The writer desires rather to emphasize the fact that the conclusion that in a properly conducted fire assay the main loss of lead is occasioned not by volatilization but by chemical combination in the slag, is outborne by analysis, though he is well aware that it is somewhat at variance with the views of some, who lay great stress upon the volatility of lead, seeming to hold it up as the main source of error.

It may be said in favour of the fire assay that rapid determinations can be made which satisfy many technical requirements, but it must be acknowledged that rapidity in this case is quite incompatible with accuracy. At best the determination is unsatisfactory, inasmuch as while the errors involved may be reduced to a minimum, their total elimination is impossible. It would seem then that these facts argue strongly for the speedy and general adoption of the wet method (with a certain arbitrary deduction) as a basis for settlement in the case of the buying and selling of lead ores, as is the custom with copper ores to-day.

In conclusion, it may be said that the views expressed in the foregoing, have been arrived at by the writer, after making upwards of 10,000 lead determinations in almost every kind and grade of ore, pure and impure, and after he has been checked up by other chemists in the case of upwards of 1,000 samples.

Pioneer Work in The Crows Nest Coal Areas.

By Wm. Blakemore, M.E., Montreal.

At the moment of commencing to write, news comes to hand of the sudden demise of Dr. G. M. Dawson, the respected head of the Geological Survey of Canada, and it is imperative that anyone professing to treat upon the subject of this paper should, under the sad circumstances, pay a tribute to the value of those splendid services, which he so faithfully rendered to the country; and especially is it fitting that I should do this because he was the first authority to recognize the value and possibilities of these coal areas. He passed through the country in 1881, and although there was only time for a cursory examination, his keen perception, and intuitive scientific genius enabled him to prepare a monograoph, the accuracy of which has been fully established by subsequent detailed surveys; and for the geological data upon which this paper is based, I wish to acknowledge my indebtedness to Dr. Dawson's reports, which were of the greatest assistance to me, when first opening up the coal seams for active operation.

But whilst Dr. Dawson may be called a scientific pioneer of the Crows Nest Pass, and the first to realize its enormous importance and value, it is right here to tender a meed of praise to the men who first discovered the existence of coal and, especially, to the one man whose name is most intimately associated with this district. It was in the late seventies that Mr. William Fernie, in company with his brother, whilst prospecting near Martin Creek for gold first noticed coal float in the bed of the streams, and was led by this to make a more careful examination of the steep mountain sides, and finally to discover at an elevation of about 6,000 feet the outcrop of a 30 foot seam of coal. Although this was Mr. Fernie's first experience in dealing with anything but the precious minerals, he was shrewd enough to conclude that it might be a find of considerable importance, and from that date until 1896, when the Crows Nest Pass Coal Co. was formed, with Mr. Fernie as a Director, in season and out of season, through good and evil report, in the face of opposition—which at times threatened to swamp the undertaking—he never ceased to labor and scheme for the building of a railway and the development of mines; devoting all his time and pledging his last dollar, and it is only a fair tribute to his British pluck and energy to say, that but for the tenacity and ability with which he clung to his pet scheme, there probably would not have been either a Crows Nest Railway or coal mine to-day. Mr. Fernie has had a remarkable career, of which this, possibly the most important coal project in the world, is a fitting climax. The son of an English country doctor, educated and trained to follow his father's profession, at twenty he ran away to sea, sailed nearly round the world, reached San Francisco in the early fifties, became a gold miner there and, subsequently, in Briti h Columbia, being one of the earliest pioneers of the Fraser River placer mining, and afterwards going with the rush into the Cassiar and Caribou country. Attracting public attention he became Gold Commissioner and Government Agent, and for some years ruled the Indians and miners with a rod of iron in the Fort Steele division of East Kooteney, winding up his career in connection with the Crows Nest coal areas. To-day, at sixty five years of age he has retired to enjoy a well earned rest, and it is some satisfaction to know that the reward of his industry has furnished him with ample means to do so.

I have dwelt on personal matters to this extent because it is not always that the men who deserve credit in connection with onerous and difficult mining enterprises get it, and there is certainly no calling in which high qualities of character are more often demonstrated.

The coal areas referred to lie longitudinally upon the western side of the first range of the Rocky Mountains near the boundary, which separates British Columbia from Alberta. Coal seams are found in the Cretaceous formation, and are inter-stratified principally with sandstone and shales, super-imposed upon carboniferous limestone, and below this proceeding westerly we find the Cambrian rocks. The extent of the coal field is theoretically ninety miles long, running north from the south fork of the Elk River, but the actual limit of the coal basin, which is undisturbed, and can be counted upon to yield workable coal, extends only a distance of forty miles north of this point where the limestone comes to the surface, and the coal measures are so broken up and disturbed as practically to terminate at a point four or five miles north of Michel Creek. The exact southern limit is from four to five miles south of the North Kootenay Pass. The western limit of the basin is defined by the Elk River, all along the west bank of which the limestone outcrops and forms precipitous mountains. The eastern limit is determined by a line running north and south, at an average distance of nine to ten miles from the Elk River. Allowing for the large areas which have been eroded between the various mountain peaks in the creeks, it is probable that the nearest estimate obtainable of the area of workable coal is not less than 150 square miles, and Dr. Selwyn, the late head of the Geological Survey, computed the available coal to each square mile at 24,976,000 tons.

The coal measures lie in a long and narrow synclinal trough, the strike being due north and south. The western outcrops upon the mountain sides are at an elevation of from 1000 to 2000 feet, and upon the eastern side near Martin Creek, from 500 to 1000 feet above the level of the trail As the creeks are traversed they gradually rise into the measures and the outcrops are exposed on the level of the trail which gives the easiest possible access. The question of the exact extent of this basin will be determined by the geological survey, which is now being conducted, but the limits here given are probably correct. It is possible that there may be areas of detached coal between the limestone ridges a considerable distance north of Michel Creek, but there can be no large area favourable for working outside the basin indicated. The southern boundary is easily determined by the character and pitch of the rocks, all of which are much disturbed, and are frequently flexed with over-turning folds to the east. Along the trail which crosses the North Kootenay Pass the Cretaceous rocks are found, dipping to the north at an angle of 40 degrees, and at this point there is also a large fault with a throw to the east of not less than 1,500 feet. Another large fault crosses the River Elk near the bridge, so that while