Calcium Carbide [1]

Calcium Carbide

by Lindley S. Butler and Kimberley Hewitt, 2006

Calcium carbide, a chemical compound used in the commercial manufacture of acetylene gas, was discovered accidentally during experiments in aluminum processing in Spray (now Eden) in Rockingham County [2]. A local entrepreneur, James Turner Morehead [3], formed a partnership with Thomas L. Willson, a Canadian chemist, to develop an economical method for producing aluminum. Using existing water-power resources in Spray, the Willson Aluminum Company constructed the first electric arc furnace in the United States to procure the high temperatures necessary to reduce aluminum. Combining aluminum oxide and carbon in the furnace was not successful, but the company did commercially produce alloys of copper and aluminum.

In the course of the experimentation, a mixture of lime and coal tar was introduced with calcium for the purpose of producing metallic calcium as a reduction agent in the aluminum process. Following the routine procedure of quenching the results in water for rapid cooling, a large quantity of gas was observed on 2 May 1892. Morehead's son, John Motley Morehead III [4], a chemistry graduate of theUniversity of North Carolina in Chapel Hill[5], identified the new substance as calcium carbide. Lacking gas analysis equipment, they sent a sample to Chapel Hill, where Professor F. P. Venable and an assistant, William Rand Kenan [6], identified the gas as acetylene. In spite of initially lacking a practical use for the new compound or gas, the elder Morehead continued to produce and experiment, believing that the gas had commercial possibilities for energy and especially lighting use. His heavily mortgaged businesses were lost in the panic of 1893, and he was left with little more than samples of calcium carbide.

In 1894 Morehead and Willson convinced New York investors to form the Electric Gas Company to produce calcium carbide and acetylene. Additional experimentation in Spray with alloys led to the development of ferrochromium and ferrosilicon, which were used in the hardening of steel [7]. These steel alloys were important in the development of armor plate and armor-piercing projectiles, which were significant in the late nineteenth-century naval arms buildup. Later power development by Morehead on the James River in Virginia and the Kanawba River in West Virginia, as well as patents in chemical processes and metal alloys, led to the formation of Union Carbide Corporation [8] in Chicago in 1898. Union Carbide was founded with the purpose of producing acetylene gas for use in household lighting and streetlamps, providing an alternative to coal gas and kerosene. The company expanded into producing oxyacetylene for welding in 1911. The 1917 merger of Union Carbide, Linde Air Products, Prest-O-Lite Company, and National Carbon Company created Union Carbide and Carbon Corporation, which quickly developed into a producer of petrochemicals, metal alloys, antifreeze, and synthetics. The company is also known for its role in the horrific 1984 pesticide plant disaster [9] that killed 3,500 people in Bhopal, India.

References:

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Additional Resources:

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Subjects:
Gilded Age (1876-1900) [14]
Industry [15]

Authors:
Butler, Lindley S. [16]
Hewitt, Kimberly [17]
Origin - location:
Rockingham County [18]
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Encyclopedia of North Carolina, University of North Carolina Press.[19]

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Links
[1] https://ncpedia.org/calcium-carbide [2] https://ncpedia.org/geography/rockingham [3] https://ncpedia.org/biography/morehead-james-turner-0 [4] https://ncpedia.org/biography/morehead-john-motley-iii [5] https://ncpedia.org/university-north-carolina-chapel-hi [6] https://ncpedia.org/biography/kenan-william-rand [7] https://ncpedia.org/iron-and-steel-industry [8] http://www.unioncarbide.com/ [9] http://www.unioncarbide.com/bhopal [10] http://acswebcontent.acs.org/landmarks/landmarks/cal/index.html [11] https://digital.ncdcr.gov/Documents/Detail/e.s.c.-quarterly-1952-summer-fall-v.10-no.3-4/4239185 [12] https://digital.ncdcr.gov/Documents/Detail/morehead-family-of-north-carolina-and-virginia/1225329?item=4554118 [13] http://portal.acs.org/portal/PublicWebSite/education/whatischemistry/landmarks/calciumcarbideacetylene/CNBP_026922 [14] https://ncpedia.org/category/subjects/gilded-age-1876-1 [15] https://ncpedia.org/category/subjects/industry [16] https://ncpedia.org/category/authors/butler-lindley-s [17] https://ncpedia.org/category/authors/hewitt-kimberly [18] https://ncpedia.org/category/origin-location/piedmont/r [19] https://ncpedia.org/category/entry-source/encyclopedia-