

By extremely slow heating of Middle Lingan coal—

Volatile.....	21.78
Powdery residue.....	78.22
	100.00

and no further change, of course, was produced in the appearance of the residue by application of a good heat to the closed crucible.

Similar results were noticed in Hartley's report on the coals and iron ores of Pictou Co., Nova Scotia,* for instance, as regards the coal of the Acadia Seam at the Acadia Colliery, while from 65.12 to 68.70 per cent. of firm coke was obtained by rapid and slow coking respectively, by slow heating a pulverulent mass only remained. Further on, in the same report (page 385) is a statement which does not agree with the foregoing; in describing the coals from different benches of the same (Acadia) seam at another colliery, it is said that the cokes of some "were all strong and light, whether by slow or rapid heating, though of course more compact with a slow carbonisation." On this point, he states, "a still more important consequence of a long-sustained and high heat is the condensation and contraction of the coke into a smaller volume."—(*Dictionary of Arts, &c.*, Am. Ed., 1854, p. 429.)

Ashes.—There are not many published quantitative analyses of coal ashes, although general enumerations of some of their constituents are by no means uncommon. Such analyses as are to be found are not all made on the same plan, and there are some curious discrepancies to which it may be useful to draw attention. The most complete series of quantitative analyses of the ashes of bituminous coals was made by Mr. J. A. Phillips during the Admiralty Coal Inquiry, and they are given in the Appendix to the First Report on Coals suited to the Steam Navy, and in Mr. Phillips's Metallurgy, second edition, p. 136. There is a paper giving a number of analyses of coals from Silesia and Westphalia, by M. Becker (*Revue Scientifique et Industrielle*, 1854, p. 161), at the end of which it is said, "Les cendres n'ont pas été analysées quantitativement; celles des houilles se ressemblent du reste en tout; elles ne renferment pas d'alcalis, mais elles contiennent du sesquioxyle de fer, de l'alumine, de la chaux, de la silice, du soufre et de l'acide sulfurique, du chlore et de la magnésie, et des traces d'acide phosphorique." These constituents agree pretty closely with those recorded by Phillips, and those found by myself in all the cases I have examined; but in Muspratt's Chemistry (vol. II, p. 79), is a table giving the composition of the ashes of six American anthracites, and of one bituminous coal from Quin's Run, Pennsylvania, where there is no mention made of chlorine, sulphuric, or phosphoric acid; the constituents given

* *Geology of Canada, Report of Progress*, 1863-69, pp. 375, 381, 382.