SOME PIGMENT MATERIALS OF NORTH-WESTERN TASMANIA

Location and Access

Situated 2¾ miles south-east of Abbotsham Post Office are occurrences of red ochre and earthy hematite. Access is gained by means of the motor road from Ulverstone to Upper Castra as far as a point ½ mile south of Abbotsham school. From here a branch road deviates in an easterly direction and proceeds to within a few yards of the deposits.

Topography

The area described comprises a small portion of the basaltic plateau of the north-west coast. Drainage is proceeding by means of Clayton and Little Clayton Rivulets, and the country in the immediate vicinity of the deposits is represented by a comparatively small flat-topped and cultivated hill, being the divide between the streams named.

Geology

The geology of the area is comparatively simple. Basalt of the Tertiary Period caps the hill in question, while underlying the basalt Pre-Basaltic drifts are poorly exposed at one point where they are seen to be composed of boulders of hematite with sand and earthy hematitic material.

Some large boulders of Pre-Cambrian quartzites are found in the immediate vicinity of the above mentioned drifts, but it is doubtful as to whether these are in situ.

Red Ochre Occurrence

On a 100 acre farm owned by A. J. Pearson, being portion of 500 acres purchased from the Crown by G. Atkinson, at Spalford; and north and adjoining the Town Reserve of Moreton; a red ochre of medium softness has been worked in the past, the product being bagged at grass and carted to Ulverstone for transport by rail or water. About three chains south-east from the north-west corner of the 100 acres above described a pit 60 feet by 36 feet has been opened out to a depth of 12 feet exposing the ochre below an average of 6 foot overburden of soil and partly decomposed rock. The overburden appears to be greater to the east and west than to the north and south.

The ochre is evidently decomposition matter from the surrounding basalt in which it seems to occur, but may have been derived from an interbedded tuff. In no place in the pit was the ochre penetrated to the fresh basalt below.

Ochre is said to have been proved by a system of holes over an area of 1 acre in the vicinity of the pit, but the holes were only a few feet in depth and the full thickness of the ochre was in no place ascertained.

Samples taken from the pit and treated in the Geological Laboratory gave the following results:-

CONSTITUENTS	Grab Sample of 1st class material	Grab sample of 2nd class material
	PER CENT	PER CENT
SiO_2	28.18	27.4
Fe_2O_3	27.17	28.30
FeO	1.55	2.06
Al_2O_3	30.31	30.80
TiO_2	2.00	1.80
CaO	nil	nil
MgO	0.50	0.50
Ignition loss	11.00	10.30

As a comparison with French ochres, which are the recognised standard, analyses from the Yonne district in France are quoted below:

CONSTITUENTS	Five samples of red ochre PER CENT	
H_2O	0.90	- 3.20
Loss on ignition	3.25	- 5.00
Sand and silica	59.00	- 65.30
Iron Oxide	23.50	- 59.71
Alumina	0.15	- 5.39

Generally the material from Spalford may be said to be a non-plastic red clay chiefly containing alumina (high), silica and ferric oxide.

The quality varies greatly from point to point in the pit and much hand picking would be necessary to obtain a first grade pigment. Much of the ochre is pitted with a decomposed white to yellow mineral which would modify the colours of the finished product.

Before mining the material varies in hardness and compactness, but on exposure to the air pulverises to a certain extent, and it would appear to be an ideal subject for reduction to the size necessary for pigmentary purposes.

The specific gravity of the ochre as determined by the writer is 2.6.

About 180 tons of the better class ochre in the crude state have at different periods in the past been sold to various firms, namely, the Serpentine Paint Coy. of Launceston, Chas. Atkins & Sons, Melbourne, Packenham Ochre & Oxide Coy. of Victoria, and Goodlass Wall Coy., Melbourne.

An amount of approximately 5 tons of material is at present bagged at the surface, but it is understood that none at present is being marketed. The price received from the Serpentine Paint Coy. was £4 per ton on trucks in Launceston. It is understood that the prices being paid for ochres at the present time on the mainland are in the vicinity of £8 to £10 per ton, ground according to grade, and delivered at factory.

A paint said to have been made by simply mixing ground ochre, from the Spalford deposit, with linseed oil and viewed at Abbotsham. The paint, which is on a fence and exposed to the weather, was said to have been applied over ten years ago and is at present in an excellent state of preservation and of a bright red colour.

HEMATITE OCCURRENCE, No. 1

About 15 chains north-west from the ochre pit and in a lot of 23 acs. 0 rds. 11 pers., J. Robertson, Purchaser, said to be owned by A. Robertson, a mass of decomposed hematite, sand, and pieces of fresh hematite, the whole a dull red colour, is exposed in the roots of an upturned tree trunk. Although very little can be seen and no development work is now visible, the occurrence appears to underlie basalt, which is showing 4 chains easterly and higher up-hill. Small pieces of hematite can be picked up from surface over a small area about the uprooted tree mentioned.

A shaft is said to have been put down in the immediate vicinity for a depth of 40 feet in similar drift and hematite and that bottom has not been reached. The shaft has apparently now been filled in as no signs of it were found.

A sample of the red material from the tree roots was taken and the fine earthy matter sifted from the coarse hematite.

An analysis of the fine material was carried out by the Acting Chief Government Chemist and Assayer with the following result:-

CONSTITUENTS	FINE HEMATITE & SANDY DRIFT PER CENT
SiO_2	43.60
Fe_2O_3	48.30
FeO	1.55
Al_2O_3	6.15
CaO	nil
MgO	0.27
Ignition loss	2.00

HEMATITE OCCURRENCE No. 2

Although this occurrence is not included in the district to which this report generally refers it was thought desirable to record it here.

On a block of 3 ac. 3 rood 37 pers. purchased by Charles Atkins and a Soldier Settlement of 92 ac. 3 r. 38 pers. leased by E. Yaxley, situated 2¾ miles south-west of Penguin, and fronting on the east bank of Penguin Creek, 3 open cuts have been excavated from a hillside which slopes down to the creek.

The material exposed in the quarries is composed mainly of sand and clay stained by oxides of iron. Scattered here and there in the deposit boulders and gravels of hematite abound.

This deposit is considered as occurring very similar to Hematite Occurrence No. 1, in that it is apparently a Pre-Basaltic Tertiary drift. The overlying basalt is plainly seen capping the hill easterly above the workings.

In the two more southerly quarries which are on E. Yaxley's land the sands and clays have been tinted a dull red colour - derived from the breaking up of hematite which is seen to be mixed with the sands &c.

The northern and largest quarry is situated on Chas. Atkin's lot and this has been excavated to a depth of some 25 feet. Here also most of the sands and clays have been stained a red colour, but where limonite occurs in place of hematite, the finer material is a yellow colour.

A short tramway, now in disrepair, leads from this open cut to a water-race, which, in its turn, runs for ½ chain to open settling boxes.

The yellow drifts were here treated, bagged and shipped to Melbourne for pigment purposes. The red drifts are said to have been bagged without treatment and exported to Sydney for use in gas works as a purifier in the manufacture of lighting and heating gas.

Grades and Tests of mineral pigments

R. B. Ladoo, in his work entitled Non Metallic Minerals, deals with these aspects extensively and some of his remarks are quoted here, as follows:-

"Colour" A high-grade pigment must possess a clear uniform, bright colour closely resembling one of the standard colours in use. The colour must be permanent and its tinctorial power must approach that of the standard colours (By "tinctorial power" is meant the ability of the colour to stand dilution with white pigments without seriously weakening the colour)."

"Oil absorption Different pigments require the addition of differing amounts of linseed or other oils to produce a paste of a uniform consistency. Since high-grade linseed oil is usually more expensive per unit of volume than most earth pigments, it follows that a paint of a given consistency can be made more cheaply from a pigment with a low oil absorption than from one with a high oil absorption. For this reason the paint manufacturer (and similarly the makers of linoleum and oilcloth) usually prefer a pigment with a low oil absorption."

"Grain size In the manufacture of linoleum, oilcloth and low-grade mixed paints, the pigments are mixed thoroughly, but are not usually ground much after mixing. For this reason very finely ground pigments are desired, the finer, the better. For such purposes the pigments should be ground to at least 250 mesh. High grade mixed and paste paints, however, are ground for a considerable time in oil in paint grinding mills, in which a fineness of particle ranging from 0.0002 to 0.050 millimetres (average 0.005 to 0.020 millimetres) is attained. A 240 mesh screen has an opening of 0.066 millimetres.

It follows, therefore, that extreme initial fineness in such cases is not of such great importance, for the pigment will ultimately be ground much finer. A 200 mesh product for such purposes has usually been satisfactory, but there is a growing tendency toward the use of finer pigments and a 325-mesh product is now often demanded".

"Price For such uses as linoleum and oilcloth colours, relatively low-grade pigments, of low colouring power and poor colours, may be used. Therefore, the chief considerations are low oil absorption and low cost. In some cases price alone seems to be the governing factor."

"General Characteristics As noted previously, most paint manufacturers have their own standards, tests and specifications, and in the end a pigment must meet these tests and specifications or be rejected. The final test, therefore, rests solely with the customer. Certain rough tests, however, may be made, which will at least serve to eliminate wholly unsuitable material. Such tests have been described by Brown (Brown, J.Coggin, Notes on Barytes and Mineral colours) as follows:

"The value of an ochre (yellow) depends on the brightness and intensity of its colour, on its texture, on its "strength" or staining qualities, on its iron content and on the relative proportion of oil which must be mixed with it to obtain the proper degree of fluidity for use as a pigment. To be acceptable to the market, prepared ochres should be very finely powdered and quite free from grit. The presence of very finely divided silico is not always detrimental, as it may enable the paint to adhere to the fibres of wooden surfaces to which it is applied and, by filling up spaces, so improve its covering power. It has been stated that, under the microscope with a considerable magnification, the particles of an ochre of good quality should appear flocculent and uniform. Good natural material should be of a uniform yellow or brown colour and the lumps should be easily crushed between the fingers to a soft, fine powder, free from any sensation of grittiness. It should also form a plastic paste when mixed with a little water.

Deposits of red ironstone, ruddle or bole to be used as sources of earth pigments should show a uniformity of colour, a freedom from grit, a high percentage of iron oxide and should, in addition be friable and soft.

At the same time, although a high iron content may increase the quality of an oxide for use in the manufacture of metal preserving paint, it does not follow that the other important qualities, such as brilliancy of tint or staining power, will necessarily be good because the iron content is high. Natural oxides with comparatively small amounts of ferris oxide may be better in these respects, and, therefore, worth more of the market, than those with higher percentages.

In testing natural ochres and oxides for their suitability as pigments, a carefully dried and

finely powdered sample should be mixed with oil and applied with a knife to a slip of clear glass. The colour as seen through the glass should be compared with similar prepared samples of standard colours".

Conclusion

The first consideration for a deposit of mineral paint materials, to be of commercial interest, is that it must contain material, in large quantity, suitable for commercial use as proved by actual test. The extent and depth of the deposits under review should, therefore, be proved by boring with a small hand boring plant; or else by means of shaft digging. Secondly the material must be uniform in colour and physical properties. The colour of the decomposed basalt at Spalford is not uniform and it is suggested that the material be put up into two or more grades according to colour and qualtiy. The physical properties would have to be ascertained.

The third regard must be the situation of the ore with reference to cheap and easy mining.

The ochre on Pearson's property is not too convenient for open cut working as the hill is flat-topped, but sites for benches may be obtained a little lower down the hill if the ore is found to be extensive.

The other occurrences could be worked by quarrying methods.

Fourthly, the ore must be of high enough qualtiy to use without washing or it must be able to stand washing without too great losses. These considerations would have to be gone into by those concerned when the materials are being tested.

In the fifth place the deposit must be situated closely enough to railroad and to important markets so that the product can be shipped economically.

The North-west Coast pigment deposits are served by motor roads closely connecting with rail and shipping. The chief markets for pigments at present are the Mainland States, and the prices for shipment would be a grave consideration.

Lastly markets would have to be established to cater for the particular materials according to their uses, for the only real test of the value of a pigment is to have it tried out in practical tests by possible users.

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