on a branch of Maple Creek. They found the farm situated on a Cretaceous clay plain covered with dried up grass — worthless land according to Macoun's previous report. The unassuming farmer, however, had sown grain late in May, and despite a long June drought, his results were astounding. Wheat and potatoes were growing luxuriantly in the same field with cacti and sagebrush.

In the same letter to Fleming, Macoun related his latest discovery, having great difficulty suppressing his excitement:

The farmer — Mr. Setter — had ploughed up Sage Brush and Cactus and had sown wheat, barley and oats and planted potatoes and here on this arid spot were all there (?) quite green — too green for the time of the year — and the land which remained unbroken so dry that it was impervious to rain while the cultivated! — it had been ploughed once 2½ inches deep — land received the rain and admitted it to the soil. I took a spade and dug it into the subsoil quite easily and found it moist but the unploughed land I could not penetrate without great difficulty the surface was so dry.  

Thus, once the seemingly arid "cactus sods" were ploughed and cultivated, precipitation would prove ample for the requirements of farming. These soils were no longer a restricting factor for agriculture.  

52 Ibid.  
53 MACOUN, Manitoba and the Great North-West, p. 205.
From Fort Walsh, the men struggled with their carts to the western end of the Cypress Hills, climbing over high ridges and descending into deep coulees. They then turned eastward and headed for Swift Current Creek, near its confluence with the South Saskatchewan, and from there to the Qu'Appelle. During that time, they crossed a "badlands" country with dried up streams, sand hills, gravelly soils and short stunted grass. As they drew near the Swift Current, however, the land steadily improved. Its abundant water supply, clay loam soil and more luxuriant vegetation caused Macoun to rate it as first class agricultural or pastoral land.54

At the Qu'Appelle, preparations were made to explore the Great Plain to the north and the party loaded their carts with a week's supply of wood and water. They then climbed out of the river valley and made their way over Eye Brow Hill Range; a slightly undulating plateau with a light sandy loam soil, short grass and little water. Continuing northward to the 52nd parallel, the appearance of the country was altogether different than Macoun had expected.55 The plain became a series of extensive well watered pasturelands.

55 Ibid., p. 19.
The men then turned southeastward, and marching across the Great Salt Plain to the Touchwood Hills, found the saline features, such as brackish marshes and white mud swamps, to be limited. Macoun concluded that the title, Great Salt Plain, was a misnomer.56

He then quickly explored the country southeast around Spy Hill before returning to Winnipeg.

Macoun again devoted the winter to publicizing his findings. His official report to the government was essentially a narrative of the expedition. It did, nonetheless, include an assessment of the various sections traversed, as well as botanical and ornithological notes. In some instances, Macoun was uncomplimentary about certain parts of the southern interior, particularly the Cypress Hills district. Generally, however, his statements tended to the other extreme. He claimed that they had seen neither poor pasture between Moose Mountain and the Cypress Hills nor a mile of bad soil from Swift Current Creek to the Qu'Appelle River.57 He estimated:

Taking the Qu'Appelle at its mouth, as a center and projecting a line nearly due west to the South Saskatchewan, a distance of over 250 miles, and starting at the meridian of Fort Ellice and including only the land south of the Touchwood Hills a belt with an average breadth of 100

miles extends right up that river. Here, we have 25,000 square miles or 16,000,000 acres of land lying in one block that to my own knowledge has over 90 per cent of it fit for agricultural or pastoral purposes.... There will be no difficulty in obtaining first class wheat crops throughout the greater part of it.58

He also argued that Cretaceous clays were not barren or irreclaimable and he extolled the virtues of the treeless plain:

Experience has taught me that wherever trees and brush wood are found there to look for a broken country and one that contains too much water while the open treeless prairie generally condemned to sterility is by far the best farming land.59

This assessment went against traditional ideas of good agricultural land which emphasized the presence of wood and water.

Professor Macoun also continued to lecture about the Western country. In a Hamilton, Ontario speech, he presented himself as the sole expert on the North-West. He stated that he had never seen a bad crop in the region, regardless of the character of the soil:

...there [is] no such thing as the fertile belt — it [is] all equally good and God in His providence [has] blessed it with a continual climate, fixed and unalterable.60

This same lecture was delivered before an Ottawa audience and so

58 Ibid., p. 23.
59 Ibid., p. 22. Macoun had first touched upon this idea in his 1879 report (General Remarks on the Land, Wood and Water...", p. 237), but at that time was still uncertain about Cretaceous clay soils.
60 Winnipeg Free Press, April 7, 1881.
impressed the Governor-General that he asked Macoun to act as

guide on his tour of the North-West during the upcoming field
season. The government had other plans for the Professor,
instructing him to explore along the Swan and Red Deer Rivers,
and the Duck and Porcupine Mountains; the area through which the
transcontinental rail line had originally been projected. The
assignment represented a complete change of pace from his previous
two summer's work. He was to conduct his exploration by water,
and as his companions, he took three boys, including his son,
James.

Starting from Winnipeg, June 8, 1881, the party
travelled by train to Portage la Prairie and then walked 22
miles north to Totogan. Here, they found their hotel almost afloat.
Heavy spring rains had caused Lake Manitoba to rise three to
four feet, turning meadows into marshes and muskegs into floating
bogs. Macoun consequently engaged a sailboat to take them down
the lake to Manitoba House, and they reached there the following
day. In the only incident, they lost their camp outfit during
a fierce thunderstorm.

At Manitoba House, the Professor examined the slightly elevated country bordering the lake and found it saturated with water. Yet, the nature of the land itself was encouraging. He detected 480 species of plants native to Hastings County, Ontario, as well as a very rich and deep limestone soil. He argued:

It would be altogether out of place to condemn this country because the located railway line near the lakes is at present time underwater. I am quite sure that further and more careful examination will reveal large areas of good dry land in the very region which I am now tempted to condemn and which in the near future will be spoken of in the highest terms.

From here, Macoun and the boys continued up the lake to the Narrows, and meeting a census taker as prearranged, travelled in his sailboat up the Water Hen River and across Lake Winnipegosis towards Swan Lake House. Progress was slow because of steady headwinds and it was only by continually rowing that they reached the settlement. Their exertions, however, were more than repaid by the scenery at the northern end of the lake.

At Swan Lake House, Macoun resumed his investigations. Despite the wetness of the land, he again considered the soil

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63 Ibid., p. 72.
well suited for agriculture; although, he did concede that drier seasons were first necessary for successful cultivation. 64

The Professor and the boys then crossed Dawson Bay 65 and turning into the flooding Red Deer River, tracked their boats in shifts along the shores of the raging torrent for two weeks to Red Deer Lake. Here, the party took a short break from their water travel and marched south to the thickly forested Porcupine Mountains.

Upon completing this reconnaissance survey, Macoun and the boys resumed their battle with the Red Deer, making small excursions inland or taking observations from treetops as they worked their way upriver. At the junction of the Red Deer and Etoimani Rivers, the effect of the unusually wet season continued to be seen. Yet, the Professor still emphasized the potential of the region:

The ground is extremely level everywhere, and all the marsh and meadow land must be ascribed to this cause. There is an abundant rainfall and no drainage, a most luxuriant growth and little chance for vegetation to rot, and the result is peat bog or marsh. No other result could be expected; yet this region has a very rich soil and a very mild summer climate. Although I say the land at present, except along the river is totally unfit for settlement, I do not wish to condemn the country except for one cause — want of drainage. All the soil is good, and all that is needed is a gradual clearing and drying of the land, and there will be no richer region in the interior. 66

64 Ibid., p. 73.
65 Macoun Point on Dawson Bay commemorates this expedition.
These reservations were borne out along the Little Swan River, where they found a drier, better drained country of poplar groves and richly grassed meadows.

Continuing upriver, Macoun's survey of the land was soon overshadowed by his growing concern for their overall situation. They had not found the expected link with the Swan River, but only a small creek congested with brush. Furthermore, the boats were worn through in many places, their provisions were nearly exhausted and almost continual rains had soaked all their clothing. It was only after an intensive search that they eventually located a stream leading to Swan Lake. From there, they paddled down the Swan River to the N.W.M.P. Head Quarters at Livingstone.

At the settlement, Macoun examined the farming efforts and concluded that early summer frosts, although restricted to certain areas, were unavoidable; he suggested that crops be sown early. He also surveyed the country east and west of Livingstone, declaring the soil in both directions to be first class. The Professor and the boys then travelled overland to Fort Pelly, repaired their boats and set off down the Assiniboine River,

67 Ibid., p. 85.
September 19. Two days later, they visited the highly efficient Indian farm at Cote's Reserve and explored the neighbouring Duck Mountains for several miles. Macoun's evaluation of the region's agricultural potential was greatly reinforced by the fine samples of Fife wheat he secured. He reported:

There can be no doubt of the value of the whole of the Duck Mountains and all of the region around Fort Pelly as a field for agriculture. The soil is almost all of superior quality, much of it very rich. The climate, though subject to more summer frosts than the prairie country to the south, is all that could be desired. Wood is abundant, and hay lands are in sufficient quantity for all stock that can be raised.68

They then quickly descended the river through an excellent dairy farming country, to Fort Ellice and from there, returned to Winnipeg.

Later that fall, Macoun travelled to Ottawa for his routine report on the summer's exploration. Over the past two and a half years, he had done much to make the North-West and its potential better known. He had travelled extensively through the region, particularly the southern territory, became thoroughly acquainted with the land and its natural phenomena, and discovered that temperature, rainfall and soil were ideal for the purposes

68 Ibid., p. 87.
of agricultural settlement. He then brought these findings before the public in entertaining and enthusiastic lectures.

Thus it was not surprising, when at the conclusion of his presentation to the Deputy Minister of the Interior, the Professor was appointed to the Geological Survey, effective January 1, 1882. The appointment was confirmed during an interview with Prime Minister Macdonald.69 At the age of 50, the dream of John Macoun's life had been fulfilled.

69 MACOUN, Autobiography, p. 196.
Chapter Five

THAT GENTLEMAN'S ABILITY

Macoun as Propagandist of Canadian Imperialism

The city hall was completely filled last night by an audience comprising much of the worth and intelligence of Winnipeg, gathered together to hear a lecture on his travels in the North-West from the distinguished Professor Macoun. However high the estimate may have been formed of that gentleman's ability, it was more than fully borne out by his graphical and instructive picture of his travels across the great plains of the west. Not only is Prof. Macoun an accomplished scientist, but he proved himself possessed of the faculty of imparting to others all the enthusiasm with which he himself regards the land of his labours.

Manitoba Free Press, November 21, 1879.

At the time of his appointment to the Geological Survey of Canada, John Macoun's Western explorations and his subsequent endorsement of the region's potential had gained him national prominence. With his removal to Ottawa and the publication of his extremely popular book, Manitoba and the Great North-West in the spring of 1882, he emerged as the most widely recognized expert on Western Canada. His statements generally went unchallenged, being referred to in government publications and newspapers with great regularity. For seasoned travellers, prospective settlers
or contriving officials, he was the first man to consult. Macoun was gospel.

Macoun's pronouncements about Western Canada's suitability for large scale agricultural settlement were not the simple product of his field investigations. The Professor continually consulted the theories and findings of other scientific investigators. He also was a great enthusiast of the North-West who praised each region as it was explored. He mirrored the period's growing optimism for Western Canada. Finally, extremely conscious of public recognition, he was caught up in the task of discrediting pessimistic assessments. These various factors combined to determine Macoun's outlook on the Western Interior. Indeed, he tackled the task of opening Canada's Western frontier with great enthusiasm, drive and certainty. His evaluations may have been incomplete, prejudiced or based upon misconceptions, but they carried an almost undeniable authority.

John Macoun believed that his field work had revealed the real truths about the character of the Western Interior.¹ Grappling with the question of the agricultural potential of the

¹ MACOUN, Autobiography, p. 115.
Peace River district and later, the southern plains, he had scientifically demonstrated that these regions were equal to, if not superior, to the fertile belt. A large part of his subsequent statements were based on this resource research. It instilled in him a sense of confidence, almost a sense of infallibility. There was very little for which Macoun could not or did not eventually formulate an explanation. Nor did he believe that he could possibly be seriously mistaken.

The fundamental test of the Professor's field work was his practice of determining the capabilities of a district by judging its flora and comparing it with a known area. This test was not peculiar to Macoun, for both Palliser and Hind had appraised the land by its vegetation. It was also an accepted practice among Geological Survey members. Yet, because of Macoun's training as a geographical botanist, his dependence upon such a simple, general test was much greater. It effectively determined the line of thought he pursued. His floral studies indicated a regional uniformity in vegetation, suggesting that the Western Interior was a complete geographical entity. He did not seem to realize that the test's validity was limited for it failed to effectively capture the possibility of varying climatic conditions.
Daring assumptions and bold generalizations were the outcome.

From his explorations, Macoun deduced that the unvarying character of the flora across the Western country was caused by similar temperatures during the growing months brought about by the northward sweep of summer isotherms. Existing meteorological information, although meagre, confirmed this isothermal phenomenon. The Professor consequently argued that mean summer temperature as opposed to mean annual temperature was important to crop production. Calculating tables for the growing months of various interior tracts, he arrived at his enormous 1877 estimates² and suggested that the potential threat of summer frosts due to the shortness of the growing season could be discounted.

This emphasis on the role of isotherms was misleading. Violent and sudden changes in temperature had played havoc with Western agriculture since its fur trade beginnings. As Archbishop Tache warned:

...greater experience proves that they [isothermal lines] are not to be depended upon. These lines are fundamentally wrong, for, I repeat, ... a single night is sufficient to destroy all analogy with the climate of the country to which they refer.³

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² MACOUN, "Sketch of That Portion of Canada...", p. 334.
³ TACHE, Sketch of the North-West of America, p. 17.
Macoun did state that late fall sowing for early spring growth would completely remove the threat of August frosts. Yet, he was more concerned with emphasizing the warmth of the growing season than determining its actual length. From the nature of Western vegetation, he was convinced that frosts would never do any serious injury. The flora had indicated a warm climate and cereal crops in northern districts had adjusted to the environment. Macoun thus ignored the record of damaging frosts at the fur trade posts and the Red River Colony—a serious oversight.

Macoun's work on rainfall also revolved around the idea of unfailing uniformity. Although he failed to assign exact rainfall figures to the various regions, the Professor considered precipitation in the North-West to be adequate for the purposes of cultivation. His examination of the Peace River district and fertile belt had revealed ample moisture, while the luxuriant grasses of the southern plains territory suggested that the region was not arid. Rather, the prairies were maintained or

4 MACOUN, Manitoba and the Great North-West, pp. 212-213.
extended by fires that destroyed brush, removed the grass cover and burned the upper organic layer of the soil. If these fires could be stopped, trees and grasses would return and the climate would improve. Because of the influence of the Great American Desert, precipitation was also exceptional. Much of Western Canada's rainfall came during the growing season. This rainfall cycle was highly significant to wheat culture. Grains demand an increasing amount of moisture as they grow and fill the ear, followed by a dry harvest period to ripen and harden. The seasonal distribution of moisture in Western Canada was therefore presented by Macoun as ideal.

Once again, for similar reasons, these views were misleading. In actuality, rainfall deficiency is the most important single climatic factor in life on the Canadian prairies. The twenty inch rainfall line, critical for agriculture, enters Manitoba at the 98th meridian of longitude and curves northwestward; rainfall diminishes from east to west. Below average rainfall, however, is not the real problem. Precipitation, although scanty,

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6 Scientists of the period compared the possibilities of tree planting on the plains with the example of Egypt's Nile Valley.  
7 MACOUN, Manitoba and the Great North-West, p. 201.  
8 MACKINTOSH, Prairie Settlement, p. 14.
is effective as Macoun noted because a high proportion usually comes at the critical point in the growing season. The most serious problems arise because of frequent, wide deviations from average seasonal distribution from place to place or from year to year. The south presents the greatest variability, and long periods without rainfall are not uncommon. The success of each year's crop depends on the season.

Macoun may not have fully understood the importance of the widely varying precipitation within the region. He explored the prairies during a period of unusually wet springs when more favourable conditions prevailed. Yet, the Professor was fully aware that the region was enjoying a wet cycle.

Travelling over the Qu'Appelle plain in 1880, he reflected:

In ordinary years water must be very scarce on nearly every part of it, but this year there was abundance of rain in the shallow pools owing to the rainy weather we had experienced for some weeks.

To acquire experience in the arid region and be able to express a competent opinion required detailed study over a series of years. All explorers of the grasslands should therefore be

9 Ibid., pp. 13-14.
11 ROE, "Early Opinions on the 'Fertile Belt'...", pp. 137; 144.
criticized in this regard, but particularly Macoun. He realized the abnormality yet used the wet years to substantiate his claim that dry seasons were so infrequent or local as to be negligible.\(^\text{12}\)

As for Macoun's findings on the nature of the land, he analysed the soil from vegetation to grass roots. He concluded that grasses were luxuriant in those areas where surface water was scarce because rainfall easily penetrated the frost-cracked soil and was utilized by the grass roots. The soil's apparent aridity in other regions resulted from heavy Cretaceous clays which prevented the absorption of water. Once these cactus sods were ploughed, however, precipitation would prove sufficient and the soil would become increasingly productive under continued cultivation. He had seen in 1879 and 1880 how cultivated land could better absorb water than unbroken land. He logically assumed

\(^{12}\) F. G. Roe ("Early Opinions on the 'Fertile Belt'...", pp. 135-136.) suggests that similar problems arise with Macoun's description of the grasslands. His incidental remarks about his prairie travels in 1879 and 1880 give the impression of a dry, broken territory, whereas his reports and speeches announced the country's fertility. There are no inconsistencies, however, between his private findings and public statements. In the south, he had found rich grasses on an otherwise treeless, semi-arid plain and in attempting to explain this contradiction, arrived at a scientific argument for the region's fertility.
that fertility would increase with each successive crop. These so-called discoveries coupled with the Professor's climate studies led to his overall conclusion that prairie soils were the best wheat lands.

Macoun's claim that parts of Palliser's arid triangle could be brought under cultivation was essentially correct. The region's treelessness was not a sign of complete deficiency. His statements on the cultivation of prairie lands, however, attributed equal capabilities to the various soil types of Western Canada. The matter is more complicated. The prairie soils of the second and third steppe contain varying amounts of sand, clay and gravel. They also possess shallow and light concentrations of organic material, because of the short grass cover and frequent fires. Such soils therefore complicate the problems of rainfall deficiency. Any precipitation received by them quickly passes to the subsoil and is lost, leaving the topsoil dry and less drought resistant.

Despite Macoun's contention, bringing prairie land

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13 MACOUN, Manitoba and the Great North-West, p. 144.
14 Macoun (Manitoba and the Great North-West, p. 202.) was one of the first scientific investigators to correctly argue that the first prairie steppe had been once covered by an ancient glacial lake (Agassiz).
into agricultural production was not then a simple matter of cultivation.  

Bad husbandry had an immediate effect on production. Virgin prairie sod eroded and blew away when carelessly broken. Successive crops drew off moisture from the land and the area suffered from reduced yields. Special techniques, such as fallowing, were essential to the farmer's success. Otherwise, serious agricultural problems resulted.

John Macoun's revelation of the secrets of the North-West was therefore incomplete. He was not necessarily wrong, but his findings represented only one aspect of the region's character — the ideal aspect. Deviations from the norm were more important, for Western Canada was an area of persistent natural hazards. The Professor's misconceptions or distortions arose when he applied his sectional or seasonal findings to the vast Western Interior. By concentrating on observation for its own sake and generalizing, he achieved a limited kind of truth.

Professor Macoun also relied upon the findings and theories

16 MACOUN, Manitoba and the Great North-West, p. 201.
17 JOHN WARKENTIN, "Water and Adaptive Strategies in Settling the Canadian West", Historical and Scientific Society of Manitoba Transactions (hereafter referred to as HSSMT), series iii, n. 28, 1971-72, p. 62.
of other explorers and scientists. His personal research could only be undertaken in the context of existing scientific knowledge and clearly, many of his ideas originated with other men. Some of them had already been formulated and needed only confirmation. Others were roughly worked out on his traverses and expanded and refined during the winter months.

Charles Horetzky's comments were well founded when he accused the botanist of culling his information from existing literature, especially the work of George Mercer Dawson. In the 1873 and 1874 field seasons, Dawson, a geologist attached to the North American Boundary Commission Survey, had explored the country along the 49th parallel from Lake of the Woods to the Rocky Mountains. His subsequent report which "attempted to make the 49th parallel a geological baseline with which future investigations may be connected", included an assessment of the settlement possibilities of the Canadian West. He stated that the third steppe did not compare favourably with the fertile belt and was better suited for pasture lands. At the same time, Dawson took great care

to point out that:

...this country, formerly considered almost absolutely desert, is not — with the exception of a limited area — of this character; that a part of it may be of future importance agriculturally. 21

Here was the first scientific reappraisal of the Palliser and Hind desert concept. 22

In preparing his 1877 report of the North-West's potential, Macoun quoted Dawson's comments extensively to present an encouraging picture of the southern territory 23; he himself had not yet seen the area in question. In fact, the Professor consulted all the authorities, traders and settlers included, and carefully marshalled the more favourable data on the various Western regions. He had great faith in other people's opinions, if they served his purposes. Before the Select Committee on Agriculture and Colonization, he testified:

At Carlton I crossed the North Saskatchewan and therefore I know nothing personally of the immense region extending west and south thence to the Boundary. All accounts, however, agree in saying it is the garden of the country. Good land generally speaking extends northward to Green Lake, a distance of 170 miles from Carlton. How much further eastward

21 Ibid., p. 299.
22 John Warkentin (The Western Interior, p. 235) suggests that it was unfortunate that this report did not receive more attention, for Dawson's remarks might have prevented future widespread criticism of Palliser's work.
23 WARKENTIN, "Steppe, Prairie and Empire", p. 125. Macoun was quite familiar with the report, having examined Dawson's collection of grasses and carices.
this good land extends I am unable to state; but Sir John Richardson says that wheat is raised without difficulty at Cumberland House.24

Thus, the relative worth of Macoun's early assessments in determining the agricultural potential of Western lands was questionable. As an inventory of auspicious remarks, they were unrivalled.

The Professor also referred to the work of other scientific investigators when examining the natural phenomena of Western Canada. The idea of the northward extension of summer isotherms into the Canadian North-West had been voiced by Lorin Blodget in 1857. Yet, as noted, it was largely an unproved thesis in 1870. The temperature records at various northern posts hinted at the isothermal phenomenon. It was also well known that the arrival of spring was enjoyed almost simultaneously in the Red River Settlement and the Peace River district. George Dawson, ever cautious of making broad generalizations on the basis of limited field work, observed:

...enough is known to prove the remarkably uniform progress of the spring along the so-called "fertile belt", which, passing northwestward from the Red River valley nearly follows the Saskatchewan to the Rocky Mountains. 23

24 CANADA. House of Commons Journals, v. 10, 1876, appendix 8, p. 21.
25 DAWSON, Geology and Resources, p. 283.
John Macoun was the first man to bring the available data and Blodget's work together and prove the theory.

As for the Professor's ideas on rainfall and its seasonal distribution, he was once again influenced by Blodget's thesis, as he had explained before the Toronto Institute in 1879. 26

Macoun had probably also consulted the work of James Hector, geologist for the Palliser expedition, as well as George Dawson. During their traverse through the fertile belt and the South Saskatchewan country, Hector had noted that thunderstorms were a regular occurrence. 27 He also concluded, on the basis of the rich plant life on the hills of the dry, southern plains, that "there [was] quite a sufficient quantity of moisture in the atmosphere during the summer months to support a more vigorous vegetation." 28 In his 1875 report, Dawson agreed with these thoughts, arguing that the prairies originated from the frequent passage of fires rather than rainfall deficiency:

The very dryness of the atmosphere and soil is thus brought about, to a great extent, by the destruction of forest areas by fire, and the effect is a cumulative one. 29

26 see Chapter Four, p. 87.
28 Ibid., p. 22.
29 DAWSON, Geology and Resources, p. 317.
He suggested that replanting of grasses on the prairie might have the same effect as renewing forests and increasing precipitation.

Professor Macoun was also influenced by these two explorers' work on Western soils. Hector, in trying to determine why the vegetation of the grasslands should be so sparse despite a seemingly sufficient rainfall, decided that the "desert" country derived its character from the nature of its soil. The prevailing Cretaceous strata baked under the hot spring sun into a hard surface, resulting in the region's barrenness. Dawson greatly expanded this idea, placing emphasis on the relationship between the parent material of the soil and its inherent fertility (or aridity). He stated that glacial drift produced more fertile soil, particularly those areas underlain by impervious rocks or clays which retain the water level near the surface. Areas, on the other hand with a soil and subsoil too light to retain moisture were best suited for pasture lands, while those based on Cretaceous clays were condemned to sterility.

The concept that Cretaceous soils were fertile was based on Macoun's own findings. In 1880, he had come across

30 HECTOR, "On the Physical Features...", pp. 10-11; 22.
31 DAWSON, Geology and Resources, pp. 283-284.
32 Ibid., pp. 292-294.
wonderful crops on the cactus sods northwest of the Cypress Hills. He concluded that ploughing increased the effectiveness of the rainfall. It is noteworthy, however, that similar ideas were being voiced on the American agricultural frontier at that time. As American farmers pushed beyond the Mississippi Valley onto the Great Plains in the post Civil War years, there was a widespread belief that precipitation levels in the area were rising with the migration. This notion that rainfall was increased by breaking the land was clearly enunciated and defined by the distinguished Nebraskan scientist, Dr. Samuel Aughey, in 1880. Aughey stated that the cultivation increased the soil's absorbing power, thereby causing an improvement in climate and an increase in rainfall. Put quite simply, as one of Aughey's associates wrote the following year, "Rain Follows the Plow". The actual influence of this notion upon Macoun's work is uncertain. The botanist was busy making his discovery at Setter's farm at the time of Aughey's writing. In Manitoba and the Great North-West, however, he declared that "much of the southern district ... will


34 Ibid., p. 186.
yet be known as the best of wheat lands. Nothing is needed
to prove this but the plough." He also used the example of
the "practical Yankee" to reinforce his argument for the settlement
of the open prairie.

Professor Macoun's evaluation of Western Canada's
potential was further influenced by his own preconceived view
of the region and its importance. At the time of his explorations,
the concept of a vast, treeless desert in the American Trans-Mississippi
West had been completely reversed. With growing pressure to expand
during the immediate post Civil War years, American national
energies focused on the occupation of the prairies. Their bias
was a desire to settle and cultivate the Great Plains. This new
concern influenced men's perceptions. Americans in the 1870's
were no longer prepared to accept the idea of desert in the heart
of the continent. Consequently, to support the farmers's battle
with this new environment, the Great American desert became known
as the Great American Plains — what was termed as "an imaginative
conquest". Men's illusions about a new environment were more

35 MACOUN, Manitoba and the Great North-West, p. 291.
36 Ibid., p. 294.
37 H. N. SMITH, Virgin Land. The American West as Symbol and
38 Ibid., p. 179.
important than the real geography of the land itself.

It is doubtful whether John Macoun was prepared to see aridity or any other serious drawback in Western Canada. He was more concerned with extending fertility over the region. While crossing the prairie interior from Fort Garry to Edmonton in 1872, Macoun was greatly impressed by the country's richness and had difficulty in expressing his delight and amazement. This infatuation with the fertile belt was soon broadened to include the Peace River district. Reporting on his findings during the 1875 Selwyn expedition, he confided:

It would be folly to attempt to predict the appearance of the country as it was so much beyond what I ever saw before that I dare hardly make use of truthful words to portray it...39

Two years later, before he had seen the southern plains territory, he announced:

None of the prairie country except that south of the Missouri Coteau, is naturally so deficient in rainfall to prevent forest growth.... Extend the area of forest land and the rainfall will increase.... It is to be doubted, however, that any deficiency exists.40

40 MACOUN, "Sketch of That Portion of Canada...", p. 334.
When he eventually explored the grasslands in 1879 and 1880, he lauded them (Horetzky, Some Startling Facts, p. 43.) aptly remarked: "Since writing the above, Mr. Macoun has gone forth in search of more acres.... It cannot...be doubted that the Dominion will be further enriched by many more millions of acres. It may be taken for granted that another scientific adjustment of the map will be in order, and that much of the arid, cactus region north of the boundary line will be forever obliterated to make room for the countless prospective homesteads".

Thus, in every region Macoun had examined, he was convinced that the physical disabilities could be overcome or simply dismissed.

This tendency to praise each region as it was explored was a result of the Professor's visions of empire. The philosophy underlying Macdonald's National Policy with its expansionist, nation building programs was mirrored in the botanist's work for the government. His reports and commentaries continually stressed the abundance of natural resources available for use in Canada's interests; resources that would make the young Dominion a powerful arm of the British Empire. (University of Saskatchewan Archives and Special Collections, John Macoun letter, Macoun to the Deputy Minister of the Interior, May 12, 1880.)
he urged:

...we should be the means of enlightening the world as to the extent of the resources of the "Great North-West", and in so doing, possibly as acting as special agents, fulfilling the beneficient intentions of the all-wise Creator.43

At the same time, it was important to reach Englishmen and have them support what he said or published. He realized that the statements of Englishmen about the Western country carried weight among their kind, while those of Canadians were discounted.

He conveyed this insight to William Van Horne in 1888, then Vice-President of the CPR:

As you are aware I am enthusiastic about our noble Western country and for years have advocated its claims. Prior to 1884 I had discovered that Englishmen (I am Irish) put faith in the statements of other Englishmen and so in that year I carefully coached a number of the gentlemen and they have been giving their idea of our North-West, in many ways, ever since. Two years since in London I went through the same performance and it took well. We had hosts of professors before our maps who aired themselves to our advantage.44

Macoun was truly an ambassador of the Canadian West.

These ideas of the North-West's unsurpassed fertility and Canada's future as a great agricultural nation were brought together in Macoun's massive book, Manitoba and the Great North-West.45 A compilation of the greater part of his resource

43 MACOUN, "Notes on the Physical Phenomena...", p. 152.
knowledge and general thoughts about the country, the book emphasized the potential of the southern plains over that of the fertile belt. Here, the settler would experience a fresh start:

A look over a field of growing grain is all that is necessary to tell the practical man that here is a land with untold wealth in its soil, and as the life giving breeze fans his cheek, he feels that here life means an unending pleasure. The blood courses through his veins as it did when he was a boy, and he is young again in spirit if not in years. The sensation is irresistible, and all men feel never to be forgotten pleasures as they gaze on the waving fields of grain and prairie grass. It is not too much to say that everything is instinct with life.46

He would also become an invaluable element in the achievement of a truly transcontinental nation. Macoun prophesied:

Want, either present or future is not to be feared, and man living in a healthy and soul invigorating atmosphere will attain his highest development, and a nation will yet arise on these great plains that will have no superior on the American continent.47

This vision had a great impact on the imagination.

Finally, Macoun was motivated in his evaluation by a pompous self-righteousness. He strongly felt that he was right and doing a great service to Canada by revealing the truth about the North-West country. He could no more quietly accept the contrary views of another observer than could any

46 MACOUN, Manitoba and the Great North-West, p. 219.
47 Ibid., p. 264.
of his contemporaries. It was a period of intense professional rivalry. Writing to Sandford Fleming concerning a paper by N.W.M.P. Commissioner French, he declared:

I utterly dissent from Col. French in everything except his remarks on the country in the vicinity of the Boundary.... I think I see my way to annihilate French. I will touch him on his want of knowledge and also on his want of honesty. I would like very much to know where he crossed the prairie.

This letter was written almost a year before the Professor's first prairie exploration.

A large part of Macoun's criticism was directed against Captain John Palliser. The Captain's general conclusions on the potential of the southern grasslands clearly contradicted the Professor's findings. Macoun, however, remained respectful of Palliser's work during the 1870's, arguing that:

...the southern part ... was set down, or assumed, to be arid and of slight value; an opinion still generally prevalent and mainly fostered by writers whose views have been based on a misinterpretation of Captain Palliser's remarks.

A few years later, with his growing prominence and pronouncements on the great worth of the prairie country, such a tolerant stand on Palliser's findings was neither possible nor necessary and he

48 PAC, Sandford Fleming Papers, Macoun to Fleming, May 20, 1878.
49 MACOUN, "Notes on the Physical Phenomena...", p. 152.
viewed the explorer with contempt. In Manitoba and the Great

North-West, Macoun sarcastically noted:

On the Souris Plain, both east and west of Turtle
Mountain, the early explorers found short grass
and little rainfall and called it a desert.
Practical men break up the dry and apparently
sandy soil and produce crops that astonish the
world. Today South-Western Manitoba is called
the garden of the province; five years since it
was supposed to be a barren ir reclaimable waste.50

This disdain for Palliser's work achieved its full expression
in his autobiography, 40 years later.

John Macoun's outlook on the potential of the North-West
did not provoke a storm of criticism. With the publication of
his findings, debate over the North-West was intensified to an
extent. Charles Horetzky, who had remained an enthusiast of the
Peace River district and a northern rail route since 1872, published
a pamphlet questioning Macoun's methods of observation, as well
as his estimates. Ironically, the surveyor also used the botanist's
conclusions to support his own contentions.51 Henry Youle Hind,
one of the few qualified men who could challenge Macoun's views,
also published a book52 disclosing his correspondence with

50 MACOUN, Manitoba and the Great North-West, p. 52.
government officials on the matter. His letters, however, were pervaded with insinuation and invective and ignored.\(^{53}\)

Generally, Macoun's statements were accepted, even welcomed. With the land transfer in 1870, the former domain of the Indian and fur trader became the agricultural frontier of the newly created Confederation. The land awaited the farmer's plough. Concurrently, modest prospects gave way to a growing optimism for the North-West. The debate no longer revolved around the existence of good or bad land but became a question of where the most fertile tracts were located.\(^{54}\) Canadians wanted the hope of something bright and prosperous held out to them.

Macoun's endorsement of Western Canada's capabilities was echoed "by a surprising number of books, pamphlets, newspapers and maps all professing to give a true and correct account".\(^{55}\)

As early as 1870, A. J. Russell, Inspector of Crown Timber Agencies

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53 Hind (Ibid., p. 11) referred to Macoun's pronouncements as "the one sided speculations of the incompetent amateur, or the grosser perversions of the unscrupulous charlatan...". W. L. Morton (personal communication, May 12, 1976) believes that such criticism was largely motivated by a bitter, professional jealousy.

54 WARKENTIN, "Steppe, Prairie and Empire", p. 124.

in Canada, had suggested that the value of the South Saskatchewan country might have been underrated.\textsuperscript{56} In the same year, the translator's introduction to Archbishop Tache's book, \textit{Sketch of the North-West of America}, apologised for its pessimistic outlook:

The deep interest which now attaches to everything connected with the North-West Territories, induces the Translator to hope that this work may not be unacceptable to the public.\textsuperscript{57}

These books were followed by the publication of volumes of material throughout the 1870's and 1880's dealing with the region's resources and capabilities. The West was viewed as the growing point of the Canadian nation, a region promising prosperous agricultural communities.\textsuperscript{58} Unfortunately, most people who sought to popularize the North-West gave little indication of the complex problems involved.\textsuperscript{59}

John Macoun's assessment of Western Canada's potential was therefore the product of several interrelated factors and presented a very appealing picture. Yet, it was not chiefly responsible for the Canadian public's great hopes for the region.

\begin{itemize}
\item \textsuperscript{56} A. J. RUSSELL, \textit{The Red River Country, Hudson's Bay and the North-West Territories Considered in Relation to Canada} (Montreal: G. E. Desbarats, 1870), pp. 43-45.
\item \textsuperscript{57} TACHE, \textit{Sketch of the North-West of America}, translator's introduction.
\end{itemize}
The general optimism of the period was already in existence and mirrored in the Professor's work. These great hopes, however, needed to be substantiated. The fertile belt and Peace River district had their supporters, but Macoun was the first man to suggest that all of the Canadian North-West, particularly the southern grasslands, was fertile. Consequently, his work was readily accepted and acquired an authority that few other scientific investigators have enjoyed. For better or worse, his evaluations figured prominently, adding to the enthusiasm surrounding the Canadian West.
Chapter Six

IT WAS HE

Macoun and the Route of the CPR

It was he, perhaps more than anyone else, who eventually convinced the Government, the public at large, and, finally, the men who built the Canadian Pacific Railway, that Hind and Palliser were wrong — that the land to the south of the Saskatchewan River was not an arid belt but a fertile plain. In doing so he helped change the course of the railway and thus, for better or for worse, the very shape of Canada. It is possible that the South Saskatchewan farmers, eking out an existence along the drought-stricken right of way during the 1930's, might have cursed his memory, had they been aware of it.


John Macoun's emergence as an expert on the North-West's potential was a direct outcome of the Canadian government's desire to open the region to agricultural colonization. His various, special assignments throughout the 1870's and into the 1880's attempted to evaluate the suitability of Western lands for cultivation and thereby help determine the best route for the Canadian Pacific Railroad. What was the actual significance of Macoun's work on the course of settlement and development in Western
Canada? Did his assessments affect the findings of the land
surveyors or the method of disposing lands? How did his enthusiastic
statements figure in the building of the railway, particularly
the route selected? Finally, what consequences did Macoun's
work hold for the individual settler? Were his views on the
capabilities of the prairie lands followed, and if so, what were
the immediate results?

In 1869, when Canadian land surveyors began their work
in the North-West, it had been assumed that the lands of Palliser's
and Hind's fertile belt were most likely to be settled.¹ Town-
ships were surveyed west of Red River along the Assiniboine towards
the North Saskatchewan. Yet, as these operations progressed they
tended to prove that the area of arable land was much greater
than previously estimated. Lindsay Russell, Surveyor General of
Dominion Lands, reported in 1879:

Districts hitherto roughly classified as inferior,
prove to be but partly so, and those defined as
fertile areas, have their limits more extended the
fuller our information becomes.²

According to the official history of the Surveys, they eventually

¹ T. R. WEIR, "Settlement in South West Manitoba, 1870-1891",
² CANADA. Sessional Papers, 1880, n. 4, Report of the Department
of the Interior for 1879, part ii, p. 6.
"settled the question of adaptability of the larger part of the country as a field for successful farming practices." 

Macoun's role in these developments is a moot question. 

The Dominion Lands Branch was cognizant of his findings, accepting them wholeheartedly. In briefly noting the findings of the Professor's 1880 expedition, the Report of the Department of the Interior observed:

In fact, the portion of the so-called American desert which extends northerly into Canadian territory, is proved to have no existence as such, for in the very worst parts of the country many tracts of good soil were found, and almost invariably the grass was rich and nutritive offering excellent facilities for stock raising.

The official history suggests that Macoun's exploration corrected many erroneous ideas about the potential of the southern region.

That his ideas effectively determined the findings of subsequent evaluations of the region by Survey members, nevertheless, is doubtful. Surveyors, through entries in their notebooks, also played a vital, independent part in defining the physical resources of the region. They not only measured the land but were required

4 Warkentin ("Steppe, Prairie and Empire", p. 125.) attributes a considerable impact to Macoun's interpretation.
6 DENNIS, "A Short History of the Surveys...", p.22.
to provide a detailed, systematic description of its geology, climate and vegetation. Although there is little indication of the criteria used in these judgements, their favourable reports indicated that the southern district was much better than expected and that a large part was suitable for settlement:

As in previous years, the information obtained from the surveys tends more and more to contravert the idea held, that there exists a large area with sharply defined limits, of what was deemed relatively a desert or barren land ... by far the greater proportion ... has turned out to be specially fitted, both by fertility of soil and by the nature of its surface, for agricultural occupation.

If anything, the surveyors performed a great service to Macoun by verifying his views and demonstrating that his estimates were not unique.

As for a possible influence on the nature of the survey system, Professor Macoun's findings were not responsible for limiting farm size. The details of the Canadian survey system and homestead policy were formulated almost immediately after the land transfer. Canadian officials were very conscious of the need to make the newly acquired territory competitive with the American frontier. This concern was reflected in the formal legislation in 1872. The American survey system was adopted with a few minor

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8 CANADA. Sessional Papers, 1882, n. 18, Report of the Department of the Interior for 1881, part i, pp. 4-5.
modifications, together with a homestead program based on 160 acre land grants. Thus, the method of occupying the land had already been devised and was in force at the time of Macoun's first Western exploration.

The Professor did, however, have an indirect impact on the application of these policies. His statements on the fertility of the southern plains (as well as those of surveyors) suggested that the standard 160 acre allotment for homesteads was appropriate in grassland areas. His work confirmed federal land policies when actual conditions called for larger acreages and related special farming techniques. Settlement regulations consequently remained unaltered until the experience of the settlers proved the need for different arrangements in the southern plains than were enforced in the fertile areas.

John Macoun's part in the building of the transcontinental railway was largely limited to the use of his idea that the North-West had great potential. At the time of the 1878 federal election, the location of the more important fertile tracts of the

North-West and hence the best route for the rail line had been a matter of debate in the House of Commons. Despite their piecemeal construction policy, the Mackenzie government favoured a route along the North Saskatchewan and through the Yellowhead Pass. It had been the long established policy of the Conservatives, on the other hand, to adopt a more northerly route for the main line through the highly praised Peace River district.\(^{11}\) This assessment of the resource potential of Western Canada changed dramatically with the Conservative resumption of power.\(^{12}\)

Several weeks before Professor Macoun was dispatched to explore the prairie region in the spring of 1879, the new Macdonald administration began to emphasize the overall fertility of the Western Interior. Dr. Charles Tupper, Minister of Railways and Canals, informed the House of Commons, May 10:

We believe that, today, being in possession of increased information beyond that which we possessed five years ago, and from the opinions expressed by the authorities who are well able to judge, we have vast regions only partially explored which are not second to any lands in the West. We


\(^{12}\) see Chapter Four, p. 69.
believe we have there the garden of the world. We believe we have something like 180,000,000 acres of land which, in regard to fertility and grain growing qualities, are equal to any on the face of the globe.\textsuperscript{13}

Such claims were made necessary by the Conservative scheme to finance the railroad by giving a twenty-five million acre land grant to its builders. They were not simply recognizing Macoun's early estimates. The Conservatives wanted to attract potential railroad capitalists and investors by the offer of a land grant and the promise of wonderfully fertile lands would greatly facilitate this task. Tupper was aware that the Liberals had unsuccessfully offered even larger grants during their term of office. He also realized that Western lands, no matter how good, would be valueless without a railway.\textsuperscript{14} Findings such as those of Macoun were therefore employed by the wily minister to demonstrate that the potential profit from railroad construction was very great.

When Professor Macoun returned from his prairie exploration later that year, many members of the House of Commons continued to doubt his 1877 estimates. He bitterly remarked:

\begin{quote}
It is needless to say that owing to political necessity or a state of chronic obliviousness the discussions on the Pacific railway resolutions
\end{quote}

\textsuperscript{13} CANADA. Debates of the House of Commons, v. 7, May 10, 1879, p. 1893.
\textsuperscript{14} Ibid., pp. 1879–1893.
brought out the fact that a large section of the House of Commons doubted, or affected to doubt, my carefully compiled report on the extent and fertility of the country.  

The Liberals, who now supported the Peace River district for the rail line, seriously questioned the fertility of various sections of the Yellowhead route. One of Mackenzie's speeches so incensed Macoun that he called out to the Opposition Leader from the visitors' gallery. Even the Prime Minister "scarcely allowed himself to accept as fact that which was so ardently desired...".  

Macoun's attendance at the various sessions dealing with the Pacific railway in the fall of 1879 was consequently the source of a general disillusionment with politicians. Its effect on his exploration of the Great Souris Plain the following summer is uncertain but, given the Professor's character, he probably tried to vindicate himself.  

Support of Macoun's statements came largely from Tupper. Before the final report of the 1879 field parties had been released, the minister left little doubt as to its findings. He reported March 3, 1880:  

I believe that information will be found to be of a very satisfactory and assuring character.

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15 MACOUN, Manitoba and the Great North-West, p. 612.  
16 Ibid, p. 612.  
It will be found that, instead of having overrated the character of the country, the most sanguine views in relation to the fertility of the Great North-West will be more than borne out by the positive information we will be able to lay before the House on the subject.\(^\text{18}\)

A month later when the report was presented before the House, Tupper first underlined the need for favourable views about the Western country for the success of the railway venture. He then confidently quoted Macoun's 1879 figures to back up his earlier assertions, giving the impression that the Professor's findings were irrefutable.\(^\text{19}\) Privately, however, the reliability of Macoun's estimates was secondary to the fact that they coincided with Tupper's contentions. Although the minister did briefly question Macoun before making his April speech, he also "encouraged [him] to do [his] duty and stick to what [he] conceived to be the truth."\(^\text{20}\)

Thus, it was not so much Macoun's findings as it was Tupper's use of them that made him such a central figure in the railway debates.\(^\text{21}\)

Whereas Macoun had marshalled the work of others to support his

\(^\text{18}\) CANADA. Debates of the House of Commons, v. 9, March 3, 1880, p. 391.
\(^\text{19}\) Ibid., April 15, 1880, pp. 1409; 1407.
\(^\text{20}\) MACOUN, Manitoba and the Great North-West, p. 612.
\(^\text{21}\) "Now we find that Professor Macoun who is one of the most able explorers and one of the best qualified men to form a judgement upon the matter..." CANADA. Debates of the House of Commons, v. 10, December 14, 1880, p. 73.
arguments, Tupper had used the Professor's work for essentially the same purposes.

The relationship between Macoun and Tupper obscures the actual influence that the Professor's statements had in the framing of the railway contract. When the railway Syndicate demanded that their 25 million acre grant consist of lands 'fairly fit for settlement', Members of Parliament viewed the clause with little apparent concern.²² Was it Macoun's findings or Tupper's rhetoric that convinced them that there was enough good land in the West to allow the Syndicate to pick and chose? Similarly in the Railway Act (February, 1881) the land grant was to be secured within the fertile belt, "that is to say the land lying between parallels 49 and 57 degrees north latitude".²³ Who was responsible for this new definition? Macoun's work obviously provided the scientific justification for these terms but to many politicians he was little more than an enthusiast.

There is also much confusion over Macoun's exact role in the location of the Canadian Pacific Railway. Early plans for

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²³ CANADA. Statutes of Canada, 44 Victoria, 1880, Chapter 1, p. 11.
the railroad, as previously noted, had contemplated two possible northern routes: the Yellowhead or Fleming route and the Peace River route. By 1880, however, when the Syndicate assumed control of the project, it was practically a foregone conclusion that the railroad would pass via the fertile belt to Edmonton and thence through the Yellowhead Pass to Burrard Inlet on the Pacific.

A Conservative Order-in-Council, dated October 4, 1879, had recommended this route. It was thus very surprising when the Syndicate decided in the spring of 1881 to build the route directly westward from Winnipeg through a more southerly pass.

Several reasons have been advanced to explain this last minute abandonment of the Yellowhead Pass in favour of the Kicking Horse. Most accounts, nonetheless, suggest that John Macoun's re-evaluation of the prairie grasslands' potential was a consideration in the decision to bring the main line south.

The newly proposed rail line was not simply placed a short distance away from major settlements but located well to the south of any

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24 WILSON, op. cit., p. 119.
26 In The Last Spike (Toronto: McClelland and Stewart Limited, 1972) Pierre Berton subtitles a section of Chapter One: "How John Macoun altered the map".
previously proposed route and through a sparsely settled region. The railway company was also granted acreages within a 48 mile belt of the main and branch lines to subsidize the costs of construction. The Syndicate would seem to have believed that the southern plains were capable of large scale agricultural development.

Finally, at J. J. Hill's invitation, Macoun met a few Syndicate members in St. Paul at roughly the same time that the relocation of the route was announced.

In actuality, Macoun's revelations played no part in the selection of the main line route. If the Syndicate genuinely believed his claims, why did they insist on the 'fairly fit for settlement' insurance clause? Revenue from the development and sale of subsidy lands was essential to the railway's financial success. Indeed, great difficulty arose in trying to locate acreage suitable for the land grant requirement within the 48 mile belt. The builders refused to accept any large amount of land west of Moose Jaw and eventually secured the required acreage in areas far removed from the rail line.27

As for Macoun's meeting with Syndicate members in June, 1881, he did not convince them that a southern line was practicable for the simple reason that the route change had already been determined. The Professor's account of the meeting does, however, hint at the railway men's motive for their route selection. When Macoun arrived at Jim Hill's office, the men were debating whether the rail line could proceed westward from Moose Jaw or turn northward to Battleford and proceed through the Yellowhead Pass; they had brought the rail line south without being certain of a suitable pass through the mountains. Macoun was thus summoned to St. Paul because of his explorations in southern Alberta in 1879 and was quizzed on the suitability of the Bow River Pass for a rail line. Jim Hill then pounded the table, declaring:

Gentlemen we will cross the prairie and go by the Bow Pass if we can get that way.... I am engaged in the forwarding business and I find that there is money in it for those who realize its value. If we build this road across the prairie, we will carry every pound of produce that the settlers wish to sell, so that we will have freight both ways.

29 Ibid., p. 185.
Herein lies the key to the Canadian Pacific Railway strategy.  

The decision to locate the main line through the southern grasslands was based on the determination of the railway men to meet the threat posed by the close proximity of the Northern Pacific Railway and thereby secure the traffic of the of the Canadian West for their own line. The northwesterly drive of American expansionism during the 1860's had been one of the principal factors compelling Canada to acquire and settle Rupert's Land. Yet, at the time of the formation of the CPR Syndicate, economic penetration of Western Canada from Minnesota, Dakota or Montana remained a most serious threat. The Northern Pacific, first under Jay Cooke and then Henry Villard, sought northward connections, continually maintaining and updating contingency plans to invade Canadian territory. Members of the Syndicate, given their experience with the St. Paul, Minneapolis and Manitoba Railway, were probably aware of this policy and its implications. Since the main line could only serve or control a limited area, they consequently decided to crowd the American

30 I am indebted to Dr. T. D. Regehr for helping me with the knotty problem of the CPR route selection. He guided me to several important letters dealing with the matter.
boundary as closely as possible in order to restrict the territory of the rival Northern Pacific. Originally then, the railway men wanted to build through the Crow's Nest Pass. The federal government, however, insisted that the road be built at least 100 miles north of the International boundary for security reasons. Roger's Pass offered a compromise. It is questionable whether the CPR would have turned north if this pass had not been discovered. This attempt to exclude American inroads into the Canadian West was further necessitated because the CPR was intended to be an all-Canadian route running through the wilderness north of Lake Superior. Western traffic had to be secured to support this otherwise useless section. George Stephen, President of the CPR, emphasized this point to Prime Minister Macdonald when he explained

"Were it not for the objections raised by the Government of that day, the Canadian Pacific Railway would originally have been built through the Crow's Nest Pass. It was thought by the Government, however, that it brought the Transcontinental line too close to the International frontier, and as a consequence the present pass known as "Kicking Horse" was utilized...."

PAC, Shaughnessy letterbook, n. 51, p. 785, Thomas Shaughnessy to Sir Oliver Mowat, April 14, 1897. "When the Canadian Pacific Company entered upon its undertaking in 1887 its intention was to survey the Crows Nest Pass with a view to carrying the line that way, but the Government would not consent to this because it would bring it so near the International Boundary that in the event of war with the United States the line could be easily cut, and it was with difficulty that the Government could be induced to the building of the line as far south as the Kicking Horse." PAC, Van Horne letterbook, n. 52, p. 118, Van Horne to J. P. Edgar, October 2, 1896.
the Syndicate's desire for a monopoly clause:

As to the question under discussion, do not forget that we are contracting to build and operate a road from Lake Nipissing to Port Moody with a branch to Thunder Bay and Emerson and having once entered into the contract we mean to execute it to the letter. Any man or Co., undertaking such work and incurring such a responsibility has to look a long way ahead and try to forecast the future as fairly as he can. Now what do you think would be the position of the CPR or of the men bound to own or operate it, if it were tapped at Winnipeg or at any other point west of it by a line or lines running towards the U. S. boundary. What would, in such a case, be the value of the CPR line from Winnipeg to Ottawa? No sane man would give one dollar for the whole line east of Winnipeg. I need not say more on this point as it must be clear to you that any and every line south of the line of the CPR running towards the boundary line must be owned and controlled by the CPR. Otherwise the CPR would be strangled.33

The alternative, the extension of water rates to Winnipeg from Thunder Bay, could not guarantee the same effect.34 If the section north of the Great Lakes was to be a revenue producing one, all Western traffic would have to pass east of Winnipeg by the CPR. Stephen asked Macdonald:

How do you suppose the line north of Lake Superior can be maintained and operated if the N. P. succeeds in getting control of the traffic of Manitoba or what is practically the same thing forcing down the rates to a point which leaves no profit? The N. P. have no line north of L. Superior to sustain, and as I have always told you without a through line north of Lake Superior there would be no CPR. The line north of Lake Superior cannot be operated unless it can get the traffic, and reasonably fair rates.35

34 The American rail lines were potentially competitive in Western Canada because water rates were applicable at St. Paul, Minnesota.
The CPR builders, therefore, thought primarily in terms of national strategy and not local settlement. They would have built across the southern grasslands even if the area had been poorly regarded, relying on branch lines north into the fertile belt.

The location of the CPR main line had great implications for John Macoun's work. Before the route had been finally determined, the Professor already believed in the agricultural potential of the prairie region. Thus, when the railway men built where they did, it was a genuine coincidence but one that suggested that Macoun's revelations had been responsible for the Syndicate's action. Most people who had been connected with the railway locational question through the 1870's were astonished at the abandonment of the more popular and more certain Yellowhead route. Searching for an explanation, they fell upon Macoun's pronouncements which had been given government support by Tupper and now happened to provide the agricultural justification for the chosen route. The railway builders were seen to have followed his advice as concerned businessmen.\(^{36}\)

John Macoun did much to foster this belief that his work had accounted for the main line location — a belief that he himself personally held. In *Manitoba and the Great North-West*, he popularized the southern plains at the expense of the fertile belt. He wrote:

> It is now known that the prairie lands are better suited for immediate settlement, and less subject to summer frosts, which prove so injurious to late sown grain on the more elevated and moister sections of the country. All the land on the Saskatchewan is not equally suited for agriculture, but there is no tract where there will not be continuous settlement, and when we speak of summer frosts and too much water and muskeg, and late harvests, we do not wish to be understood as being afraid of these, but only to state that these drawbacks exist.\(^{37}\)

This distinction between regions went far beyond his earlier doubts about the North Saskatchewan country and should be seriously questioned.\(^{38}\) Unfortunately, such passages further implicated Macoun in the re-routing of the CPR line.

Because Macoun heralded the prairie grasslands as embracing the best farmlands, it is also assumed that he had a great impact on the settlement of the southern district. Macoun's

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\(^{38}\) Roe ("Early Opinions on the 'Fertile Belt'...", p. 149) condemns Macoun outright: "...he offended in the light of knowledge, history and experience. Among propagandists his utterances were trumpeted as science; I doubt whether they were anything more than propaganda among scientists."
part was not as important as is sometimes imagined. Granted, the location of the CPR main line did much to support Macoun's contention. The route change focused activity in the near empty prairie region for the next twenty years, away from established settlements of the fertile belt:

...the adoption of this southern route across the prairies...meant that the Canadian Pacific Railway did not have anything like the effect it might have had on the northward advance of Canada's frontiers.... The Northwest, for practical purposes became replaced by the West. 39

Prairie settlement and development became the immediate task of the young Canadian nation, a task that Macoun strongly supported. Yet despite all his powerful promotional skills, the mass invasion of the southern prairies that he envisaged did not occur.

In response to the CPR construction boom of the early 1880's, settlers poured across the Great Souris Plain and occupied farms beyond Palliser's limit of true prairie land. This first advance, however, was largely restricted to a long thin line following the railroad. Very few settlers at the time of the rail line completion in 1885 had passed up the wood and water of the higher lands in favour of the open prairie or ventured onto the

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semi-arid lands west of Moose Jaw. By the turn of the century, there was a greater population along the North Saskatchewan than the rail line, demonstrating a definite bias in favour of the fertile belt. Settlement spread across this park belt and northward before there was any serious penetration of the prairie lands. By 1921, most of the lands available for settlement in the Western Interior had been occupied.

Professor Macoun, nevertheless, was responsible for encouraging men beyond the danger zone of aridity with false ideas. The settlers that chose to occupy farms along the CPR main line did so under the delusion that the land was richly fertile, easily farmed and blessed with an exceptional climate. They pursued slovenly cultivation techniques that only aggravated the basic problems of climate. Moreover, because Macoun's opinion of the southwest's agricultural worth was exceedingly optimistic, the government saw little need to assist settlers at the pioneering stage. Many anxious and disillusioning moments, especially during

40 JOHN WARKENTIN, "Western Canada in 1886", HSSMT, series iii, n. 20, 1963-64, pp. 99-100.
41 MACKINTOSH, Prairie Settlement, p. 59.
42 WARKENTIN, "Water and Adaptive Strategies...", p. 64.
43 WARKENTIN, The Western Interior, p. 247.
the 1886 crop failure, were the consequence.

Generally though, the settler was the greatest obstacle, as well as the greatest asset, to the successful settlement of the open prairie. While the inhabitant of the northern parkland areas found himself momentarily in a backwater, the farmer in the subhumid plains faced a situation limiting the value of his traditional farming experience. Indeed, the settler's concept of good agricultural land actually complicated the difficulties of the prairie interior. To the farmer with experience in Eastern Canada or Europe, wood, water and soil were the successive prime requisites to settlement. He questioned the usefulness of the treeless plain, preferring to settle in bush country comparable to regions that he had already farmed. He also ignored climatic peculiarities of the region, making no allowance for the application of dry farming techniques. Agricultural settlement of the southern plains in the 1880's therefore suggested:

...how men from humid areas struggled with the task of trying to grasp the agricultural potential of the prairies.

46 HARRIS, Canada Before Confederation, p. 286.
Professor Macoun had claimed that the region had potential. It was the settler, however, through the application of traditional farming techniques, who was primarily responsible for his own success and the future of the region.47

These first attempts to settle the southern plains eventually produced solutions to the problems imposed by the region's geographical features and represented the first assessment or revision of Palliser's and Macoun's findings. The farmer came to realize that open prairie made for better wheatland. Partial or complete crop failure also demonstrated to him the necessity of summer fallowing and of early maturing wheat. The farmer on the open prairies was forced to become a practical agriculturalist and quickly learned that cultivation of the land, although possible, was hazardous.

John Macoun's field work thus played a relatively minor role in the surveying of Western lands, the location of the transcontinental rail line and the farming practices of the prairie settler — a surprising legacy in light of his prominence during

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WARKENTIN, "Steppe, Prairie and Empire", p. 127.
the 1880's. Yet, Macoun became a recognized expert on Western Canada because of his enthusiastic endorsement of the region's capabilities. This enthusiasm was also his major contribution to the great task of settling and developing the region.
(National Museum of Canada)
ASSISTANT DIRECTOR, GEOLOGICAL SURVEY OF CANADA
Chapter Seven

WRONG IMPRESSIONS

Macoun’s Later Years

After I am dead and gone and many of you also, this northern country will be a glorious country filled with happy people growing enormous quantities of wheat and other products. That is just as true as that the sun is shining today; there is not the slightest doubt about it. It is our wrong impression that is causing all our trouble. I am getting out of my wrong impressions, and I want you, gentlemen, if you have any, to get out of yours also.

John Macoun, Evidence before Select Committee on Agriculture and Colonization, December 18, 1906.

While the first wave of settlers were struggling on the southern plains of Western Canada in the mid 1880's, John Macoun embarked upon his new career with the Geological and Natural History Survey of Canada, an appointment having many results.

The Professor, very much concerned with stimulating public interest in natural science, became deeply involved in the activities of the Ottawa Field Naturalists' Club¹ and gave much time and attention

¹ The OFNC was essentially an educational institution initiated to study the natural history of the Ottawa locality. Summer work took place in the field by regular monthly excursions, while classes on nature study were conducted in the winter. Expert leadership was provided for these activities by officials connected with the Geological Survey or other government departments. The club also undertook a special evening lecture program, publishing monthly transactions on club
to the accumulation and arrangement of natural history material for museums. He also continued his pioneering botanical work, becoming more confident of his own capabilities and the service he could offer the country. He expanded his collecting efforts into all branches of natural history and undertook a comprehensive survey of the relatively unexplored areas of Canada, particularly the Rocky Mountain region.

John Macoun's great interest in Western Canada and its future, however, never waned. During his 30 year career with the Survey from 1882-1912, he performed several special assignments in the North-West, ranging as far north as the Canadian Klondike. Each time, he returned more thoroughly convinced of the great wealth and potential of the country, favouring even those regions that he had once slighted. His enthusiasm had no limits except the boundaries of the region itself.

In 1894, for the first time since his survey of the Manitoba lake region, Professor Macoun returned to explore the activities and new advances. The OFNC had an important influence in the development of Canadian natural history and owed much of its early success to men like Macoun.

Macoun accompanied the British Association, an English scientific society, across Western Canada by train in the fall of 1884.
prairies for the purposes of his natural history survey. He and his assistant, William Spreadborough, collected along the rail line between Medicine Hat and Lethbridge, among the Cypress Hills, but primarily at Crane Lake, an observation point for the spring bird migration. The result of their efforts was discouraging. Throughout the better part of June, the weather had been exceedingly hot and dry, adversely affecting the area's natural life. There was an almost total absence of waterfowl and most plant life on exposed hills and the open plain had withered up — unmistakable signs of drought.

That winter, the House of Commons was greatly concerned with the apparent drying up of the country and began to question the wisdom of earlier decisions to settle the region. And it was under government instructions to determine the cause of the drought that Macoun returned to the same general region in the 1895 field season. At the beginning of his investigations as he proceeded from Moose Jaw to Old Wives Lake, the Professor found the effects of the drought on the land to be staggering. While camped among

3 National Herbarium of Canada (hereafter referred to as NHC), John Macoun 1894 field notebook, June 3; 5, 1894.
the hills of the Missouri Coteau, he noted:

Drought showed in the seedless grass, the cracked sod and parched earth and the dried up ponds.5

These conditions, according to Macoun, could only be reversed by an average spring rainfall. Saturation of the ground would assure a good harvest and save pasture lands from possible total destruction by fire.6 He reasoned almost desperately:

My data up to now points to 1874 as the counterpart of 1894 and 1882 or 3 as the wettest time. If this data be correct this season ought to be fairly wet. I pray God it may. I have been told that what were lakes three years ago are now dry. The last two years drought finished them.7

The botanist had finally been made fully aware of the inadequacy and variability of precipitation on the southern plains.

Fortunately, for southern Assiniboia and Alberta, as well as Macoun's reputation, the spring rains came. Beginning May 24 and continuing into July, rain showers supplemented by snow storms occurred regularly. The results were overwhelming. Except for a dry section south of the Cypress Hills, the country's appearance steadily improved as Macoun travelled from Old Wives Lake

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5 NHC, John Macoun 1895 field notebook, May 19, 1895.  
6 Ibid., May 20, 1895.  
7 Ibid.
south to Wood Mountain and then along the International boundary
towards Lethbridge. The drought had been broken.

In his subsequent report, the Professor had a much
brighter outlook than at the outset of his expedition, confidently
assuring the government "that the permanent drying up of the country
[was] a myth". He noted that the dry period was but a periodic
change and then outlined the process by which the ponds and lakes
of the region would fill up the following season. His statements
about the region's future, however, suggested that his field
work had had a sobering influence. Macoun described southern
Assiniboia as a difficult country to settle and occupy, an
opinion that is not the contradiction it seems of his earlier
statements about the fertility of the arid country. The same

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8 JOHN MACOUN, "Summary of Botanical and Zoological Work" in
CANADA. Sessional Papers, 1896, n. 13A, Annual Report of
the Geological Survey for 1895, part A, p. 148.
9 Throughout southern Assiniboia and Alberta, Macoun had found
a layer of cracked, impervious clay at the bottom of every
dried-up lake. Rain running into a lake, thus penetrated
the ground immediately. To prevent the water's escape, the
Professor concluded that a normal winter snowfall was necessary.
The snow's melting in spring would close up the cracks and the
lake would fill.
11 see ROE, "Early Opinions on the 'Fertile Belt'...", p. 146.
in 1880 but had been overshadowed by his emphasis on the wheat
growing capabilities of the southern prairie. These cautions
did not mean that the region lacked potential:

With an increase in the number of settlers and
a wider knowledge of the capabilities of the
country Southern Assiniboia will become a valuable
district. As regards its soil and climate, much
of it is suited for agriculture, but my purpose
is to draw attention to the numerous small
streams traversing it and the ease with which
the water could be used for irrigation purposes
and the watering of stock...the time will surely
come when cattle, sheep and horses will be as
plentiful in Southern Assiniboia as they are now
in Southern Alberta. 12

Macoun could not extract himself from the role of enthusiast.

The following field season, the Professor inspected
shelterbelts at the Brandon Experimental Farm and then journeyed
to Moose Jaw to make further observations on the matter of rainfall
and water supply. His findings were beyond his expectations.
Phenomenally heavy spring rains had saturated the soil and filled
the lakes. He consequently declared that his 1895 forecast had
been fully borne out and that enough moisture was ensured for
crop production for the next two years. 13 Macoun continued to lend

13 JOHN MACOUN, "Summary of Botanical Work" in CANADA. Sessional
for 1896, part A, p. 135.
credence to the false impression that agricultural success was simply a question of rainfall and not special cultivation practices. Yet, the experience of 1894 and 1895 would not be forgotten.

From Moose Jaw, the Professor travelled northeast to Prince Albert and made some interesting observations on the climate and the region's potential from the ferns and flowering plants:

...I...am satisfied that 300 miles north of the boundary the climate is as good if not better (especially to the west), than it is at any point on the 49th parallel.... My three season's experience have convinced me that, while the prairie is even richer and more valuable than we believed it to be, the brush and aspen district to the north of it is best suited for immediate settlement, as shelter, which is necessary for comfort is to be found everywhere, and although more labour is necessary to make a beginning, the settler from the first has more conveniences and needs far less capital. The soil is good, there are no droughts, blizzards cannot prevail, water is good, wood is plentiful and farming just as we have it in Ontario will be the outcome of the settlement.14

These comments are not surprising, given Macoun's recent doubts about the southern region, as well as his general belief in the North-West's future. Except for the traverse from Fort Garry to Edmonton in 1872 to discover essentially what was there, this

14 Ibid., p. 136.
exploration in 1896 represented his first detailed examination of the area around Prince Albert. Naturally, he lauded it.

Canada in Macoun's eyes was destined to become a great agricultural nation and each region of the North-West would receive its due recognition once it had been explored by him.

This tendency to praise each region as it was explored was further demonstrated in 1902 when the Professor was dispatched to make a detailed study of the agricultural possibilities of the Yukon. Although in his seventy-first year, Macoun carried out the assignment with seemingly limitless energy and drive, roaming the Dawson area for a month. Upon his return, he reported to the Geological Survey that the long, bright summer days and warm July temperatures combined to produce conditions suitable for the growth of vegetables and some grains. Wheat was presently doubtful but would gradually become acclimatized, as it had around Edmonton.¹⁵ He concluded:

...we are quite safe in predicting a great future for the Yukon district as a producer of everything needed to support a very large population....

With the facts learned last season and my former knowledge of the Peace River country, the Mackenzie River Valley and northern British Columbia, I am quite within the mark when I say that all the land having a suitable soil within this immense area will in the future produce enormous crops of all the cereals, wheat included.16

The Professor was continually adding acreage to his estimate of the land available for agriculture.

On April 17, 1903, Macoun repeated these findings before the House of Commons Select Standing Committee on Agriculture and Colonization. Before doing so, however, he presented himself as the unrivalled authority on the Canadian North-West, intimating that the Committee members were there to listen and learn. He informed them:

I hope before I am through to show you that the North-West is only the entrance to the wonderful country we have got. From Edmonton right up to the Klondike the greater part of the country is suited for settlement, much for the growth of wheat, and an immense extent for the growth of cattle and sheep and horses.17

The Committee consequently had a difficult time trying to separate the exaggerations from the truths in his statements. Indeed, Macoun would not tolerate any questioning of his findings. During the 1903

16 Ibid., pp. 50-51.
field season, his son, James, carefully examined the Peace River district and advised against settlement. It was a "poor man's country". When asked about his son's pessimistic report, the Professor evidently replied, "James was always the cautious sort!"18

Three years later, Macoun was called upon to examine the land along the proposed route of the Grand Trunk Pacific from Portage la Prairie to Edmonton. This assignment was undoubtedly a rich and rewarding experience for a significant change had taken place in the landscape since his last detailed study of the region in 1879. The once unbroken wilderness was now a well settled, grain producing country, particularly the land between Touchwood Hills and Saskatoon. Ironically, Macoun considered the region's development as confirmation of his earlier assessments — assessments that had raised doubts about the region's grain growing capabilities. He reported:

The conclusions regarding the fertility of the soil which I published in 1872, 1879 and 1880 have been practically illustrated by the results obtained by actual experience. At this time it is conceded by all observers that the growth of grain throughout the whole of what was formerly called the "Fertile Belt" is no longer an experiment but an actual fact and can be relied on for all time.19


The Professor had apparently not only forgotten his earlier
misgivings but felt that Palliser and Hind deserved no credit
for their part in first drawing attention to the North Saskatchewan
country.

Later that fall, Macoun appeared before the Committee
on Agriculture and Colonization once again. After assuring the
members that his statements were not perhaps the Gospel truth but
the scientific truth, he stated that the capabilities of the fertile
belt had been seriously underestimated. He also claimed that
parts of the barren lands could be successfully brought under cultivation
and that Canadians as northern people were destined to be a
dominant society:

...let me say this to you as a last word. I am
trying to create interest in that North land, and
I am speaking on this subject because I am getting
to be an old man, and when I am dead and many of
you are dead, the people of Canada will begin to
discover that the North land is to Canada precisely
what Germany was to the Romans. It was hyperborean
climate and supposedly unfit for mortal beings to
live in, and yet to-day Germany is one of the strongest
nations in the world. That is going to be the outcome
of Canada. We have more than half a continent, and
if we can raise first-class wheat and first-class
women, certainly we ought to raise first-class men.

of the Select Standing Committee on Agriculture and Colonization",
appendix 4, pp. 1-3.
21 Ibid., p. 18.
The Committee then adopted a resolution thanking Macoun for his services over the past 34 years; a period that had witnessed his transformation from amateur collector to scientific explorer to enthusiast to visionary.
Chapter Eight

RAMBLER

John Macoun and his Legacy

"Rambler" is dead. The beautiful flowers of the forest, which he loved so well, will never again receive the gentle touch of "Rambler". The flowers among which he spent the greater part of his life will miss him no less than those of our readers who took much interest and received great pleasure from this Department of the Review. Professor John Macoun, "Rambler", died last Sunday morning.


In 1912, at the age of 81, John Macoun retired to Vancouver Island whose climate offered the possibility of year-round collecting and where, in earlier years, he had obtained a great number of species new to science. For the next few years, although partially crippled by a paralytic stroke, the Professor returned to the simple joys that he had first known as an amateur collector. He investigated the natural world of the island, presented his various discoveries to the provincial museum and conducted a column in the local newspaper under the name "Rambler". The last two years of his life were devoted to his autobiography. On his death,
July 18, 1920, at his home in Sidney, B. C., the scientific world mourned the passing of the dean of Canadian botanists. He had been this and much more.

John Macoun was the explorer of a little known Canada. An extremely active figure blessed with a child's insatiable curiosity, he had roamed across the prairies, through the forests and over the mountains of Western Canada at a time when more reliable information of the region's capabilities was urgently required. Throughout all of these explorations, Macoun proved himself to be perfectly at home in the outdoors, usually working from daybreak to dusk. Determined, almost tyrannical, he was extremely confident of the success of his assignments and seemed ready to sacrifice almost everything to ensure that they were carried out. Speaking before a House of Commons Select Committee on the Geological Survey, he had once declared, "There is no such thing as 'can't' in my vocabulary." Finally, the Professor mirrored the sense of connection between theoretical and applied science encouraged among the Survey staff. He combined pure science

\[1\] CANADA. *House of Commons Journals*, v. 18, 1884, "Report of the Select Committee Appointed by the House of Commons to obtain information as to the Geological Surveys", appendix 8, p. 188.
particularly his botanical expertise, with his field experience to determine the potential of the Canadian West for agricultural colonization. Under Macoun and other explorers, the scientific approach became an instrument of government policy and after him was a hallmark of the comprehensive exploration undertaken in mid-Victorian Canada.

John Macoun did not stop here. His Western explorations had thoroughly convinced him that the southern plains were not an irreclaimable desert but that the region would support a large population of agriculturalists. Transcending his surveying activities, he tried to impress upon Canadians that the world's granary lay at their doorstep and was consequently overly optimistic and self-righteous in the presentation of his views. Conversion of the Canadian public, however, was not such a difficult task as Macoun envisaged.

The land transfer and subsequent attempt to occupy the region had given rise to a general feeling of optimism that needed substantiation. Macoun's scientific endorsement of the great worth of the North-West was therefore precisely what the moment called for and he emerged as the unrivalled authority on the region. He became a much sought after advisor, his statements
were used to support various schemes such as the transcontinental railway and he was credited with a great impact on the region's subsequent development. It did not matter whether some of his ideas were shortsighted, partial truths or completely wrong. The general acceptance of such unlikely notions as cultivation increasing rainfall was a testimony to the strength of the confidence of the period. The Professor himself reflected the great hopes of the period in his lectures and writings, as well as his field work. Indeed, his dreams for the region influenced his perceptions of the land's capabilities probably more than his actual investigations.

These comments, however, should not detract from John Macoun's contribution to the settlement and development of the Canadian West in the latter half of the nineteenth century. He was the first Canadian investigator to fully appreciate the importance of the northward extension of summer isotherms and the seasonal distribution of precipitation to the existence of Western agriculture. He was also among the first to emphasize the grain growing and stock breeding potential of the unfamiliar, open plains. Generally speaking, his book, *Manitoba and the Great*

2 SMITH, "Rain Follows the Plow...", pp. 192-193.
North-West, was a storehouse of useful information. Foremost, Macoun should be remembered for emphasizing Western Canada's potential to become the greatest agricultural region in the world.\(^3\) He stirred men's imaginations with his scientifically based arguments that Western lands were uniformly fertile and ideally suited for immediate settlement. His was a genuine and necessary attempt to further the realization of a great agricultural nation on the Canadian prairies.

The Professor's enthusiasm, however, depended upon current interpretations and was no substitute for reality. Once large scale settlement of the North-West began, wide generalizations about the region's possibilities were no longer required but in fact misleading. The settler, particularly along the CPR main line, was confronted with disillusioning agricultural problems and began asking the same questions that the explorations of the 1870's had originally sought to answer. He gradually learned that each locality had its unique set of problems and qualities.

\(^3\) In 1879, Macoun estimated that there were 150 million acres of good land in present day Saskatchewan and Alberta between the 49th and 57th parallels. There were 126.7 million acres in farms in the prairie provinces in 1956. M. C. URQUHART (ed.), *Historical Statistics of Canada* (Toronto: Macmillan Company of Canada, 1965), p. 352.
and that cultivation of the land depended upon the increasing application of science and technology. Determination of the region's future therefore passed from the hands of men such as Macoun to the individual farmer who now realized that Western Canada had the potential of a desert or a garden.4 This change probably accounts in part for John Macoun's relative anonymity today — an unfortunate fate for one of the great scientific explorers and public servants of nineteenth-century Canada.

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4 WARKENTIN, "Steppe, Prairie and Empire", pp. 127-128.
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