

WASC 2140

WAI ~~1527~~
561

Extract from
'An American
Powder Maker in
Great Britain'
Lanmot du Pont
1858

WASC 2140
WAI 561

An American Powdermaker in Great Britain: Lammot du Pont's Journal, 1858

by

Dr. Norman B. Wilkinson

Read at the Science Museum, London, S.W.7, on 9th April, 1975

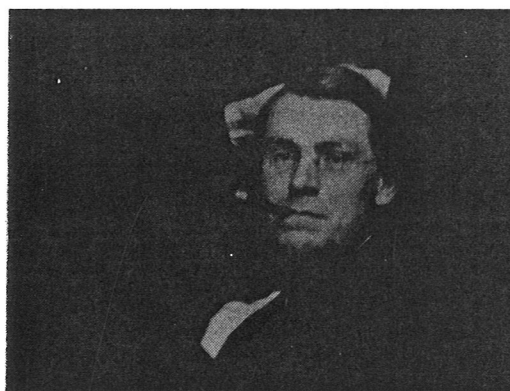
Lammot du Pont (1831–1884) was a third generation member of the Du Pont Company, a family enterprise which by the 1850s had become the principal manufacturer of black powder in the United States. After graduating from the University of Pennsylvania with a major in chemistry he had worked in the family mills on Brandywine Creek near Wilmington, Delaware, for eight years before journeying to Great Britain and the Continent in 1858. His earlier working experience had been refining saltpetre and making charcoal, which, with sulphur, were the ingredients of black powder, the only explosive then known. But knowledge of the complete process of black powder manufacture was soon learned by Lammot under the tutelage of his father, Alfred Victor, and his uncles Alexis I. and Henry du Pont.

His career in the powder business began at a propitious time for it coincided with increasing demands for black powder in railway construction, coal mining, iron and copper mining, and by hunters, traders and migrants who made up the westward movement surging across the breadth of America. Powder was supplied to the U.S. Army and its outposts in Indian country; shipments were made to Central and South America, and manufacturers in the neutral U.S. had sold to both belligerents during the Crimean War (1853–1856). Du Pont Company sales figures reflected this flourishing state of the business, rising from \$258,586 in 1850 to \$694,814 in 1855, the highest they were to reach until rumblings began to be heard of civil war in 1860.¹

For several decades a major effort of American powder-makers had been to find a cheap, effective substitute for Indian saltpetre, potassium nitrate (KNO_3), available only through British brokers who controlled the trade. Lammot du Pont worked on this and in 1857 perfected and patented a process using South American saltpetre, sodium nitrate ($NaNO_3$), which cost about half the price of Indian saltpetre, and the supply of which was not as readily subject to the vagaries of British foreign policy which could shut off shipments to the U.S. in times of crisis.²

The new soda or 'B' powder, however, was too hygroscopic, moisture-absorbing, to be used for hunting, sporting or military purposes. But it was effective as a cheap blasting powder which lowered costs in the burgeoning extractive and excavating industries. When put on the market its quick acceptance gave the Du Pont firm a decided advantage over its competitors.

Fig. 1. Lamlot du Pont (1831–84).
From a daguerrotype, c1860.
*Courtesy of Eleutherian Mills
Historical Library.*



20,000 lb., exceeding in weight any Lammot knew of. They were in operation night and day, producing mostly blasting powder for which there was heavy demand. Twenty-five tons of saltpetre were refined weekly. Materials were moved from mill to mill via boats on the mill race. Fifty-five coopers were employed making barrels and kegs, and the finished powder was hauled from the mills in wagons, each with a capacity of 200 25-lb. kegs, roughly comparable to the loads carried by the larger Conestoga wagons, still the common carriers of powder in America. Lammot's note that the Ballincollig's kegs '... are smaller than ours but they put in full weight' is subject to several interpretations. A very literal reading implies that Du Pont gave short weight in its packing; the second, that it made its kegs a little larger, with some free space to allow the powder to tumble about in the kegs when they were periodically rolled to prevent the powder from caking while in storage.

Tobin gave him samples of blasting powder and of a new kind of powder which had been invented in France. Lammot described it as 'a kind of sawdust'; reportedly it performed very well sometimes, at other times very badly. But it seemed worth looking into '... for from its appearance it might be made cheap enough to supersede powder'. He ended his visit by driving around the outside of the Ballincollig establishment and then went off to see Blarney Castle. He fails to note whether he kissed the Stone.

The time was drawing near for his return home and he had not yet succeeded in seeing those parts of the Waltham Abbey Mills from which he had been barred on his previous visit. On 27 April he wrote to U.S. Minister Dallas boldly stating he thought it was his obligation to assist an American manufacturer whose product was so important to American security:

As you are probably aware I am engaged in one of the principal powder factories in our country and have been on a tour to examine in what respects we are behind the European nations. I have been through the most important private works of England and Europe which manufacture principally for commerce. But I am very anxious to see the government mills of England where they manufacture nothing but cannon powder... As we are the principal contractors for our government I think there can be no objections to requesting a permit as it is the duty of our government to aid rather than discourage our manufacturers in endeavouring to gain knowledge. I should have brought letters from the government to you, but I am still trusting to your appreciation of our troubles.

With little confidence such prodding would bring the desired result, Lammot went to the War Department office and filed a direct application to be admitted to Waltham Abbey. Through the good offices of Henry Byham of the War Office a permit was soon issued to him and he went to the mills on 30 April.

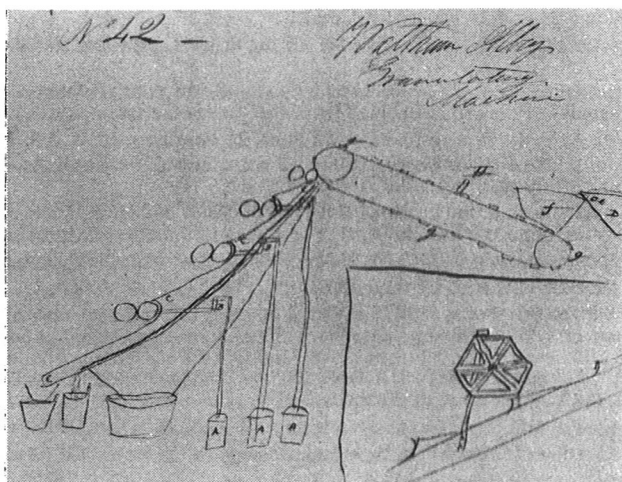
Neither Major Baddeley, the superintendent, nor any other officer was available as guide, so the foreman of the mills who knew 'nothing but the routine of the manufacture' was assigned to him. He was first shown how saltpetre was refined by a new process set forth in a recent aide-memoire; sulphur was doubly refined, the second time by a method of distillation Lammot had not seen elsewhere. Charcoal was usually made from willow and alder but some experiments were being made using English dogwood. Filling the cylinders and loading them into the horizontal ovens above the furnaces was expedited by use of a rail track and rollers. In the press house an endless belt fed powdercake on to breakdown rolls before it went into a hydraulic press to be compressed between plates of gunmetal, a material Waltham had found more durable than wood.

He was much impressed by the granulating machine, declaring it to be 'decidedly the best granulating machine in England or Europe'. It had been built at Woolwich at a reputed cost of £2,000 and it could granulate 8,000 lb. of powder daily, a more complex and efficient machine than the simple device his uncle James Bidermann had seen here twenty years earlier.

Glazing barrels were made of mahogany, 5 feet long and 2 feet diameter, each with a capacity of 270 pounds. Cannon powder was glazed for four hours, musket for six, and then rolled again in reels or bolters to sift out the powder dust. Drying was done in wooden trays with canvas bottoms against which a current of air was directed, a method Lammot had first seen at the Le Bouchet mill in France.

He was given a sample of a new, large grain coarse powder hopefully designed for a more successful firing of the 'monster' mortar he had seen at Woolwich. His guide also gave him samples of musket and cannon powder, and of a slow-burning powder developed for use in the Enfield rifle. Nine pages of notes and observations illustrated with crude sketches of equipment and parts of machines, provide

Fig. 3. Granulating Machine at WALTHAM ABBEY. Lammot du Pont's sketch of what he called 'decidedly the best granulating machine in England or Europe'.
 Courtesy of Eleutherian Mills Historical Library.



a meticulously technical picture of every step in making powder at Waltham Abbey, the prime objective of his stay in England, where he spent four days, from 30 April to 3 May.

On 5 May Lammot boarded the steamship *Fulton* at Southampton, bound for New York. His baggage contained samples of raw and refined materials, finished powder, copies of patents, mill and machinery drawings, pistol eprouvettes, canisters, labels and trade cards, laboratory apparatus (with some special pieces ordered in Paris to follow), and his 104-page journal with rough marginal sketches of machines and other mill equipment. When only three weeks into his tour he had written his uncle, 'I am a poor hand at describing, but I have taken notes of all I have seen and can explain it when I return . . .'¹⁴ Soon, in the small stone office building that was company headquarters he would be showing and explaining to brother Irénée and Uncle Henry what he had gathered and learned during his sojourn in Europe.

Had the purposes for which Lammot made the trip been realized? Did consequences of any import to Du Pont powdermaking technology result from it? In retrospect, upon returning home was he still of the same opinion he had stated in his letter of 16 March to Uncle Henry that ' . . . they are far behind us?' Could he corroborate, or would he now refute the assertion of Henry Drayson, the English powdermaker who had visited the Du Pont mills the previous November, that it would be time wasted visiting European mills with the hope of learning anything new in powdermaking techniques?

Unfortunately no summary evaluation of his journey has been found in his surviving papers or those of the company or his partners. The only subsequent mention of it occurs in a letter written by Lammot's Aunt Eleuthera, a neighbor and shareholder in the firm, to a relative in France:

In the three months he was absent he has contrived to see more than I ventured to hope, besides accomplishing successfully the object of his journey.¹⁵

This paper is printed as it was read to the Society. Another version, entitled *An American Powdermaker in Europe* . . . has been deposited in the Science Museum Library. It includes Lammot du Pont's visits to mills on the Continent and a substantial addendum with sketches of equipment which are unsuitable for reproduction. (Ed)

NOTES

1. E. I. de Pont de Nemours & Co., Ledgers, 1850-1855, Accession 500, Eleutherian Mills Historical Library, Greenville, Delaware. All manuscript citations will be from collections in this repository, abbreviated EMHL, unless otherwise indicated.
2. Patent No. 17,321, 19 May, 1857: U.S. Patent Office.
3. Eleuthera (du Pont) Smith to Lilia Bienayme, 6 July, 1857. Bienayme Family Correspondence, Acc. 521, EMHL.
4. Lammot du Pont Papers, Accession 384, Series B, EMHL, hereafter cited as Acc. 384, EMHL.

N^o 42 -

William Allen
Granulating
Machine

