

and tail brown again, with shorter fur, tail flattened inclined to a double point. There were eight mammæ, two in the axilla, two inside of fore leg, and four inguinal. The very great development, especially in the large specimen, of the masseter muscle, gave them an appearance of cheek pouches. As all our specimens agree in the white ring around the nose, the black feet, and chestnut red belly, with the more southern specimen, we must suppose they owe this longer and more hoary fur upon back to their northern origin. *Of their habits in the forest I have studied but little.* They generally affect a barren stony side hill for their burrow, not in the deep forest but on the outskirts of settlements, and as I never have heard of their ravages in the clover fields, I fancy they are not very numerous in our province. A young one that I saw in confinement was very graceful in its attitude, sitting upon its haunches with its tail brought forward like a squirrel and using its fore paws. As they advance in life in confinement, they become loaded with fat, and clumsy in their movements; they have the habit of flattening themselves to the ground. When going on all fours, they have the high back and steep cut off rump of the guinea-pig. The nose is somewhat pointed though the head is blunt or rounded. Another favourite attitude is to sit upon their haunches with the head thrown upwards and to one side, the fore paws hanging down flattened to the body. They hibernate regularly in confinement, on the approach of cold weather, but may easily be roused from insensibility, by being placed before a warm fire.

ART. II. ON A PECULIARITY IN THE BLOCK-HOUSE SEAM,
COW BAY, CAPE BRETON. BY JOHN RUTHERFORD,
M. E., *Inspector of Mines.*

(Read January 18, 1869.)

THE carboniferous formation which borders the eastern shore of Cape Breton, does not in its general features differ much from other coal-producing localities. The position of the coal measures has been ascertained over a distance of about fifty miles, extending from Miré Bay on the south, to the syenitic range which forms the promontory of Cape Dauphin on the north, against the southern



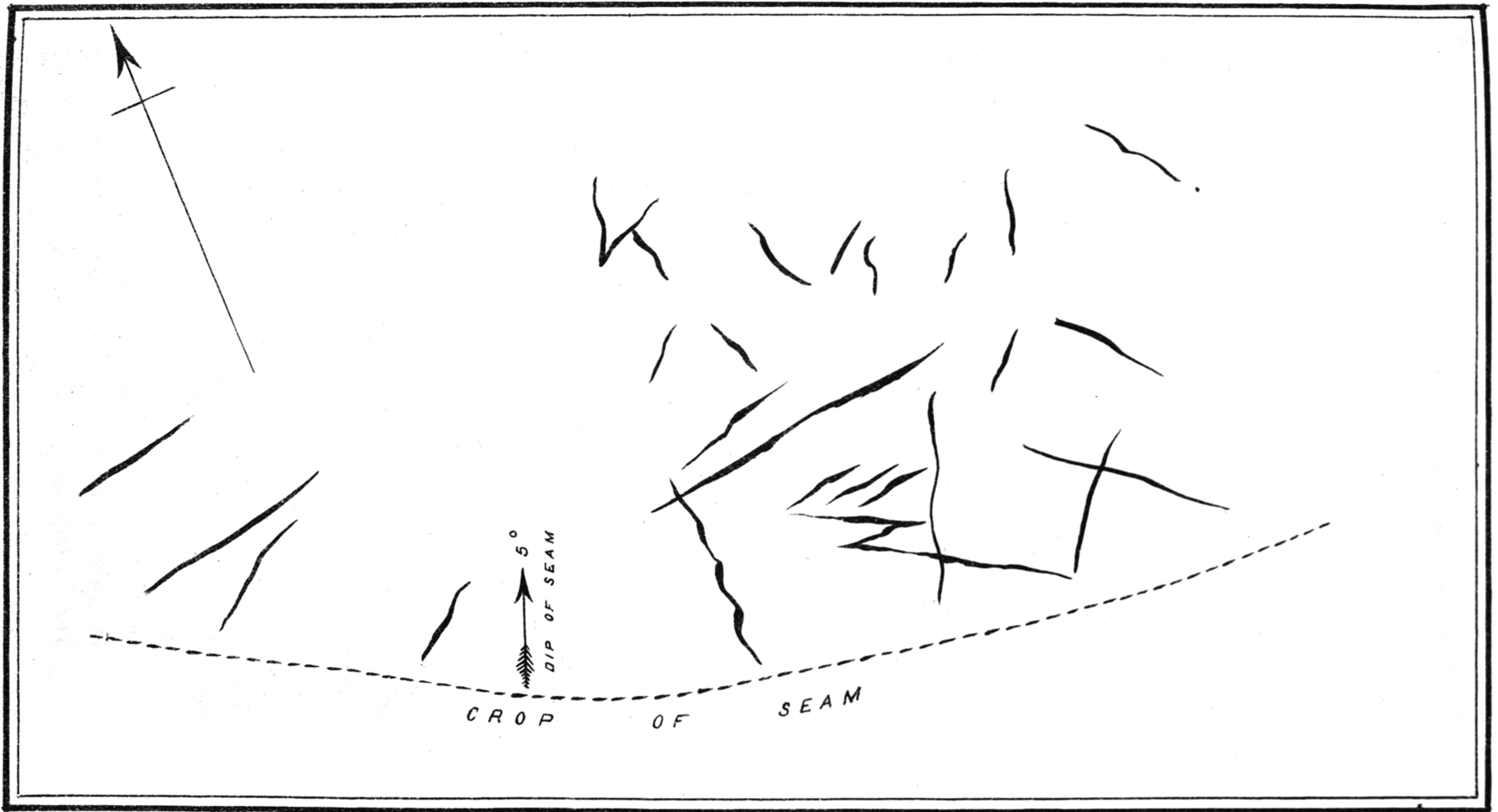


DIAGRAM 2 — SHEWING POSITION OF MASSES OF STONE IN THE BLOCK HOUSE SEAM REDUCED FROM PLAN OF WORKINGS. CLARKE'S LITH

flank of which they terminate on the northern side the great Bras d'Or, and although the mines are neither sufficiently near each other, nor the workings in them of an extent to leave no room for doubt as to the identity and number of the seams, the openings, both of a permanent and of an exploratory character, have sufficiently indicated the general shape of the formation, and have given besides to certain parts of it a configuration which, though not peculiar is certainly interesting.

With the exception of one or two localities there does not appear to be any break of importance in the continuity of the measures throughout the entire length of the range; and even that to which I am about more particularly to refer, would not perhaps be considered an interruption of this regularity if it were viewed in its entirety, and not under the divisional aspect which it superficially presents.

Between what are known as the Cow Bay and Glace Bay districts, there is an elevated portion of land, ranging from the sea shore westward, which separates these two localities, with not more distinctness in their superficial connection than in their mining relation to each other. That this elevation is of an anticlinal character, is evidenced both on the surface and in the mines on each side of it; the former is covered with masses of disrupted rock strewn in the utmost confusion, and in the latter the seams in its immediate vicinity are upheaved and thrown to the surface in a very abrupt manner. It is not improbable that the eastern termination of this elevation is not far from the present shore, and that the seams at one time folded regularly round it, and preserved that continuity which the encroachment of the sea has destroyed.

The Block-house seam is situated on the south side of the anticlinal; it is 8 feet 10 inches thick, and occupies the upper portion of an elliptical shaped basin, the major axis of which ranges nearly east and west. Its southern crop is distant from the anticlinal about three miles, and dips to the north-east at an angle of 5° . This dip continues with little variation a distance of 600 yds. The seam then begins to rise, the transition being somewhat sudden, and in the comparatively short space of about 100 yds. horizontal, the northern crop is reached, which is there lying at an angle of 45° . The coal is overlaid by an irregular bed of dark grey shale,

varying in thickness from 1 ft. 6 ins. to 6 ft., above which there is a hard sandstone five feet thick. No dislocations of any importance have been met with in the workings, and with the exception of the peculiarity which forms the subject of this paper, this very fine seam of coal is of a most regular and uniform character. This peculiarity consists of masses of stone similar to that overlying the coal, which with a frequency very undesirable as regards cost of working, range through the seam in a very extraordinary manner. Without exhibiting the slightest change in thickness or quality, the coal appears in some cases to terminate as it were against a wall of rock. On cutting through this, however, it is again found in its regular position, the planes of the floor and roof being unbroken, and the coal of its usual quality.

These interruptions, for they are not faults, vary much in thickness; in some instances they are only a few feet thick next the roof, and are thinned down to a wedge-like point near the bottom of the seam; in others they are much thicker, 32 feet of stone having been passed through at one place. The wedge shape is a prevailing form, but it is inserted, if I may use the term, in the most irregular and fantastic manner; in some places it is nearly vertical, and in other it is in an oblique position. It is difficult to convey an idea by mere words of the variety of shapes in which these masses are found in the coal; the diagrams which I have prepared to illustrate the paper are copies of sketches made by myself in the mine, and represent sections of the stone as exhibited on the sides of the openings made in working the seam. There is generally near the roof a portion of the stone strongly slickensided, which gives it when found in an angular position with the plane of the roof, the appearance of a fault; but in cutting through it the coal is found on the other side, undisturbed. Not unfrequently pieces of coal are found embedded in the stone, and it often happens when the workman is preparing a hole for blasting, that he chances to drill into some of these, and the operation is much expedited in consequence. I may here state that although when first met with the stone is generally so hard as to require the use of powder to remove it, it becomes in the course of a few weeks like moistened clay, and may be easily squeezed between the finger and thumb.

Another and a very striking feature is the detached pieces of

stone of the same character as the larger masses ; these are generally near the latter, and are in various positions in the coal ; sometimes they are near the roof and sometimes close to the floor.

Such are some of the principal features of these peculiar interruptions in this otherwise evenly deposited and undisturbed seam. How these masses of stones have got into these shapes and positions is a question of some interest ; for, although we may readily assume and with fairness, that the upheaval forming the anticlinal has caused the tilting of the northern edge of the basin, it is not evident how that movement could originate the peculiarities we have described.

When my attention was first directed to them I was curious to know whether any parallelism in their courses through the seam could be detected. Of this, however, I do not find sufficiently distinct indications to warrant any deductions from this feature as to their origin ; they range through it in the most irregular manner, and are as variable in their length as in other respects. This is shewn in diagram No. 2, which is copied from the plan of the workings, and shows their correct position and relation to each other as found in the mine. It does not however represent a tithe of their number, those of smaller size not being noted.

An examination of all the circumstances leaves little reason to doubt that these masses have been thrust or squeezed into fissures in the upper part of the seam ; they are of the same composition as the overlying bed, and there is this additional fact, that in very few instances that I could learn have they any connection with the floor of the seam. In nearly every case the thinnest part of the mass, the wedge-like point, is near the bottom of the seam, clearly shewing that the openings took place at the top of the coal bed as we see in mud creeks in dry weather.

The presence of the detached pieces of stone in the coal may be accounted for by the assumption of an unconsolidated state of the vegetable matter of which the coal is composed, when the overlying bed was in course of deposition ; and it is not at all an improbable supposition, that portions of carbonaceous matter might get mixed with the sedimentary deposit which filled the openings, and thus account for the streaks of coal in the stone. The evidence of pressure which caused a movement is afforded by the smooth

markings of the stone, which are more especially observable near the top of the seam.

I may add as worthy of remark, that in no other seam in any part of the Province, have I seen any thing of a similar character. Whether the McAuley, which from its position as an underlying seam has its northern crop nearer the anticlinal, is in like manner disturbed, is not yet known, as that part of it which is immediately beneath the Block-house seam has not been opened; but in the Gowrie mine, where it is worked, there is not any thing at all resembling the peculiarity I have endeavoured to describe.

We can imagine disturbances affecting the underlying strata in such a manner as to cause the seam to be disturbed, that the upper part would be fractured and present openings which subsequent deposits would fill up; but we should expect the floor of the seam to exhibit corresponding irregularities. Such, however, is not the case in this instance; from its southern crop to the centre of the basin, the bottom of the seam is regular in shape, and rests conformably on the strata beneath it, the plane of which is unbroken.

It seems therefore that some unusual conditions have existed during the formation of the Block-house seam, which have not occurred at an earlier period.

ART III. GEMS AND THEIR APPLICATION TO THE ARTS.

BY A. S. FOORD.

(Read January 18, 1869.)

I HAVE considered that a few facts relative to the mode of occurrence and natural appearance of gems, may not be uninteresting to those who reside in a country like Nova Scotia, abounding in almost every species of mineral wealth, and I have selected the following stones as being those universally valued for their beauty, rarity, and distinctive character, namely: the *Diamond*, the *Ruby*, the *Sapphire*, the *Emerald*, the *Beryl*, the *Topaz*, the *Amethyst*, the *Opal*, the *Garnet* and the *Turquoise*.

I shall commence with the diamond, which now holds the most prominent position amongst gems.

A great deal of confusion exists between the ancient and modern