

Allegheny River. The workings in West Franklin and Winfield were of very small extent. Outside of these localities it is not known.

The Freeport ore is described as a solid, compact, very argillaceous layer 2 to 4 feet thick, 26 feet below the Upper Freeport coal. It is a carbonaceous ore yielding a little over 30 per cent of metallic iron. The iron is disposed to be red short and would be improved by a mixture of one-quarter magnetic or red hematite ores. (Second Geol. Surv. Pennsylvania, Rept. II, p. 229).

While the Freeport ore probably can not be regarded as an important source of future supply of iron, it is evident that in the Balustrone ore there exists an almost unlimited store of medium-grade ore which may become an important source of supply when the more productive and profitable deposits are exhausted.

Limestone.

Freeport ("Freeport") Sandstone.—At West Winfield this limestone is extensively quarried and

crushed for road metal and railroad ballast and to some extent also for lime. At this place the limestone is 21 feet thick. It is not quarried, but mined in the same way that coal is mined. This limestone is also quarried incidentally by the Kittanning Clay Manufacturing Company for lime and for flux in the furnace located near by. It was formerly much used for flux in the blast furnaces of the region, but it has been superseded for that purpose by poorer limestone from other parts of the country. In many parts of the quadrangle the limestone is quarried and burned into lime for fertilizer. It is generally hauled by the farmers to their farms and burned in the fields where it is to be applied. This practice is facilitated by the abundant supply of coal which many farmers have at hand. There are ample supplies of limestone easily accessible for this purpose, and it would seem that such use might be greatly extended with profit.

Freeport Limestone.—There are abundant supplies of this limestone in the southeast corner

of the quadrangle, and these are drawn upon to some extent for use as a fertilizer. It was once quarried at Manor and vicinity and shipped to Pittsburgh for use as flux (Second Geol. Surv. Pennsylvania, Rept. II, p. 255), but the industry has been discontinued, probably because the use of the Freeport limestone for flux, like that of the Yauport, has been supplanted by the use of limestone from other regions better adapted for the purpose.

Building Stone.

On the hills southwest of West Winfield the Saltsburg sandstone is extensively quarried. This sandstone practically forms the surface of the flat hilltops here and can be reached by a minimum amount of stripping. The quarry already extends over a large space to a depth of from 10 to 15 feet. The rock is a coarse-grained sandstone in layers of such thickness that it is easily worked. It is suitable for coarse masonry only. The quarried blocks are let down by an incline

to the West Winfield Railroad for shipment. On the east bank of the river about three-fourths of a mile south of the Cowanshannock a sandstone, probably the Clarion, has been quarried to a considerable extent for the same kind of stone, and the same is true of the Freeport sandstone in the west bluff of the river just south of Applewold.

Sand.

At West Winfield the Saltsburg and Clarion sandstones are being ground into sand. In the vicinity of Kittanning large quantities of sand are dredged from the river and used for grinding plate glass at the Kittanning Plate Glass Works. It is also used to a less extent for mortar. The Malomington sandstone is extensively quarried on the west side of the river opposite Ford City by the Pittsburgh Plate Glass Company. It is reduced to sand, which is use for grinding glass at Ford City.

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Analyses of sands of Kittanning quadrangle.

Name of sand.	Locality.	Owner.	Analyst.	Collection.	Free carbon.	Volatiles, hydrocarbons.	Moisture.	Ash.	Sulphur.	Phosphorus.	Evapor.	Color of sand.	Color of bottom.	Character of sand.	Remarks.
1. Clarion.	West Winfield.	A. G. Morris.	E. C. Sullivan, U. S. G. S.	J. S. Burrows.	50.82	16.19	2.30	16.78	52.35		100.00	Slightly red.		Swollen porous.	1-1.44
2. Lower Kittanning.	Malomington.	Malomington Coal Co.	A. S. McCraith (H. p. 222).		49.490	17.55	1.18	4.505	1.969	.604	100.00	Pinkish gray.	56.27		1-1.45
3. " " Do.	Rogers farm west of Buffalo Mills, near county line.		A. S. McCraith (H. p. 282).		48.742	12.72	1.10	5.065	2.313		100.00	Reddish gray.	56.42		1-1.14
4. " " Do.	Kittanning.	Kittanning Clay Man'g. Co.	Geo. Steiger, U. S. G. S.	J. S. Burrows.	52.59	22.09	1.40	9.71	14.62		100.00				1-1.32
5. " " Do.	Mouth of Cowanshannock Creek.				49.49	22.30	3.49	14.30	17.32		100.00				1-1.49
6. " " Do.	Craigsville.	Mr. Bowser.			53.97	27.06	3.89	8.96	14.41		100.00				1-1.42
7. Lower Freeport.	Cowansville.	Cowansville Mining Co.	W. F. Schaller, U. S. G. S.		53.31	31.73	2.92	11.30	15.31		100.00			Hard.	1-1.62
8. Upper Freeport.	Stewartson Farm, off quadrangle.		A. S. McCraith (H. p. 171).		53.343	15.52	1.47	6.61	.853	.0884	100.00	Yellowish gray.	61.91		1-1.56
9. " " Do.	Near Freeport, off quadrangle.		A. S. McCraith (H. p. 392).		50.506	30.805	1.44	5.74	2.819		100.00	Cream.	58.553		1-1.36
10. " " Do.	One mile east of Ewing.	Gallbreath bank.	Geo. Steiger, U. S. G. S.	J. S. Burrows.	49.78	31.65	2.72	15.85	14.00		100.00				1-1.57
11. " " Do.	One and one-quarter miles SW. of N. Buffalo p. 9.	Bruner bank.			46.00	31.37	29.00	2.17	17.46	12.58	100.00				1-1.55

Sulphur determined separately.

Kittanning.