be said to be unscientific, even primitive; time will correct this however, and at the close of 1884 we will doubtless see still greater advancement in this respect than was accomplished during 1883. From the mining districts of British Columbia no recent news has reached us.

A feverish and unsettled condition, as well as a serious decline in prices, having characterized the Iron trade in England during 1883, it is a remarkable fact that the production of pig iron in the North has exceeded that of any former year, it having reached, as nearly as can be arrived at, not less than 2,765,000 tons, as compared with 2,688,650 tons in 1882. At the beginning of the year prices ranged from 43s. to 43s. 6d., and at the close 36s. to 36s. 6d. were the ruling quotations, showing a decline of 7s. from a price that was considered not more than sufficient to yield a fair margin of profit on cost of production. The excess in the amount produced does not remain with the producers, for it is known that the stock on hand is no more than they were carrying at the close of the previous year. There has been a marked falling off in the exportation of crude iron during the year, remarkable in the quantity sent to the United States, and this, in addition to the fact that the production was greater than that of any former year, leads to the conclusion that the demand for home manufacture was brisk, and, in a notable degree, exceeded what has ever before been known in the history of the English Iron trade. Large imports of ore from Spain and other countries have been made into Wales, Durham and Scotland. In Scotland there has been the same large production, and in the Cleveland and Durham districts the output shows the largest record in the history of the trade. Yet prices have declined.

☞Attention is directed to Mr. Obalski's advertisement in another column on behalf of a French Company who desire to purchase copper ores and mattes.

THE PHOSPHATE ROCKS.

Nature of the Deposits. Will Deep Mining Pay?

BY HENRY G. VENNOR, F.G.S.

In the present active state of phosphate mining and general enquiry concerning our mines, it will be of interest to consider briefly the conditions of the deposits, and more particularly what evidence there is of these being deep-seated. I have elsewhere stated—and oftener than once—that the apatite rocks were, geologically considered, superficial. Hence the query naturally arises, Will deep-mining pay?

This question is an important one at the present time when so much capital is being invested in mines and mining properties, but, in so far as I have seen, no answer of a satisfactory nature has yet been given. The question, however, is a simple one, when we look into the nature of the deposits, *i.e.*, their geological conditions. The miner, who hitherto has been at work at economic ores *in true fissure veins* cutting alike all the rocks of a particular mining district, is entirely at sea when he is placed in the phosphate field. He may talk as he pleases about being on or off the "main lode," but of one thing only is he really certain, and that is of being supremely puzzled. Tell him to search in the direction of the bedding and he will laugh you to scorn and inform you that "true veins" but rarely run so. Yet, such is the truth—the very truth—in the case of phosphate deposits. These are nothing more than a series of irregular (large and small) masses distributed along one or two plains of bedding *in one particular b lt of rock*. Leave this *particular* belt and you lose your phosphate: follow it, and you continue to discover new deposits. As is only natural, of course, and the case with iron ore and similar deposits, *true veins* occur as *spurts* or infiltrations from these embedded masses, but only run for very limited distances. The very finding, however, of one or two of such *veins* is enough for the embryo mineralogist and geologist, and he hastens to set it down as an established fact, that as such are our economic deposits of apatite.

The phosphate rocks, geologically speaking, are superficial, and have many thousands of feet of strata beneath them, but with this the practical miner has nothing to do; they are plenty deep enoug' for his purpose, and he may rest assured of still finding his mineral in workable deposits as deep as he cares to delve. For example, let us take the rich outcrop of phosphate rock along the du Lievres river. This dips off to the westward at a high angle and plunges down to unknown depths, but comes up to the surface again in Wakefield—away over on the Gatineau river side—still carrying its phosphates. Now, as we cannot by any common sense reasoning conclude that the deposits of mineral are exclusively confined to the two outcrops of the rock, the one in the du Lievres and the other on the Gatineau side, it must be interred that these continue with the rock to great and unknown depths in the interval of country between the rivers named. Consequently I have no hesitation in affirming that the mineral "goes deep"—but as to whether the miner can mine deeply is quite another question, and depends entirely upon the size and nature of the deposit or deposits he is following down. I do not believe that any one mass of apatite will ever be found to run connectedly to a great depth, but possibly by means of "stringers" one mass may lead to the discovery of another much lower down. It is doubtful, however, whether such mining would prove remunerative, as the removal of much barren rock between the deposits would in all probability turn the balance in favor of abandoning the opening.

As an illustration of great *fissures* in this same district, I would allude here briefly to the groups or series of trap dykes which intersect the strata continuously for miles at a stretch. These undoubtedly represent or mark out the direction of great rents or *fissures* by which the rocks were affected at some period subsequent to the deposition of the phosphate of lime. Now, had these great rents through the strata become filled with the mineral last named instead of the doleritic trap, we would have just the sort of thing most of our miners are and have been looking for, namely, "main lodes," "true veins," etc. of phosphate of lime, and we would have something more tangible and definite to base our calculations upon respecting deep mining. Another illustration of the condition in which the deposits of this mineral occur may be found in the distribution of the proper or *parent* rock through Ottawa County, which clearly establishes the fact of t rock *carrying the mineral wi it*, and not the mineral *trave ing merely one particular po tion of it*, as must be the ca were we to fix upon the *true ve* theory. We have, for instan one particular volume of ro signally impregnated with t mineral in grains, veins, a masses large and small. T rock is not bedded, but is of granitoid structure and high crystalline. The chief constit ents are pyroxene (in grains a crystals), hornblende, feldsp calcite and apatite—with greater or less admixture of ir pyrites which generally gives both rock and apatite a reddi brown weathered appearan In such a volume of rock are of the deposits of mineral of a importance hitherto discover either in Ottawa County or the Rideau section towards Per and Kingston in the Province Ontario. Go where one will the course of this belt of ro phosphate of lime is found in o form or another, but leave it (t proper belt) and travel across t strike of the rocks (*i. e.* contra to their run) and very speedily trace of the mineral is lost. B yond this thoroughly establish truth nothing further is want in proof of the bedded conditi of the main deposits.

GEOLOGICAL MUSEUM

The number of persons who re tered their names as visitors to t museum of the Geological Survey this city from 1st January, 1883, 1st January, 1884, was 12,027. addition to these, however, a c siderable number of gentlemen, w did not enter their names in t museum book, called every day the various officers of the Surv and many of them inspected t museum before leaving. These, is estimated, would increase t above figure by from 3,000 to 5,0 so that the total number of visito during the year 1883 may be saf set down at 15,000, or about t times the average number while t museum was in Montreal.

THE PHOSPHATE MINES OF OTTAWA COUNTY.

More than ordinary interest h been directed towards the phosph mining industry in this section d ing the year just closed, and it rapidly increasing in importan Speculation and the manipulation properties have given place to legi mate mining, and mine owners a in most cases, preparing for perm ent working. The mines are dev oping well and, wherever operati have been prosecuted with ordin