II. No yellow color extracted by 95 per cent. alcohol but an orange color extracted by a mixture of 10 parts of 95 per cent. alcohol and 1 part of concentrated hydrochloric acid. Filter-paper moistened with the acid-alcohol extract on drying at room temperature, becomes rose-red ..... *Azo-color* ("Tropeolin").

All of the twenty-one samples examined, including those containing eggs, were artificially colored. The color in twelve cases was turmeric, in ten was an azo-color of the nature described, which we have designated as "tropeolin."

As the color in the samples containing eggs conveys the impression that greater amounts were used than were actually present, these samples, like the others, must be classed as adulterated.

ON THE UTILIZATION OF FINE ORE, FLUE-DUST, DOWNCOMER-DUST, AND STOVE-DUST, IN THE BLAST-FURNACE.

By James C. Attix.

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At large furnace plants there accumulates vast quantities of these fine ores—flue-dust, downcomer-dust and stove dust—hereafter to be referred to as fine materials. It is quite a problem and considerable expense to get rid of them. Especially is this the case in the Pittsburg, Youngstown and Lake Districts, where the furnace burden is made up of from 40 to 75 per cent. of Mesabi ores. Not only is this the case where Mesabi ores are used to a large extent, but also at other furnace plants where other ores and especially concentrates are used.

It has been no small problem for furnace managers to work these fine materials. Many methods have been tried to get these fine materials in a shape to be utilized in the furnace and at the same time have the mass porous, or at least in such a shape that when they descend with the furnace burden they will not prevent the passage of the blast and gases.

Briquetting has been tried and given considerable notoriety, especially with the New Jersey concentrates, but so far as the writer has been able to learn, not a ton of these have been made

the past two years. This, by the way, is not because the briquettes do not work well in the furnace, but because a ton of them has thus far cost more than a ton of pig-iron has often sold for.

There is, however, I believe, one brilliant example of the briquetting process still in use and that is, or was, at the Joliet plant of the Illinois Steel Company. At this plant they were elegantly fitted to carry on this work. The furnaces were run to produce a certain composition slag among other things, and this slag was manufactured into cement, and a part of the cement-making materials were utilized to incorporate with these fine materials which were briquetted and dried and delivered to the furnace as a self-fluxing ore and formed a part of the regular furnace burden. They worked well and saved hundreds of tons of good, fine materials which otherwise would have been wasted.

These fine materials are not inferior in chemical composition to ores from which they are derived, in fact, many of them are of considerably better composition. Analyses of these fine materials at the Buffalo Union Furnace Company show iron 62.50, lime 7, carbon 5 per cent. Recent analyses of these fine materials at the Port Henry plant of the Northern Iron Company, very kindly supplied by Mr. L. D. Fraunfelder, chemist and assistant superintendent, show theirs to run iron 51, lime 8.25, and carbon 4 per cent. These materials show, upon analysis, that they are far too valuable to be thrown away. They are self-fluxing and carry a good percentage of carbon to partially reduce them.

Ore running from 50 to 62 per cent. iron, on the dock at Buffalo, is worth from $3.50 to $4.50 per ton.

With a 50 per cent. Mesabi mixture and the three furnaces running full blast there will be from 40 to 60 tons of these fine materials every twenty-four hours. Taking the average of 50 tons at $4.00, we have $200 worth of these fine materials per day.

It is useless to put them back in the furnace in their fine state for they will come over at once with the blast, if put in in small quantities, and if large amounts are filled at a time, they choke up the furnace, thus preventing the passage of the gases and causing the furnace to hang and slip.

The thing necessary then for the utilization of these fine materials is to incorporate them in something which will hold them until they get below the zone in the furnace where they can be carried over mechanically. Many materials have been tried and

quite a number patented for bringing this about. The principal substances employed in the lumping process are glue, tar, molasses, asphalt, etc.

Working along these lines, the writer decided upon the idea of using carbon—or coking these fine materials with bituminous coal. The coal in coking thoroughly incorporates the fine materials, acting as a fairly good carrier, being porous, takes the materials down to the zone of reduction and much of it still further to the tuyeres, carries more than enough carbon for reduction, carries no foreign materials into the furnace, and besides it is cheap. Samples have been made carrying 12½, 25 and 50 per cent. by weight of these materials. The 25 per cent. one, the mean shows, by analysis, to run:

	Port Henry. Per cent.	Buffalo. Per cent.
Iron	14.07	16.51
Lime	2.35	2.11
Magnesium	0.30	0.70
Alumina	2.00	2.30
Fixed carbon	61.28	65.25
Volatile matter	10.56	6.86

These tests were conducted in a clay crucible. The process can be carried on very nicely in a bee-hive oven. A small battery of these can be installed very reasonably and made to pay at a plant running four or more stacks. Any sized plant can be made to pay handsomely where the by-product ovens are used as they are at many plants to-day—and more are installing them. This plan is also applicable at any plant where the coke is made at or near the furnace.

I wish to acknowledge my indebtedness to Mr. L. D. Fraunfelder, chemist and assistant superintendent at Port Henry, N. Y., for his cooperation and analyses.

ON THE CRYSTALLINE ALKALOID OF CALYCANTHUS GLAUCUS.

By H. M. Gordin.

Received December 12, 1904.

Calycanthus glaucus (Willd.) is a shrub growing in Georgia, Notrh Carolina and Tennessee, where it is known as sweet-scented shrub, Carolina allspice or bubby. The seeds (achenes) of the plant are poisonous and have been known to kill cattle that