

popular name of "gas coals." They soil very slightly, or not at all. The coke obtained from them is sometimes fritted, and partially agglutinated, but never fused into globular, mamillated masses, like that obtained from the caking coals. It varies in amount from 30 to 60, or, in typical specimens, from 55 to 58 per cent. Mean composition (normal cannel): Carbon 80-85, Hydrogen 5.5, Oxygen (with nitrogen) 9-12.5.

5. *Lignites or Brown Coals.*—These coals of Tertiary age, differ greatly from one another in external aspect. Some of the so-called jets—passing into the cannel coals—are black, lustrous, and non-soiling; whilst other varieties are brown, and of a ligniform or stratified structure; or, otherwise, earthy and loosely coherent. All, however, are partially soluble in caustic potash, communicating to it a dark brown colour. The coke—usually of a dull charcoal-like aspect, or in sharp-edged fragments retaining their original form—varies from 25 to 50 per cent. Its separate fragments are rarely agglutinated, except in the case of certain varieties (as the lignites of Cuba, and those from the fresh-water deposits of the Basse Alpes in France) which contain asphaltum. All the typical varieties of lignite, as pointed out by Cordier, continue to burn for some time, in the manner of "braise" or ignited wood, after the cessation of the flame occasioned by the combustion of their more volatile constituents; whereas with ordinary coal, ignition ceases on the flame going out. The mean composition of lignite may be represented by—Carbon 65-75; Hydrogen 5, Oxygen (with nitrogen) 20-30.

All the different kinds of coal, enumerated above, contain a variable amount of moisture, and of inorganic matter or "ash." The moisture rarely exceeds 3 or 4 per cent., although in some samples of coal it is as high as 6 or 7, and even reaches 15 or 20 per cent. in certain lignites. The amount of ash is also necessarily a variable element. In good coals it is under 5, frequently indeed, under 2 per cent. On the other hand, it sometimes exceeds 8 or 10, and in bad samples even 15 or 20 per cent. The ash may be either argillaceous, argillo-ferruginous, calcareous, or calcareo-ferruginous. The ferruginous ashes are always more or less red or tawny in color from the presence of sesqui-oxide of iron, derived from the iron pyrites (Fe S_2) originally present in the coal. If much pyrites be present, the coal is not available for furnace operations, gas making, engine use, &c., owing to the injurious effects of the disengaged sulphur. Calcareous ashes are more common in Secondary and Tertiary coals than in those of the Palæozoic Age. For