

the following facts. The carbonate of baryta may be used an indefinite number of times; it is rendered caustic anew after each operation, by mixing it with charcoal and heating it, and so it serves again. The loss of the baryta, which is unavoidable is re-supplied from sulphuret of baryum which M. Leplay prepares by calcining sulphate of baryta with 45 p. c. of charcoal, in a reverberatory furnace, and which he would prepare more advantageously still if he would apply the process suggested by Gibbs, which consists in reducing the sulphate by the gas of the refinery. The sulphuret of baryum possesses equally the property of precipitating the sugar, only there are two equivalents of sulphur when one of oxygen would suffice. In fact this last case gives,

$\text{Sugar} + \text{BaO} + \text{HO} = \text{Saccharate of BaO} + \text{HO},$
whilst the sulphuret affords,

$\text{Sugar} + 2\text{SBa} + \text{HO} = \text{Saccharate of BaO, SBa}.$

There is hence lost 1 equivalent of sulphuret of baryum. To avoid this loss, 1 equivalent of potash or caustic soda is added to the molasses under trial; and then on pouring in the sulphuret of baryum, all the baryta is precipitated in the state of a saccharate, and the liquid retains the potassium in the state of a sulphhydrate.

$2 \text{ Sugar} + 2 \text{ SBa} + \text{HO} = 2 \text{ Saccharate of BaO} + \text{SH, SK}.$
The use of caustic potash produces a residue with carbonic acid, like the quicklime, and would be too expensive for the purpose, were it not regenerated with each operation. In fact, the waters after washing are collected in boilers, evaporated, and the product then calcined in a reverberatory furnace with some chalk or lime, and fused. The fused substance is cooled, broken up, lixiviated, rendered caustic by means of lime, and the lyes are concentrated as in the manufacture of soda. The potash is thus obtained for a new precipitation of the saccharate.

In this operation, they obtain not only the potash added in the process, but also the potash and soda which existed primarily in the juice of the beet, and which, by accumulation in the molasses amounts to about ten per cent.

In this manner, MM. Leplay and Dubrunfaut have succeeded in isolating, economically, the sugar of beet molasses. But is this process applicable to the extraction of cane sugar? Yes, on one condition; that is, if the manufacture of cane sugar can be so conducted as to give molasses free from uncrystallizable sugar. For MM. Leplay and Dubrunfaut have shown that for 60 to 70 p. c. of sugar in the molasses, there are 30 p. c. of uncrystallizable sugar, which is a result of the method of manufacture, and not pre-existent in the juice of the cane.

There exists, then, great differences between the manufacture of beet-sugar and cane-sugar; in the former, the molasses contains no altered sugar, and in the latter there is a large quantity of altered sugar.

Manufacture of caustic baryta from the carbonate.—We have mentioned above the general process by means of which MM. Leplay and Dubrunfaut reduce the carbonate of baryta. The point is important and we add some further details; for it has required much time and experiment to accomplish it conveniently on a large scale. The process is now so far perfected, that caustic baryta may be obtained at a very low price.

After reducing the carbonate to powder, it is mixed intimately with 20 to 25 p. c. of pulverized charcoal, then put in a reverberatory furnace made of good refractory brick. At a reddish white heat the reduction commences, and the aspect of the mass shows when it is complete. A single furnace will thus reduce in 24

hours 1200 kilogrammes of carbonate of baryta, consuming 12 hectoliters of charcoal in heating, and 4 hectoliters for the reduction. Three workmen are required. When finished, the baryta is collected in metal cases, ("étouffoirs") large sheet-iron boxes holding about 1 hectoliter, where it is cooled. The artificial carbonate is usually reduced more easily than the native. However, the native carbonate from England is easily decomposed.—*Correspondence of Silliman's Journal.*

The Mines and Mineral Resources of America.

Having presented, in the last number of the *Mining Magazine*, the outlines of the mineralogical character of the New England States, with a view to call the attention of the student of geology and the practical miner to the abundance of mineral wealth known to exist in those States, and desiring its speedy development, I will now proceed to state facts connected with the existence of mines and minerals in the Middle and Southern States, commencing with the State of

NEW-YORK.

The first mineral I shall notice is the primitive or black oxide of iron, at Brewster's Station, in Putnam County. This is an ore of the ordinary black oxide of iron, which produces a fair yield of iron by the blooming process. It may be 50 per cent., as stated; but I fear this is an over estimate. By analyses, selected pieces, very pure, have yielded 79 per cent. This ore is very abundant, extending through the States of Maryland, Pennsylvania, New Jersey, New-York, Connecticut, Massachusetts, and Vermont, into Canada. In Washington, Franklin, Jefferson, Essex, Clinton, Westchester, and Putnam counties, in the State of New York, it is inexhaustible for all future time. Although expensive in its reduction, it possesses qualities necessary to make a fair article of steel. It is very uniform in character from the shores of the Atlantic to the Pacific Ocean.

There is also an abundance of hematite ore in the towns of Ameniam and Ancram, of the same character as the celebrated Salisbury iron of Massachusetts. Lead ore, highly argentiferous, also occurs in several localities in Dutchess County. Amongst the most prominent are the Ameniam and Ancram mines. The latter was formerly worked by Colonel Livingston with success; subsequently the mine has passed through several hands without producing any result; but I am informed it is at present presenting an encouraging aspect. At this location is found ancramitic or green oxide of zinc. It is an artificial production, and was discovered in the bottom of an old furnace erected in the year 1744. According to Professor Silliman, this new ore is cadmia. Sulphate of barytes, pyritous copper, black copper, sulphate of iron, molybdate of lead, and sulphate of zinc, are also found at the Ancram mines.

Hematitic iron ore is abundant in the town of Putnam, a little to the south of Ticonderoga. Marl occurs in several localities in New York; among the most prominent are Boker's Falls, Bethlehem, Catskill, Clinton, Coeymans, Hilderburg, North-East, Rhinebeck, Dutchess County, and in Saratoga, Ulster, and Washington Counties. Little doubt can be entertained that these deposits of marl are to be brought into use by the agriculturist, as most of them possess, in an eminent degree, the fertilizing principles necessary to aid the growth of vegetation. There are many bogs containing excellent peat, not unlike the Irish turf, which is susceptible of being made a very superior article of fuel; but I doubt if it will ever be worked successfully for tallow, oil, soda, pyroligneous acids, or any of the ingredients that have