

# COAL SEAMS AND LOCAL HISTORY

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IN coal-mining areas the history and characteristics of coal-seams that have been long worked are part of the local folklore and daily conversation.

In the British Isles the tradition of some coal-seams, such as the Ten-Yard Coal of Staffordshire, the Silkstone Seam of South Yorkshire, the Wallsend Seam of Durham, has become a part of English literature and goes back to mediaeval monastic days. Father and son, grandfather and great-grandfathers for generations beyond all but local memory, and even great-grandmothers have worked in the same coal-seam, around which have gathered memories that have become part of local history as deeply implanted in the coal-miner's thoughts as the neighborhood traditions of field and copse, of ancient churches and monuments, of all the ineradicable, instinctive, yet inarticulate affection for his country that lies hidden but burning in the hearts of the men of the British Isles. In none does it glow more stubbornly than in the "coalier".

The miner sees two scenes. When he walks abroad, in the hot sunshine or in the winter snow, he knows that beneath his feet, and sometimes these days beneath his keel, there roars the incessant traffic of the mine, through roadways and passages of interminable length, some silent, lonely and forsaken, some noisy, crowded and lively as the city street. He knows the quip, the lusty jest, the comradely greeting in the dark that are part of the social life of the mine, to which the surface-dweller is an outsider, an uncomprehending and rather pitiful alien to the miner's freemasonry. The miner knows also of the hidden dangers of the mine, of quiet heroism and quick death, but of these he says little and thinks a great deal. He is as the man who knows two languages compared to the man who knows one only. Two facets of one thought are in his mind, and he is richer in comprehension and experience because of his "other-worldly" and two-fold life and labor.

The lonely labors of the coal-miner, a condition less pronounced now than in former generations, have given a contemplative and religious cast to his character, especially to men of

an older generation and men born in the miner's tradition. In these circumstances the scene of the miner's daily toil, the coal-seam in which he works, becomes familiar as a well-known street to the city-dweller, as an ancient pasture to the farmer, or the moods of the sea to the fisherman. Many a miner travelled far from the land of his birth and training keeps in his mind's eye underground scenes that are as much part of memory as the clear brooks he waded and the green hedgerows he robbed in boyhood.

The thickness of the coal-seam, its degree of hardness under the pick-point, the strength of the roof, the nature of the floor, and the habit of the seam as to regularity, inclusions of dirt and stone, the "breaks" and "troubles" which sometimes bother the miner, all these things interest him, as winds affect the mariner, or as rain and sun concern the farmer. The miner comes in the course of his years to give to the coal-seams he knows something approaching a personality. He may speak at times of his seam as the sailor speaks of his ship, in the feminine gender, and may express his opinion of a seam's behavior as one would not ordinarily speak of a lady unless, as has happened both to women and to coal-seams, "she" is a particularly "bad actor".

Nowhere in Canada, unless perhaps it be in the Nanaimo district of Vancouver Island, is the tradition of coal-mining and coal-seam lore so socially embedded as it is in Nova Scotia, in Pictou County and in Cape Breton Island more especially.

In Pictou County no outsider or stranger to mining conversation can hope to understand the complexities of a coalfield having a geological structure to match its varied and too often tragic coal-mining history. The truth is that there are three separate and distinct coal-deposits in Pictou County, each of them tumbled around by earth movements, and partly removed by erosion before they were covered up by new coal-seams. These were in their turn moved around and partly washed away, resulting in a mix-up of coal-seams that is the despair of geologists and mining engineers alike, and a constant remover of monotony from the daily lives of mining men.

As the miner in Pictou County is not always sure what seam he has penetrated by his workings, he preserves on questions of coal-seam identity an attitude of exasperated resignation to whatever the future may have in store for him in his underground experiences. It is different in the Sydney coalfield, which is as regularly behaved and predictable a coalfield as the Pictou coalfield is not.

The "Sydney" coalfield of Cape Breton was so named long before "the Sydneys" arranged themselves into the municipalities we know to-day as Sydney Mines, North Sydney and Sydney. To strangers visiting these towns it may seem singular that no coal is mined in Sydney itself, but only around the towns of Glace Bay, Waterford and Sydney Mines, all towns situated on the sea-shore. When coal-seams and the associations they carry to the coal-mining population are considered, it is their connection with the "colliery towns" that is of historic and economic interest as constituting much of the stuff of every-day life "at the mines"—to use the rather patronising idiom of people who do not live there.

When, following the abrogation of the monopolistic control of the coal resources of Nova Scotia by the General Mining Association about 1857, an era of competitive exploitation of the coal-seams of the Sydney coalfield commenced, only to end in an economic mess, it had not been realised—with the notable exception of the General Mining Association's far-sighted manager, Richard Brown—that the land area of the coalfield was a fraction, and a small fraction only, of the mineable extent of the coalfield, the bulk of which is submarine. Nor, and it is not surprising or a reflection on the coal-mining pioneers of nigh a century ago, was the extent and quality of the individual seams more than surmise, knowledge of them being limited to scattered working of outcroppings in a wooded countryside possessing few roads. It has since been found, in the difficult school of experience, that there are in the Sydney coalfield five coal-seams of economic importance. These, in order of relative yield to date, are Phalen, Harbor, Hub, Emery and Gardiner seams.

There was never much doubt as to the continuity of these seams over the whole coalfield, a singularly undisturbed one, free from important faulting of the seams. The correlation of the seams made by Charles Robb, of the Canadian Geological Survey, in 1873 has been proved correct in all essential particulars, a fact reflecting his careful labors.

But because of the unconnected and rival exploitation of the coal seams in separated districts, and the neglect of or disbelief in the correlations of Richard Brown and Charles Robb, the same seam has received different names in different localities, names that persist to-day.

The order of commercial importance of the coal-seams first-mentioned is not the order of occurrence in the rocks, this

being, when we count from the topmost seam downwards, Hub, Harbor, Phalen, Emery and Gardiner seams.

The geological conditions determining the extent and nature of the coal deposit have been disclosed by mining operations extending over a hundred years. Without entering into details, it is now known that the coal-seams lie in the strata like a series of tilted plates, the topmost plate being the largest in area, with each succeeding plate smaller than the one above. To push the simile further, the plates are not precisely superimposed, but are placed a bit to one side or the other; that is, they do not have a common centre-point, and about one-third of each of the successive plates has been removed by erosion.

The most commercially important of the seams to date has been the Phalen seam, although this leading position is now threatened. The third largest seam in superficial area, the Phalen, has been more intensively worked than any of the series. Because of its excellent quality, its thickness, easy accessibility, and its relatively large original land area, it was the first seam attacked on a really large scale. When the Dominion Coal Company was formed in 1893, the management concentrated its efforts on production from the Phalen seam, and ever since the seam has provided up to 90 per cent and never less than 60 per cent of the production of the southern collieries. The seam was named after Colonel Phalen, one of the early soldier settlers in Cape Breton.

The Phalen seam splits up, going westward under Sydney Harbor, and loses its identity as a single workable seam. It is worked at this time by two collieries at New Waterford, where it is known as Lingan seam; and by three collieries in the Glace Bay area, where it receives its proper name. It was worked further east in the Birch Grove area in two collieries—now worked out—where it is known as Gowrie seam.

The workings of the Phalen seam have served as a pioneering and prospecting advance into the submarine areas. It is fairly certain, because of the greater superficial area of the Harbor seam, lying 400 feet above it, that wherever the Phalen seam is found of workable thickness, the upper seams will extend still further. It is also possible to test the continuity of the seams below by boreholes put down from the floor of the Phalen seam. Best-known of the Phalen collieries is Caledonia Mine, which has been worked continuously through the same shaft since 1866, and is still producing some 2,300 tons daily after 76 years of operation, with prospect of long continuance. Three gener-

ations of miners have used this same shaft, but whereas the first generation worked coal from under the land area close to the shaft, the men of this generation travel, in some instances, five miles to the working face to points distant over three miles from coast-line.

There cannot be many, if any, examples of such continuity of local coal-mining employment on the American continent. Since this mine was opened, history has recorded the close of the American Civil War, Canadian Confederation, the Franco-Prussian War, the South African and First Great Wars, and finds the colliery still operating in a conflict of greater violence and historical import than these earlier events.

Because of the exact knowledge of the upper seams, ascertainable from the vantage point of Phalen seam undersea workings, these are now being utilised to tap the upper seams, so that for further generations to come the Phalen mines on the shore-line will serve as outlets for coal mined from the Harbor and eventually the Hub seam, both of which in all probability extend as workable seams beyond the workable limits of the Phalen seam under the sea. The present shore collieries have therefore before them an operating life two or three times longer than the long life already achieved by the two veteran collieries, Princess at Sydney Mines, and Caledonia at Glace Bay.

The Harbor seam, which comes next in importance to the Phalen seam in the Glace Bay area, and is the only seam worked at the Sydney Mines collieries, has a longer record of commercial mining, and that over a wider area, than any seam in the Sydney coalfield.

Named because of its occurrence in the shores of the dredged creek that became Glace Bay Harbor, the Harbor seam is worked at Sydney Mines as the "Sydney Main", at New Waterford as "Victoria", as "Harbor" in the Glace Bay area, and was formerly worked as "Blockhouse" at Morien, where, as an Historical Sites Monument recites, it was the seam earliest worked in Canada.

The Harbor seam is remarkable in that it is the only one of the southern seams to continue under Sydney Harbor as an intact workable seam. It would be possible, were certain connections made, to walk under Sydney Harbor from Princess Colliery on the Sydney Mines side to the Waterford shore through workings in this seam, and some day it may be done.

The very earliest traditions of coal-mining in Cape Breton are associated with the Harbor seam. The French mined this

seam at Morien to supply the Fortress of Louisburg, and its local name "Blockhouse" has its origin in the erection of a blockhouse fort by the British military to check depredations on the coal-seam.

At the other extremity of the coalfield, as the Sydney main seam, it has been worked continuously since the beginning of the nineteenth century. Attacked at the outcrop originally, successive shaft sinking got nearer and nearer the shore-line, until finally the edge of the cliff was reached, when, in 1866, the "New Winning" shaft—Princess Colliery—was sunk. This took six years to accomplish, as the strata sunk through let in salt water from the sea. The water was dammed back by cast-iron "tubbing" put in place by "sinkers" brought from Durham, from one of whom, Wilson, are descended the well-known coal-mining Wilsons of Crow's Nest Pass in British Columbia.

The North of England tradition is still strong at Sydney Mines, especially in mining terms. A "mine-car" is still a "pit-tub", and a hammer is a "maul".

The names of three collieries at Sydney Mines reveal the chronology of their beginnings, the "Queen Pit", "Princess" and "Jubilee", named of course after Queen Victoria, the Princess Royal, and the occasion of the Queen's Jubilee.

The Harbor seam was also early worked in the vicinity of Glace Bay Harbor, in which it outcrops, by the Sterling Mining Company. The workings extended under territory then devoid of habitation, but now covered by the town of Glace Bay and its extensions.

Above the Harbor seam is the highest known workable seam in the field, the Hub seam. There may be one or more seams above the Hub, under the sea, having no land extension. This possibility may interest mining engineers of an unborn generation.

It is said the Hub seam was so named because its semi-circular outcropping on the promontory of Table Head, Glace Bay, surrounded as it is by concentric wheel-like out-croppings of seams lying below, resembles the hub of a wheel. This explanation of the origin of the name is certainly logical.

A projection cliff not far from the outcropping of the Hub seam was formerly known as "Shag Roost", as it was the haunt of the black cormorant, from which circumstance the lonely nature of this part of the shore-line in earlier days can be judged. The name of "the Roost" still applies to houses erected near the former site of the cliff in question. Ceaseless attack by the waves

of the sea has completely demolished the cliff, but long before its destruction was complete, the cormorants had sought out other solitary roosting-grounds, and still have their noisy, smelly, congeries along the neighboring coasts. One of these lies off Point Aconi, on a small outlier which is rapidly wasting under the great seas that sweep the promontory. Some day, it may be, when the collieries are gone, the cormorants will return to Glace Bay.

The writer was told by the late Charles H. Rigby that he well remembered as the haunt of wild foxes and rabbits the territory along the sea-cliffs where to-day are spread out the habitations, churches and roads of New Aberdeen and the sites of No. 2 and No. 1-B collieries. He described in a vivid way seeing the wooden lining of a shallow air-shaft to the Hub seam workings, in a clearing in the bush glittering in the sun with myriad flashing colors coming from a festooned carpet of snakes gathered to enjoy the heat.

One would not find cormorants, foxes, rabbits or snakes in this vicinity to-day, although the eternal sea remains unchanged, and on the small beaches at the foot of the tall shore-cliffs the children disport themselves in the brief summer heat.

Near the old Hub colliery on Table Head, Glace Bay, were erected Marconi Wireless Towers from which were sent the first wireless messages to Poldhu in Cornwall. These also are gone, and even the brave newness of Marconi's momentous invention has been besmirched by the preposterous clowning of the would-be Caesar that has brought Italy to shame.

The Hub seam workings from Table Head have seen many vicissitudes, fire and flood among them. Now the seam awaits the day of new approaches and large capital expenditures. That day will come, because the seam is probably the largest in area of all the seams in the field. Only fragments of its great area have been preserved on land, namely near Low Point, where it is known as Barachois, and on the Sydney Mines side, where it is known as Lloyd's Cove and Stubbert seams.

Below the Phalen seam, to use the simile earlier mentioned, the size of the "plates" is greatly reduced. The strata containing the beginnings of coal deposit has been reached when these lower seams are encountered.

The story told by the rocks is of a time when earth movements and swiftly flowing torrents of mud and shingle were subsiding. The terrain was being laid for the ages of quiet growth of swampy forests that succeeded, and for the accumu-

lation of the clean, thick and valuable seams that were laid down above these early seams.

It comes as a surprise, to those who judge the area of the seams in the field by looking at the land coal-maps, to find that the workable area of the Emery seam is not more than one-quarter of that of the Phalen seam, and that Gardiner seam, lying still deeper, has much less area than the Emery seam, because these lower seams have the largest apparent land area. The explanation of this seeming paradox—which has puzzled and misled the public ever since the coalfield assumed commercial importance—is that the lower seams have little or no workable seaward extension. The true condition is that the smaller the land area of the seams the larger is their seaward area, and conversely, the larger the land area the smaller is the undersea area.

Without any thought of irreverence, it may be considered a providential arrangement that the topmost seams should be of the largest area, of the best quality and, because of their shallow cover, just those seams which can be followed furthest to sea by workings. Conversely, the lower seams, progressively smaller in area and poorer in quality, are just those seams that, because of depth, could not be followed far under the sea.

Another popular belief is that coal improves at depth. Many a mine promoter like many an uninformed investor has lost his stake by faith in this assumption, a quite erroneous one in all the coalfields of Nova Scotia.

In the Sydney coalfield, particularly so in the centre of the field, that is the Glace Bay district, an area extending up to ten miles inland of the coal-seams originally laid down has been swept away by erosion. This is not surprising, as the latest and best-informed scientific opinion is that sub-aerial erosion has been at work on the Sydney coalfield for 500 million years. Contrary also to popular opinion, the least destructive of the agents of erosion—although it was the last to operate—has been glacial erosion. Indeed, the glacial drift has served to protect the coal seams from further erosion.

As a consequence of this long continued wasting, so far as the lower seams in the field are concerned, there has been preserved for man's use a truncated remnant only of the original coal-seams, these being thickest and of best quality at "the grass roots", diminishing in thickness and deteriorating in quality as they proceed to depth. It is, in other words, largely the poorer portions of the original seams that have been preserved for our use.

Fortunate is it the lower seams felt the full effect of erosion. A full explanation of the reasons for this would be lengthy. Suffice it to state that a greater proportion of the good-quality upper seams has been preserved from the original coalfield than of the lower seams of poorer quality.

In the history of the commercial mining of the seams of the Sydney coalfield there has been included nearly all of the mechanical progress and scientific invention that coal-mining on a world-wide scale has shared.

Much of the very early history of geology applied to coal deposits originated in Nova Scotia. Richard Brown competed with a famous English coal geologist, Mr. Binney, for the honor of demonstrating that the dome-like fossil roots of "Stigmaria" (so named from the "stigmata", pitted depressions that dotted the fossil roots) were the roots of the fossil tree-trunk with seal-like markings (hence called "Sigillaria") that are so numerous in the local coal-seams.

There is in Sir Charles Lyell's book, *A Second Voyage to North America*, published in 1845, an account of a gathering on the banks of the East River near New Glasgow, which included Sir Charles himself, young J. W. Dawson (not yet Sir J. W.), Henry Poole, Richard Brown; truly a remarkable meeting of men illustrious in the pioneer years of coal geology, especially at a time when implicit belief in the actuality of the Noachian Deluge was necessary for admission into respectable society. Dawson himself, as is disclosed in his geological and religious essays, suffered much perturbation of spirit in trying to reconcile what he knew to be fact with the beliefs that religious orthodoxy required in those not so far-off days.

It is comforting to know that meantime greater knowledge has led to greater faith. Significantly, the standard text-book on "Historical Geology" used in Canadian and United States universities at this time has as Epilogue a quotation from Pierre Termier, the opening sentences of which are:

It is always necessary to close a lecture on geology with humility. On the ship *Earth* which bears us into immensity, toward an end which God alone knows, we are steerage passengers.

It seems likely that the honorable tradition of technical achievement in the Sydney coalfield, extending back to the commencement of coal-mining in America, will persist as to time long beyond the lifetime of the youngest residents in the mining areas to-day, and, as to technical progress, beyond

the vision of the most experienced and wisest veteran of the coal-mining profession who seeks to assess the future in the light of the past.

Already become the classic example of undersea coal-mining, the next two centuries will see science applied to the winning of coal lying far out under the ocean bed, to an extent now merely adumbrated to the engineer's mind.

The local coal-seam traditions will receive accretions that may, because of their novelty and vastness, obscure the earlier traditions of laborers in a task pre-eminently of the future, a task in which a backward glance is justified because of the encouragement it gives to those who look forward to greater achievement.

The mining lore of the Sydney coalfield, long and interesting as it is to local residents, will be overshadowed by the story that a generation yet unborn will be able to tell of developments in the art and science of coal-mining under the waters of the Cabot Straits, of which we are now upon the eve.

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