

ART. VII. THE GROUPING OF THE PICTOU COAL SEAMS.
 BY EDWIN GILPIN.

(*Read March 10, 1873.*)

OUR knowledge of the Pictou Coal field was for many years confined to the district worked by the General Mining Association, the south crop of the Pictou great seams. The crops of the main and deep seams had been carefully proved by the Agents of the Company, and elaborate analyses made, but their explorations had never been pushed to the west of McCulloch's Brook, and it was considered that the disturbances met there threw the seams out of the miners' reach. In accordance with the generally accepted theory, the seams underlay the town of New Glasgow at an inaccessible depth, and were covered by the measures of the Upper Carboniferous.

When the monopoly ceased in 1858, it was believed that the lines of the General Mining Association covered all the available coal, and consequently for some time little interest was taken in prospecting. The discoveries of Mr. French in 1865 opened a new district called the Westville or Bear Creek. This gave a great impetus to explorers, and large sums of money were spent on both sides of the river. The reports of Sir W. Logan and Mr. Hartley contain all that is known of the field, but the general public cannot be expected to derive much information from the exact and statistical form in which it is compiled.

On the west side of the East River the Acadia seam was proved for a distance of over two miles, and now supports three large collieries; two underlying seams were also found.

To the south a coal seam has been opened on, but not clearly connected with its right and left hand neighbours the Main and Acadia seams. Opposite New Glasgow the coal measures are found to dip south, and a large bed of coal has been proved.

The explorations on the east side of the river have opened a new district underlaid by three groups of seams, the Upper and Lower. In the latter are comprised the Albion and associated seams, while the former contains the Marsh and McBean Groups.

There can be no doubt as to the existence of the main seam beneath these, but its south outcrop has not yet been clearly defined, and its northern rise is covered by the strata containing the upper groups. The work of tracing the seams in this field is much increased by numerous faults and the depth of the drift covering. The courses of the central faults are more exactly defined by underground workings and exposures in water runs. A careful study of the ground between the Albion workings and the conglomerate furnishes a key to the position of the seams on the west side of the river, and a starting point for their detection in the eastern district. The first signs of a change in the northern dip of the main seam are found in the levels of the Foord pit, sunk 900 yards from the south boundary. At the bottom of the pit the pitch of the coal is 21° , but at the face of the north level 900 yards N. 44° W. from the pit bottom, the strike approaches north and the dip lessens to 11° . Still further to the west the dip workings of the Dalhousie pits were found to pitch at an angle of 28° —coming to the surface further signs of a change are observable. 50 chains north of the Dalhousie pit shales and sandstones are found dipping 19° N. 10° E. about 21 chains. North-west of this a seam of coal is found exposed in a brook dip 42° S. 10° E. The measures here are disturbed, and the axis of the synclinal is probably between the two points, as no further dip to the north has been observed. A sandstone quarry near the Gairlock road bridge over McCulloch's brook gives the dip 25° N. 40° E.; following the brook down, about $\frac{1}{2}$ mile to the north of this, sandstones are observed with the dip 14° S. 25° E. Going east the first crops of the reverse pitch are found above the Nova Scotia Railway Bridge, lying at a heavy angle to the south with the strike turning to the north-east.

These dips establish a line of synclinal running nearly west from McCulloch's brook and agreeing with the fault observed by the geological survey on the New Glasgow side of the East River, 500 yds. above the railway bridge. The crop of the seam on the south edge of the Basin is regular and at an easy angle, while the measures exposed near the conglomerate and close to the supposed line of fault, pitch heavily to the south. This would indicate a sudden and violent upheaval of the northern half of the Basin acting at a

period later than that which brought the southern crops to the surface, and the line of dislocation would be an upthrow going north. The turn of the measures to the north-east would carry the main seam under the town of New Glasgow, where it is overlaid by the seams of the upper groups.

The highest group on the east side of the river is the Marsh Brook, containing the Captain, Geo. McKay, and Millrace seams, with 158 feet of contained measures; their average thickness is four feet. This group forms an irregular basin the north crop of which rests on the great north fault, and the south crop is broken by faults bringing up lower measures. At the horizontal distance of 480 yards to the rise of their eastern crop is the McBean group. This series contains an eight foot seam and several others not yet fully examined; one 2ft. 6in. thick underlying about 80 feet is said to be of excellent quality. The following description may be more easily understood by the aid of a section drawn from McBean's slope on the 8ft. seam to the East River pit. The distance on this line between the crops of the Marsh group is $1\frac{3}{4}$ miles, they come to the surface at an easy angle and have been opened by slopes. The crop of the McBean has not been found to the rise of these seams, and in a short distance to the west the strata dip again to the north-west, and we are crossing higher measures till within 1500 yards of the East River pit, where the pitch reverses, and a short distance further on two openings have been made on seams dipping south-east and called the Lawson and Foster. The East River pit was sunk on an 8ft. seam also dipping east of south. A short distance to the rise is the Richardson seam, and continuing from the Pottery pit to the river bank we find the measures connected with the main seam and underlying to the south-east.

Our section gives us two basins, the eastern of which contains the Marsh group and the McBean dipping 33° N. 55° W. The other is underlain by the Foster and Lawson seams believed to be equivalents of the Millrace and G. McKay, and gives the western crop of the McBean. As no explorations have yet proved the crop of the McBean on the anticlinal, its probable form is that of an undulation, and its crops are over four miles apart. The marked resemblance between the Richardson 2ft. 9in. and the 2ft. 6in. seam

found 80 ft. beneath the McBean, adds to the probability that the 8 ft. seam of New Glasgow is identical with the McBean.

Turning again to the main seam we find it overlaid by 1130 feet of barren shales, succeeded by a small seam of coal, still ascending beds of sandstone alternate with the shale, and among them two or three small seams of coal, one of which before alluded to agrees in thickness with the Stewart seam believed to underlie the Richardson; should this be the case we can form an approximate idea of the thickness of the productive measures.

Lying unconformably against the southern crops of the Marsh and McBean seams are two groups known as the McLennan and McLean. The latter contains four beds of coal with an aggregate thickness of 25 feet. Little has been done to prove the position and thickness of the seams belonging to the former group, the two lower seams are each 4 feet thick and lie about 1650 feet above the McLean group, thus closely agreeing with the estimated section between the main seam and the supposed equivalent of the Stewart seam. Should these prove the equivalents of the Albion seams, we should find the crops of the Main seam beneath those of the McBean, and the continuity of the group established across the Basin.

There are 1130 feet of barren shale above the Main seam, and at least 400 between this point and the seam before mentioned. Crossing to the Stewart seam we find that its strike would carry it 500 yards to the rise of the East River seam, which, together with its pitch, would make the thickness of the intermediate strata 750 feet. We have thus the following table :

Main seam to Stewart seam.....	1530 feet.
E. River seam.....	750 “
Marsh Group	800 “
Contained in Marsh Group	170 “
Above Marsh Group	1740 “
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	4990 feet.

Which would give the productive measures a thickness of at least 5000 feet.

The identity of the Widow McLean seams with those of the

Western district cannot be considered as settled, but the agreement in thickness of the overlying seams, and the slight difference in the estimated thickness of intervening strata, are strong evidences that the existence of the lower seams will be proved over all the Pictou Coal Fields.

ART. VIII. ON THE METEOROLOGY OF CALEDONIA MINES,
LITTLE GLACE BAY, CAPE BRETON. BY H. POOLE, ESQ.,
M. E.

(*Read March 10, 1873.*)

THE accompanying record of meteorological phenomena observed at the Caledonia Mines during the year 1872, does not vary much from that of 1871. The barometrical and thermometrical readings are closely approximate, but the relative humidity, 82·46, (saturation being 100,) was greater than in the previous five years, which is to be accounted for by the largely increased amount of precipitation in rain and snow; amounting to 74·955 ins., against a mean of 58·898 inches for the previous five years. The measured snow-fall was 173·35 inches, but the exact quantities of water contained in it could not be correctly measured apart from the rains; as sudden changes in the temperature often prevented them from being recorded separately.

The number of days on which the wind blew from S. to W. was 151; from W. to N. 66; from N. to E. 100; and from E. to S. 49; shewing a larger increase of winds from S. to W., and N. to E. than in previous years. Forty-seven gales were observed, in which the Anemometer recorded velocities exceeding thirty-five miles an hour; March, November, and December being the most stormy months; while in September there was only one high wind to record on the 19th. continuing from 7 a. m. to 1 p. m., but which must have been much more severe seaward, as vessels passing on the 21st from the southward carried double reefed topsails.

On the 3rd. of January, ice made in the outer bay of Glace Bay; and on the 7th drift ice was passing to the south. There was a gale on the 7th which sprung up in the afternoon from W. by S.