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Booklet

'Explosions at  
the Du Pont  
Powder Mills'

E X P L O S I O N S  
AT THE DU PONT POWDER MILLS

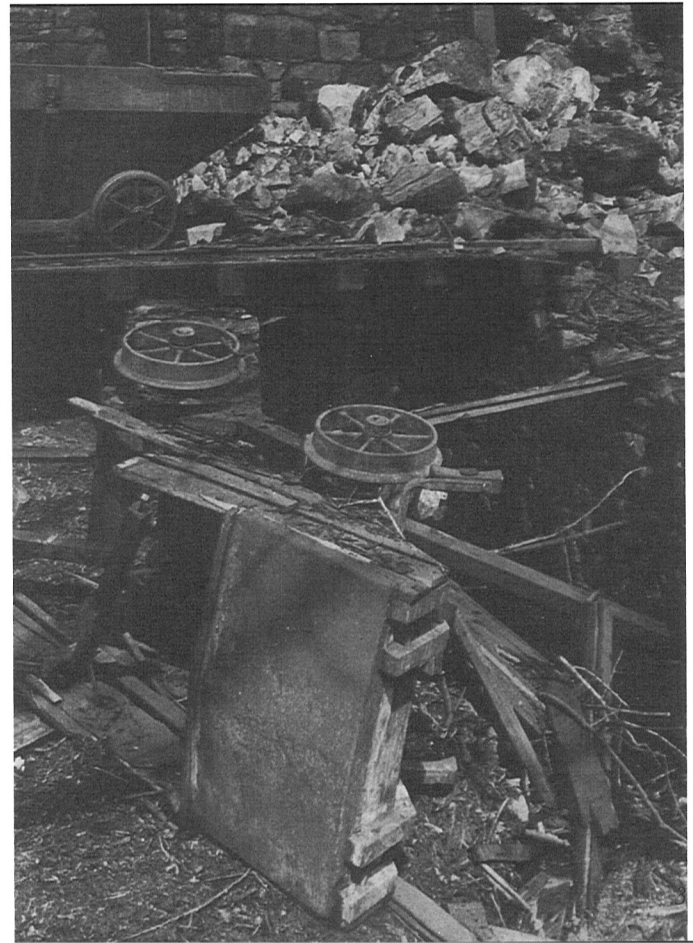
In the course of doing some research on another project relating to the DuPont Company and the family, I kept coming across reports, letters and reminiscences on explosions that occurred at the DuPont Company powder mills. Upon reading these writings it quickly became obvious that these explosions had considerable impact on the Company and the family over the years. Some of these letters and reminiscences are quite dramatic and poignant in their telling. I thought you might be interested in reading them, thus this monograph.

My sincerest thanks go to the Hagley Museum and Library for their work in preparing the Internal Report on Explosions at The Du Pont Brandywine Powder Mills and giving me access to their archives for the material found in this monograph. My thanks go particularly to Jill MacKenzie, Adam Albright, Marge McNinch, and Jon Williams for assistance in overall planning, selecting images, editing, layout, and typesetting. A debt is especially owed to Irénée du Pont, Jr. for his advice, editing and encouragement in undertaking this project.

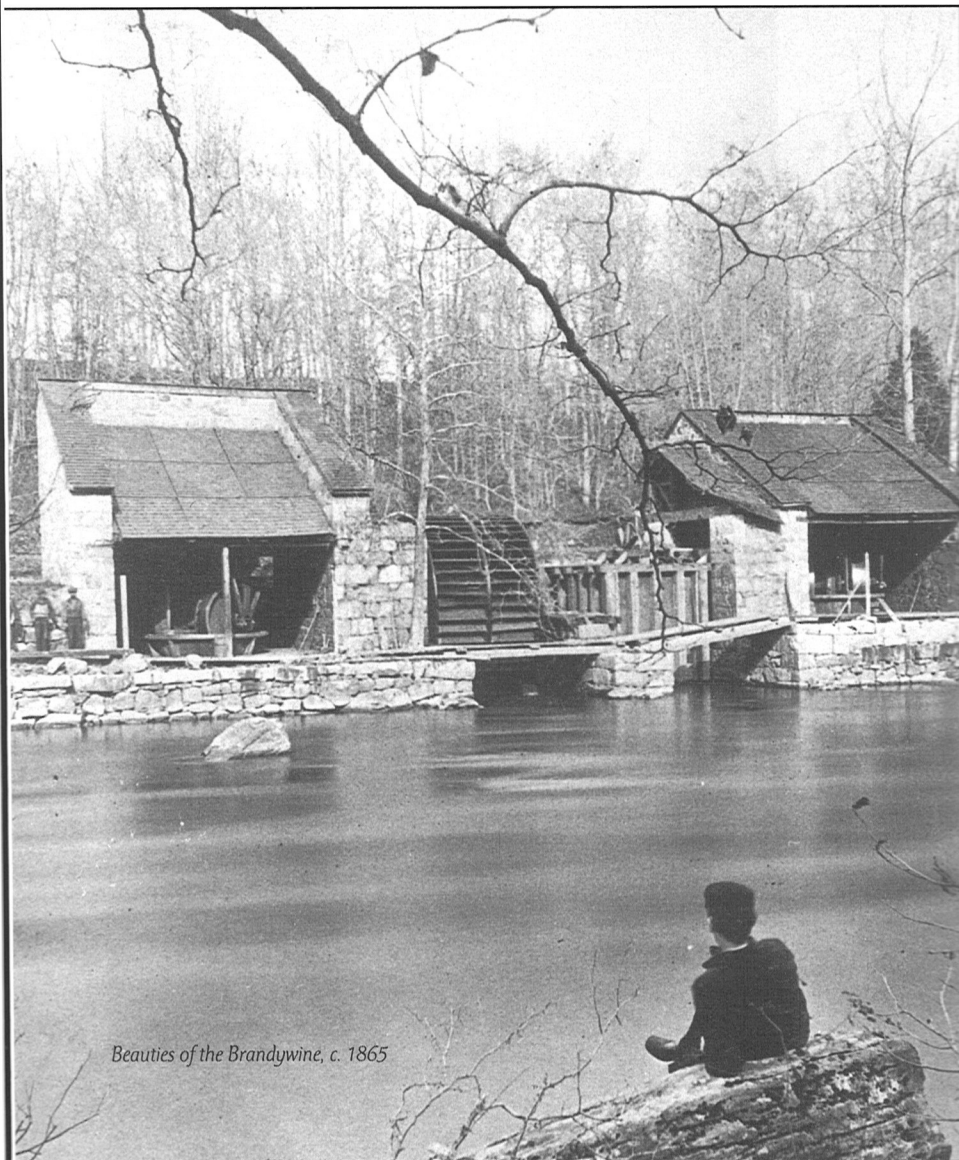
William Hulbert du Pont



**E X P L O S I O N S**  
AT THE DU PONT POWDER MILLS



*Graining Mill, Hagley Yard, after 1921 explosion*



*Beauties of the Brandywine, c. 1865*

## I N T R O D U C T I O N

The manufacture of black powder was a dangerous business. From the time The DuPont Company started business in 1802 explosions occurred regularly often resulting in loss of plant, equipment and life. Alexis Irénée du Pont was once heard to tell a preacher visiting the mills, "Any one in this business should be ready to meet his Maker at any time!"

The Hagley Museum and Library compiled a list of the explosions occurring over the 117 years (1804 to 1921) of black powder production at the Brandywine Mills.

288	Explosions
228	People Killed
60	Explosions (20.83 %) resulted in deaths
5	Largest Explosions Resulted in 107 (46.9 %) deaths
10	Largest explosions resulted in 146 (64.0 %) deaths
5	Explosions with Largest Number of Deaths
	3/19/1818      34
	11/30/1915     30
	4/14/1847      18
	2/25/1863      13
	10/17/1890     12
5	Years With Largest Number of Explosions
	1871      26
	1855      12
	1856      11
	1882      11
	1880      11

Of all the explosions which occurred in the du Pont powder mills in the first 100 years, five stand out from all the rest in terms of their impact on the du Pont family: the Great Explosion of 1818, the 1857 Explosion, the Stamping Mill Explosion at Wapwallopen in 1874, the 1884 Explosion at the Repauno Chemical Company, and the 1890 Explosion.

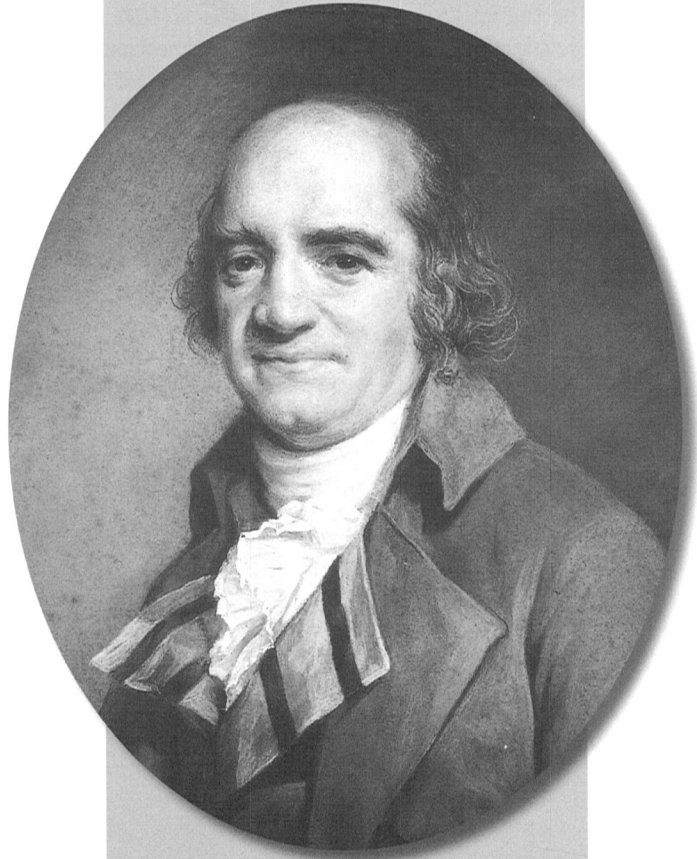
### Pierre Samuel du Pont de Nemours 1739-1817

Pierre Samuel du Pont de Nemours came to America with his two sons and their families in 1800 but he returned to France to be with his wife in 1802. There Pierre Samuel provided great assistance to Thomas Jefferson in the negotiations leading to America's purchase of the Louisiana Territory. He was made Secretary to Tallyrand's Committee to form a new government after Napoleon's first abdication in 1814 and he headed the Paris Chamber of Commerce. With the return of Napoleon, however, there was no room for republicans like Tallyrand and Du Pont de Nemours. The situation was impossible so Pierre Samuel returned alone to America in April of 1815 to assist his sons in their various enterprises.

About the 5th of August 1817, through the carelessness of a workman, a fire started in the charcoal house in the mills just below Eleutherian Mills. In his book, *Du Pont, One Hundred and Fifty Years*, William S. Dutton best described Pierre Samuel du Pont de Nemours's activities in that conflagration:

The old gentleman was retiring for the evening when the alarm was shouted. Pushing aside all who would restrain him, he joined the bucket brigade. He was soaked, singed, and blackened, but he worked as zealously as the youngest man in the line. Next day, hoarse, painracked, and exhausted, du Pont de Nemours kept to his bed. He made light of his condition, but on August 7th, 1817 he passed on to his last and greatest adventure.

While the accident in the powder mills did not kill him directly it was certainly the cause of his demise. Thus, the first casualty to accidents in the powder mills for the du Pont family was Pierre Samuel du Pont de Nemours.



*Pierre Samuel du Pont de Nemours*  
pastel drawing by Joseph Sucreaux, ca. 1795

*Eleuthera du Pont (Smith), oil painting by Rembrandt Peale, 1831 (collection of Henry Francis du Pont Winterthur Museum)*



*Sophie Madeleine du Pont, daguerreotype by Jeremiah Gurney, ca. 1853 (collection of Henry Belin du Pont)*

## T H E   G R E A T E X P L O S I O N   O F   1 8 1 8

The 1818 Explosion was the first major explosion at the du Pont mills causing a great deal of damage and loss of life. The mills were almost entirely destroyed, 33 men and one woman lost their lives, and Eleuthère Irénée du Pont's wife, Sophie Madeleine, was so injured that she never recovered sufficiently to fully resume her duties as wife and mother. The economic loss was so extensive it would have sunk the Company had it been in the hands of less tenacious owners. While there are several accounts of the disaster, the most vivid is that of Eleuthera du Pont Smith, third younger daughter of Eleuthère Irénée du Pont, written between 1861 and 1873. Her narrative relates the experiences and reactions of people living daily under the threat of just such an accident as happened that day:

What I remember about the Explosion of 19 March 1818 – I was then 11 years old – the following account is perfectly correct – This Explosion was always known as the great Explosion.

On Thursday 19 March, 1818, at 9 o'clock in the morning my sister Sophie, myself, & Brother Henry, were preparing to commence our lessons, under our loving and excellent teacher, sister Victorine Bauduy. I was taking our Atlas from the window seat when the first explosion occurred! The window, sashes, glass and all shattered to pieces, flew in my face & cut me in several places but not seriously – our Sister took Henry by the hand & told us to follow her quickly – in the Entry (upstairs) we met Mama rushing out of the door of her room which was exactly opposite to that of our School room. She held in her arms our little brother Alexis, just two years of age. She told us to get out of the house as quickly as possible, to go up the road in front of it. She went with us with the child in her arms. Sister V rushed to Sister Evelina's room for her and her baby not yet six months old – we made the best of our way out with Mama walking over plaster, broken glass, etc. At the moment of the explosion Mama was sitting at her work with Alexis playing on the floor at her side. Feeling the house shake & knowing the cause she bent over her boy and received the plaster on her head thus preserving the boy from all injury but having a wound three inches long in her head. My sister Evelina Bidermann had been very unwell,

was still confined to her room on the first floor and was only just out of bed – She had on only her nightgown and a flannel skirt. My sister Victorine wrapped a shawl around her, seized little James Bidermann with difficulty from the terrified nurse and got her to take charge of her sister and followed her. My Mother, meeting a Swiss in our employ just outside the yard gate, gave Alexis to him and told him to follow us up the road. She urged us to make as much haste as we could so as to be at a distance before the magazine went off. Meanwhile, several explosions had followed the first, the dust mill, pounding mill, granary, etc. We were already beyond the Sand Hole when Mama turned to see Alex expecting Maurice Frankhouse was close behind when she beheld the bewildered man, with the child in his arms, far down the road returning to the house! I was at some distance in front with Sister Lina, her nurse & baby and she had turned down the lane to Mr. Hiron's house, Lina intending to take shelter there. Sophie and Henry however, under the care of Joseph Petit Demange, a boy who took care of the pigs and worked about the house, were separated from us. My Mother seeing her child carried back near the expected danger flew down the road, snatched Alex from Maurice and carried him up the road herself. One of our servants, a very good girl named Nancy McAllister, came up and took the child from her. But this great exertion and the loss of blood from her wound were too much for Mama and she sank down exhausted. They seated her on the roadside in the Sand Hole.

Today, the Sand Hole can be seen on the left just after driving in the Gate to Hagley Library and Eleutherian Mills.

As I was looking back to see my Mother, Sister V and the rest, someone called back and told me Mama had fainted on the road! I ran down to join her but met Nancy carrying Lex. She told me Mama would soon come on and she said I must accompany them and take Alex to the Buck Tavern, a mile from our house, where she and Sister would soon rejoin us. I at once followed Nancy; we were just about half way out of the Sand Hole when the magazine blew up with the most tremendous report I ever heard. Looking up, we beheld an immense cloud of white, thick smoke filling with dark objects, stones, beams, etc., the debris of the building and its contents. Mercifully none fell on us! Our tension increased our speed. We proceeded straight on to Squirrel Run forget-

ting to turn and take the crossing place on the right where there were stepping-stones. We ran through the water over our ankles! It was a clear, cold March day, none of us but Lina had a single wrap and yet not one of us took cold not even I with my wet feet!

When we reached the Buck Tavern a crowd of men were on the porch and seeing my face and hands and dress stained with blood from the cutting of the broken window glass I had received at first explosion, they uttered a cry and one of them rushed to me and carried me into the house, where Mr. Hendrickson washed and bathed my face and hands. Nancy left me with Alex and went back to the house where she took charge of everything and kept faithful guard so that nothing was carried off of any value. I begged the men to put a horse to some kind of vehicle and go for my Mother. The women put chairs for us by the fire, dried my shoes and stockings and we were soon comfortable. When my Mother and Sister Victorine arrived in the cart which the men had taken to bring them in, they said they would ride on to the farm where Billy and Fanny Martin lived then. I got in the cart and Alex was on our Mother's lap. I remember people coming out of the houses on the road and looking at us especially at Walter's house where several women called out to know how we were. We were received at the farm as kindly as they could.

At 1 o'clock Dr. McLane brought Lina and her baby to us in a gig. Her nurse, a Mrs. Moore of Wil. having positively refused to stay with her another day and gone off to town! We were then first aware that Sophie and Henry were not with Sister Lina – she had not seen them and dispatched persons to find them and bring them to her. About three o'clock they arrived, John Simmons (Mary S's cousin) bringing them.

Sophie says that when the explosion of the magazine took place, they were terribly frightened and wanted to find Mama. Someone they met told them we had all gone to the farm, so Joseph Petit Demange attempted to show them the way and they wandered in the woods till John Simmons found them and took them to his father's house where they were warmed and fed. After dinner John took them the shortest way to the Martin's house. Sophie remembers her indignation and shame when Henry declared he was too tired and could not walk any further! But John took him in his arms and carried him the rest of the way. Henry was fat and not at all fond of walking and used to make our sister Lina carry him about too much entirely before she was married.



Mama sent home for mattresses and bed clothes. She and Sister and Alex occupied one bed, Lina and her baby another, while Sophie, Henry and I slept on the floor on a mattress.

At 6 o'clock in the morning my father and Brother Bidermann arrived and awoke us all. I remember Papa's grief when he found Mama had been hurt — (I still have the hair that was cut off when the cut was dressed.)

My Father and Brother first learned the dreadful event at Frankford where the stages from New York then stopped for supper. They were told the explosion had been heard there very distinctly. By this terrible event 32 men and one woman lost their lives and seven persons were wounded. Amongst them was our Uncle Charles Dalmas, Mama's brother, who was then Superintendent of the Hagley Works and lived in the house afterwards occupied by our Sister Lina and Brother B and later by our Brother Alexis who enlarged it to its present size to accommodate his family of seven children.

Uncle Charles Dalmas, on the first explosion, knowing Papa and Brother were absent, ran up to our assistance. He was told we had gone for refuge to Peter Hendrickson's; then someone came saying his sister had fainted in the Sand Hole. He seized a tumbler and was filling with water at the Barn pump to take to her when the magazine blew up! He was struck by a large stone from it, his arm was broken and his shoulder dislocated. The injury was a very serious one; he was conveyed to his own house and suffered terribly for many months afterwards. At one time fears were entertained for his life and the celebrated Dr. Dorsey of Philadelphia was called in consultation. His suggestions did not seem to produce any benefit and Dr. Didier returned to his own mode of treatment which finally proved perfectly successful.

Dr. Didier had been for many years Chirurgien Major (surgeon) in the French army and was extremely skillful. He had great contempt for the American medical knowledge at that period and did not hesitate to call Dr. Dorsey "Un Ane"!!

Our Uncle Dalmas never returned to the Hagley Mills but lived with our parents and after we lost them, with Sister Victorine and our Brother Henry. Brother moved into the Hagley house May 18 and superintended the Hagley powder yard till Nov. 1834. When we lost our dear Father, he took charge of the Business department at the office. Uncle

Dalmas lived in the homestead till his death on the \_\_\_ March 1859 after a long illness, age 78.

Our home was so injured that it required three months repairs before it was habitable. During that time Mama and her six children and little Grandson, James Irénée Bidermann, were received in Uncle Victor's house. Papa, Brother B and our Brother Alfred occupied the parlor of our house which was repaired sufficiently to be habitable.

The powder mills were at once rebuilt. The overseer of the Upper Yard at that time was Mr. Auguste Dautremont, brother of Mr. Alex Dautremont of Angelica, Genesee. He had resided in my father's house when first employed as superintendent but on his marriage lived in the house above the village. He had, it seems, acquired a taste for drink but only indulged freely when he could do so without its being known.

A short time before the explosion occurred, the man who worked the glazing mill came and told Mr. Dautremont there was something wrong in its machinery, that it made a strange noise and he had stopped the mill till it was examined and repaired. Mr. D was extremely upset, accused the man of laziness and ordered him to return and start the mill instantly. The man obeyed saying, "As soon as Mr. du Pont returns, sir, I shall tell him this; you are not yourself even now and not fit for your place and our lives would not be risked thus if he knew it." The workman set the Glazing Mill at work again. Mr. Dautremont proceeded up the hill to his own house and had scarcely reached the door when the mill exploded killing the four workmen and causing all the terrible desolation and ruin. One of the workmen who had overheard what had passed between the Glazing Mill man and the superintendent, repeated it to Papa. After a thorough investigation, Mr. Dautremont was dismissed and returned to Angelica. My Brother Alfred took charge of the Upper Yard from the time it was rebuilt until 1838 Sept. when he replaced Brother B at the office.

Peter Hendrickson, who kept the Buck Tavern, was loading his four-horse wagon with powder to take to a vessel at the moment the explosions began. He cut his horses traces, started them up the road from the powder yard with his whip, followed up after them as fast as he could run. He was knocked down when the magazine blew up but escaped all injury and saved his valuable horses.

On Friday Cousin Charles (Charles I. du Pont), who was in Phila., brought home his sister Julia, who was at Mr. Grelaund's school, for the

Easter holidays. My Aunt came up to the farm to see us and begged so to take me back with her to be with Julia, that Mama consented. I remember that Julia and I slept in Mrs. Chotard's room, that the windows had blankets nailed up against the frames to keep out the cold as there was no glass left and that it was dark, cold and dismal everywhere! However, glazers came and carpenters etc. and in a weeks time Mama and the family arrived. We occupied the library, spare rooms above it and small room next to it.

The Spring was a cold and disagreeably wet one and vegetation was so retarded that on the 17th of May, when Sister took us Maying down along the creek below the wire bridge, towards Bancroft's Mill, we could only gather small bunches of Hepaticas, and wind flowers, blood wort and violets and a few Claytonias: they were not yet fully out! Our disappointment in our May walk would have been extreme had not our dear Sister brought a book to read to us and we then listened to "Aladdin and the Wonderful Lamp."

My Father has often told us that when this great disaster occurred, he had just purchased large quantities of saltpetre from Mr. William Gray of Boston. His great losses and the necessity of repairing the Works made it impossible for him to pay Mr. Gray at the period agreed upon between them. Papa went to see Mr. Gray, explained all his situation to him and said that if he insisted on their agreement being carried out at the time fixed upon, he would receive his money but that Papa would be ruined. If he would prolong the time for payment, Papa could continue his business, repair his losses etc.. Mr. Gray at once said, "Mr. du Pont I know you will pay me as soon as you are able." And was so kind and sympathizing that my Father ever after spoke of him in the highest terms when telling of this circumstance. He if he had another boy to name, he would have called him "William Gray."

Note: Tragedy was a constant specter along the Brandywine in those days. From a perusal of the Genealogy we see that the sadness of child death, for whatever reason, afflicted just about all branches of the family in each and every generation from the beginning to the end of the 19th century. As well, an ever-present fear must have lurked in the minds of all the du Ponts at that time: with the almost regular occurrence of explosions, they were constantly reminded of the terrible potential, "has father, son,

brother, nephew or uncle been sent 'over the creek' to reside in the sand hole?" The sand hole, an easy place to dig a grave even in freezing weather, was a section of ground just beside the family cemetery designated to receive unidentifiable body parts resulting from explosions.

The mills were so constructed that the force of an explosion along with debris and body parts would be directed across the Brandywine, "over the creek"; this, in fact, happened to one poor soul imbedding his bones in a tree such that the tree had to be cut down to dislodge them.

Why would anyone continue to work in such a place as those powder mills? Possibly from a partial sense of loyalty for after all, the owners of the mills labored right along side the workers exposing themselves equally to the hazards of the trade. And from the earliest days a sympathy and compassion drove the owners to pay a pension and provide housing to the widows and furnish an education to the children. Above all, they motivated men to stay on the job and come back after a bad day.

## T H E   E X P L O S I O N O F   1 8 5 7

In about 1903 Francis Gurney du Pont, youngest surviving son of Alexis I. du Pont, compiled a Manuscript Record entitled *Explosions at Brandywine Black Powder Mills*. In this Record he recounts his memory of this terrible 1857 blast which killed six men including his father:

On the 22nd of August, 1857, at 5 o'clock P.M. an accident occurred which was the most unfortunate that ever took place on the Brandywine. Mr. Alexis I. du Pont had decided to remove an old mixing box from the Granary near the Upper Press Room, which was mentioned above as being in a bad condition. He wished to have the building ready for extensive repairs on the following Monday. He had been in the Lower Yard, having gone there to meet Hugh Stirling to give some orders about some work to be done there. It had been his intention to go to St. John's Church which was then building, but had stayed to attend to this matter in the Lower Yard and also to fire some powder with the Eprouvette.

As before stated, he went to remove the old box, when the corner which was outside the building struck a stone wall and ignited, the box being half out of the door. Alexis I. du Pont endeavored to put out the fire with his hands, but failed. The fire ran into the door of the building and communicated with a tub of sweepings which had been left in the building. This exploded, burning the men seriously and demolishing the building. Mr. Alexis I. du Pont was thrown into the road by the force of the explosion and his clothing set on fire. He jumped into the race. His coolness and presence of mind were remarkable. He said that while he was in the race he saw fire fall on the roof of the Press Room on the edge of the wall. The words of the Church Catechism came into his mind and he said to himself – "I will do my duty in that state of life into which it has pleased God to call me", and he ran to remove the fire when the building exploded, throwing him back upon the tables for drying powder in the sun, which are still standing. He was fatally injured, but never lost his coolness and self command, ordering his son, Eugene, to tie his suspenders round his leg to stop the bleeding. When he was placed upon a shutter to be carried home, he sat upright, as I saw him, until brought into the house. Knowing that he had but a short time to live his last moments were an example of Christian fortitude.



Alexis I. du Pont  
(December 1857)

### William Kemble 1850-1874



William Kemble  
1850-1874

Lammot du Pont's older sister, Victorine Elizabeth, married Peter Kemble and their first child was William Kemble. On reaching his maturity, William Kemble aspired to be a powderman and went to work for the DuPont Company. Like all apprentices at that time, William's first few jobs were in the mills at the heart of powder making so that he would learn the business from the ground up. In August of 1874 William was employed in the stamping mill at the DuPont Company's Wapwallopen mill south of Wilkes-Barre in eastern Pennsylvania.

By the mid-19th century the mining industry had become one of the DuPont Company's biggest customers and the anthracite coal mines of eastern Pennsylvania were very high on that list. Transporting blasting powder from the Brandywine to those coal fields was a twofold problem: cost and reluctance on the part of the railroads to carry such a volatile material as blasting powder. Consequently, The DuPont Company bought the powder mills of the bankrupt Parish, Silver & Company on Wapwallopen Creek in 1859. William Kemble's Uncle Lammot du Pont was put in charge of refurbishing and managing these mills.

After the ingredients of powder, charcoal, sulfur and saltpeter, were refined and weighed out in proportion they were all mixed together with water in a stamping mill. Here were rows of bowls – mortars – hollowed out of a great long beam anchored to the floor into which the dampened powder was poured. Heavy bronze-headed pestles connected to a mechanical crank rose and fell grinding and pounding the ingredients in the bowls into a fine blend. This grinding and pounding naturally caused heat so a worker had to regularly tend to the process adding water to keep down the heat. This was William Kemble's job, dirty, noisy and dangerous. In spite of the best efforts of the tender, overheating could occur and an explosion resulted. Just this happened at Wapwallopen on the 16th of August 1874 and William Kemble lost his life in the powder mills.

Because of this tragedy, Lammot du Pont completed the closing of all the stamping mills which were being replaced with rolling mills, a much safer method producing a far better blend.

Seven months later in March 1875 Lammot and Mary Belin du Pont had a baby boy whom they named William Kemble du Pont.

## THE EXPLOSION OF 1884 AT REPAUNO

On March 29, 1884, occurred what was probably the worst accident in terms of loss to the DuPont Company and to the family. The Repauno Chemical Company had been recently established at Thompson's Point, New Jersey, by the DuPont Company for the experimentation with and commercialization of dynamite. Lammot du Pont was in charge of this effort. Lammot was the next oldest son of Alfred Victor du Pont and therefore grandson of Eleuthère Irénée du Pont, founder of the DuPont Company. Lammot was extremely capable in business strategy and negotiation, assisting the DuPont Company in the difficult purchase of saltpeter during the Civil War (it was all imported and had to be purchased through England) and he played a key role in the establishment of the Powder Trust. As well, Lammot was a brilliant engineer and scientist; he perfected the replacement of saltpeter with sodium nitrate to be combined with charcoal and sulfur for the manufacture of black powder. Sodium nitrate from Chile was plentiful, easy to acquire and cheap. Lammot also developed many other chemical and mechanical processes improving the manufacture of their products. Lammot du Pont was killed in the 1884 Explosion.

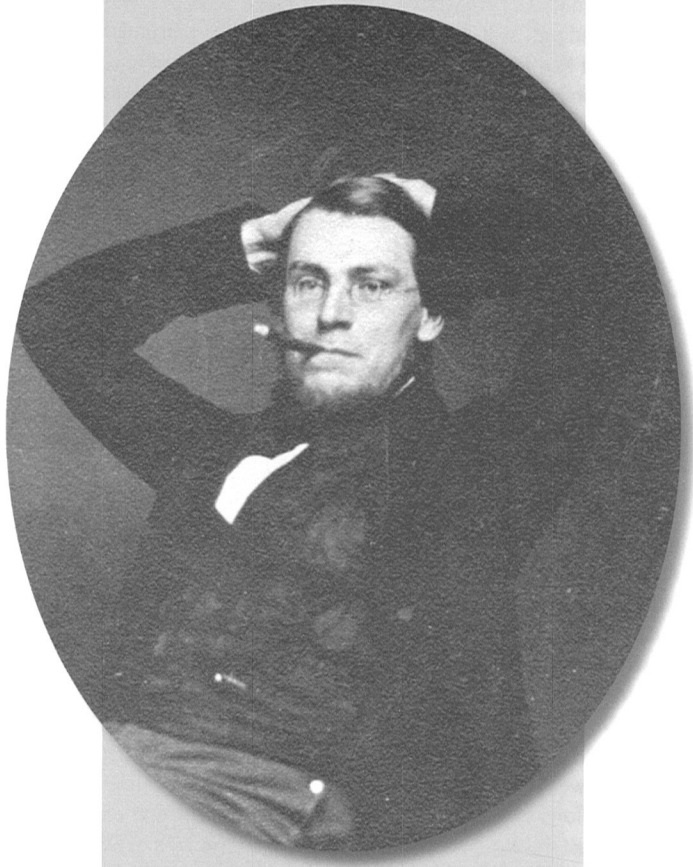
Francis Gurney du Pont, Lammot's first cousin, worked closely with him in the powder mills and Francis best expressed the grief and loss to the family in two letters to his brother, Alexis I. ( II ), immediately following the accident:

April 1, 1884

My Dear Lex;

Your letter came today after we have put all that remains of Lammot to rest until the last day. I have been shocked and grieved beyond belief. I did not know I would feel his loss so keenly. It is fearful. As the account in the papers is all wrong, I will write you the particulars.

Eugene and I went to Repauno at once on learning the news. Lammot had been for years trying to save the acids after the fabrication of N.G. (nitro glycerin) in their pure state. He did this by running the charge into a small tank and letting it settle. The N.G. rose to the top and by



*Lammot du Pont  
circa 1856*

pouring in strong SO<sub>3</sub> he floated it off and then regenerated the acids. This process had never gone beyond a laboratory experiment until this year. They were not running the N.G. house on Saturday and had drawn off the last charge Friday and placed it in a lead lined tank over night. Saturday morning the men found it decomposing and fuming to such an extent that it seemed to be boiling. Lammot had gone to the works to see Ackerson of the L. & R. Co's office (Laflin & Rand) who had an appointment with him. He was in the laboratory when one of the men came from the N.G. house to say that something was wrong. Lammot and Hill went up to the N.G. house, saying to Ackerson to wait till they came back. Ackerson became tired of waiting and went towards the building, and was within 40 feet of it when the explosion came. His neck was broken. Lammot worked with this fuming N.G. trying to stir it into the water tank, and finally told the men to leave, and he and Hill left and had got but 10 ft. from the building when the explosion came. They were buried under earth, while Norcross and the two men were killed with timbers. [The construction of the building included an enclosed bank of earth, above ground level, upon which sat the N.G. tank. It was this bank of earth which buried Lammot and Hill.] The three men were about 30 ft. in front of Hill and Lammot and Ackerson was beyond them. Had they left one minute sooner they would be alive now. Lammot was anxious for the result of his experiment and did not wish to give up, and so stayed later than he would had the fuming taken place in the regular course of manufacture. None of the bodies were badly mangled. Lammot was not disfigured in the face but was crushed in the body and ribs broken. I saw his body and was pleased to see that his face looked perfectly natural and peaceful, but death gave to the features a look of unutterable sadness that I do not remember to have seen on any other dead body.

To give you an idea of how sensitive N.G. becomes when allowed to stand with the acids instead of at once running it into water, Lammot some time ago took a cup and went to the N.G. house and got a little of the charge of mixed N.G. and acids and set it out in the sand over night fearing to leave it in the laboratory. In the morning, he came and took a pipette and drew up a little N.G. and was carrying it into the laboratory when a single drop fell from the tube and struck the ground, going off like a percussion cap. Now if a small quantity could become so sensitive, how must the charge have become on Saturday morning.

Hill was a fine chemist and a man after Lammot's own heart. Norcross was a good superintendent. I know from experience how Lammot

acted. When he saw that it was time to go, he sent Norcross and the men away and then retreated with Hill, only reaching the foot of the steps where he always said a man would be safe in case of an explosion, relying on the thickness of the bank. Whereas the bank buried him. The explosion was not a very severe one, the timbers being in large pieces and a good deal of the building being left on the spot.

Just look at the results of this explosion. Lammot — 9 children; Hill — wife and 3 children; Norcross to have been married on Thursday; Ackerson, a husband of one week; the two men who worked the N.G. both to be married shortly. I tell you this is heart-rending, all our little differences with Lammot have vanished, I can bring myself to remember only the many, many pleasant hours I have spent with him, and the assistance he gave me from his experience when I first came here. I have scarcely had another thought but of him since the accident. He was universally beloved, and many letters have poured in on us condoling our loss. Men came from Cleveland, Canada, Cincinnati and the West as well as from the North to be present at his funeral.

Well I have given you all the details I can think of at present. It is easy for me to think of all that is past and to see the scenes before me but I cannot describe them. I can only think of the fearful crash that ended his life without time for thought, and in the words so familiar to me from weekly use, "From sudden death, good Lord deliver us," pray that our family may be spared any more such afflictions.

Your affectionate brother

Francis G. du Pont

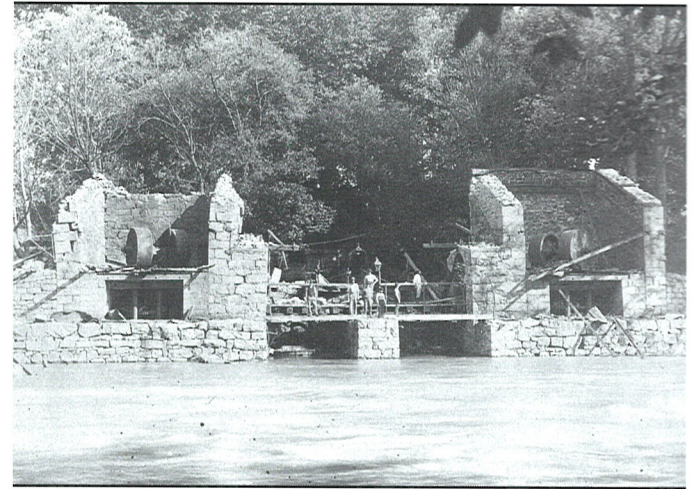
April 7, 1884

My Dear Lex:

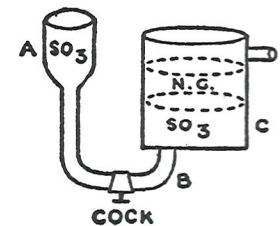
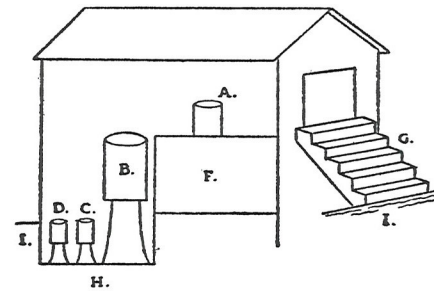
As your letter came to hand just as I have some leisure while waiting for dinner, I will write to tell you my theory of the accident at Repauno, and any other news that may be of interest to you. Lammot and Hill had experimented on a small scale and had made the proper arrangements for keeping down the heat. As I stated before the men had drawn off the charge on Friday evening and allowed it to come to rest, Then had floated off the N.G. by adding strong oil of vitriol thus: a funnel tank held SO<sub>3</sub>, and was connected with another small tank by a pipe and cock. They then left matters alone. On Saturday morning they put 6 carboys SO<sub>3</sub> in the small tank and drew off more N.G. Now as they

only had a small quantity to run off, I am pretty sure they did not start the agitators in the wash tank, and they drew some  $\text{SO}_3$  over with the N.G. This went down in a stream through the water in wash tank and heating started the N.G. to decompose in the wash tank. They sent for Norcross. He not finding himself able to stop the bubbles coming up through the water, sent for Hill, as I stated in my letter. Now my reasons for thinking the men did not start the agitators is that everyone says that no steam issued from the exhaust that day, and it seems reasonable that as Norcross was not there, that the men supposed that as they had but a small quantity to run off, that they could do so without agitating. A fatal mistake even by the old process as the  $\text{SO}_3$  would have gone to the bottom partially mixed with water and caused heat. Willard, who is general manager of the Hercules Co. agrees with me perfectly, and he is a very practical man with a thorough knowledge of the subject, and has spent some time at Repauno questioning the men and examining the scene of the accident. So you see when Lammot and Hill got there they would not suppose that the stuff had been run off without agitation, and the heating going on under 4 ft. of water, the fumes would not show so much, and so they were deceived. One thing is pretty certain, if they had adhered to the old method of working, which is to turn out the charge into a large volume of cold water, the accident would not have happened. Lammot has left no will and his capital is very much extended in various enterprises, and it is to be a big job for the executors. I believe Bidermann [probably Antoine Bidermann du Pont, 1837 – 1923] and H. Belin are to be executors, and Alfred, guardian. Aunt Sophie [widow of Admiral S. F. du Pont] bears it well, though much shocked by it. I spent an hour with her yesterday evening, she seems pretty well. Mary [Mrs. Lammot du Pont] is calm, and hopes no ill will come to her children, and thinks not, this from Amy [Mrs. Eugene du Pont] to Elise [Mrs. Francis G. du Pont] – I was sorry to hear that you had had the first experience with croup. I had a little experience in that line with Ernest, but it was soon over. We are all well here, having a very backward spring. All very busy and troubled about Repauno. The other stockholders are offering help. Things are pretty much as usual, running about full on the Brandywine. Prices ruling low. Coal region troubles pretty bad. Selling to mines, probably will win the fight if we persist. With love to Bessie [Mrs. Alexis I. du Pont], I am,

Your affectionate brother,  
Francis G. du Pont



*Explosion at Rolling Mills, Lower Yard, July 5, 1889  
Photo by Pierre Gentieu*



*These two diagrams were included in letters from Francis G. du Pont to his brother, Alexis, in which he explained his theory of the accident at Repauno.*

## T H E   E X P L O S I O N O F   1 8 9 0

Francis Gurney du Pont was right there on the scene when the explosion of 1890 occurred and his words best describe it:

On Oct. 7, 1890, the most disastrous explosion that ever happened, I will say – in the world – occurred at 3:28 P.M. That some idea may be formed, I will first give my own sensations on hearing it. I had returned from the west the evening before and had spent the morning “catching up” with what had been done in my absence, and had been in the office till 12 o'clock and at 1:30 P.M. I went to Hagley and the Keg Factory. At the latter place I looked for Wm. Green for some work that was before him, but learned that he had gone to the Upper Yard. I left the Keg Factory a few minutes before the half hour and had reached the foot of the hill in front of the Millwright Shop, and was just about to turn up the hill when a low sound as of a Rolling Mill nearby, occurred. I pulled up the horse and was stepping from my carriage when the most tremendous explosion I ever heard, occurred. The day was very foggy and the leaves on the trees shook in a manner that was astonishing. The glass from the windows of the Millwright Shop flew out to the middle of the road striking the wheels of the carriage. Volumes of dust followed. Seeing this I became convinced that a severe explosion had occurred in Hagley and several more shocks though not so severe followed the second one. My horse was restive and I had some difficulty in restraining her, but a man (Fulton) whom I had met as I turned towards the hill caught her head at my calling him. I had scarcely got clear of the carriage as the last shock came, and I was running with all the millwrights looking for an explosion in the upper end of Hagley. We ran to the bend at the Upper Rolling Mills and there met a man who said there was no trouble above, and all feeling sure that the shocks were near where they had been, ran back to the Millwright Shop to see if it was the Lower Yard. On arriving at the shop a telephone message assured us that it was not there. Then I took Henry Miller and drove rapidly to the Upper Yard, and the first sight that met our eyes was the flame from the Dust Mill which contained no powder and was set on fire. Such were my experiences of the disaster.

The explosion to have started in the old middle Magazine where Wm. Green and McGarvey were soldering prismatic boxes. Wm. Green's



*1890 explosion in the upper yard*

*Residences (double houses, right to left): Samuel Grogan, Tom Callahan, James Ward, Mary Dougherty*

*The building with the tower was known as the Bell House. The basement of this building was used in the winter to split chestnut fence and rail posts for farm property.*

*The Eleutherian Mills Barn is in the background, and the vegetable garden is in the foreground.*



body was not much disfigured, he was lying upon the bank and all his clothes were on, his breast and body were not much burned, but his face was burned. McGarvey's body was thrown in the little stream near the dry-house and the stones from the dry-house were upon him. He was mangled, his head and arms were gone, but his legs were hardly burned, but his shoes were torn off. Evidently either Green was outside when the fire took place, or he ran out. That this building exploded first is shown by the fact that the chimney of the soda house was knocked down in the direction away from this building, and also Charles Murphy was walking along the wall in the field on the other side of the creek and saw the fire burst out of the building, when he jumped down behind the wall. Also Gilsingham was standing in the door of the soda house, and saw the fire originate in that house. The Mixing-house followed containing about twenty-five tons [later estimated at forty-five tons] of powder of the highest grade. In this place the lower yard team had just placed 3,000 lbs. And had just got to the stable when the accident occurred. There was about 15 to 20 tons [estimated later as 35 tons prismatic] of prismatic in the first building or magazine, and also about two tons of Eagle grain. The dry-house followed simultaneously with the mixing-house and it contained about four tons of powder. No one was in the Dry-house, but Harrigan was in the Mixing-house and he was blown to small pieces so that very little was found. He had been at the upper Magazine with John O'Dougherty and they both started for the Mixing-house together, but the latter was called by Henry Keen and delayed until the explosion occurred, thus saving his life. The mixing-house blew the old Packing-house, called the Separating-house and out of this had gone Samuel Buchanan [who was in the Eagle Packing-house at the time of the explosion] but three minutes before. In the Separating-house was the day's work — about six tons and 13 tons Eagle grain in a room annexed. The old Hexagonal Press Room followed, containing 40 to 50 tons of powder of all kinds — "fuse", "meal", "Roll cake, and every kind almost. In this building were James Dowling and Michael Hurleke. James Dowling had about \$1,000.00 of his earnings in this building. Nothing much was found of either of these men. Old Dan. Harkins was found in the pond in front of the door, he said he had been on the porch, he lived one week. It is strange that he should have lived at all. He was not much injured and if he had been a younger man would probably have survived. He was about 75 years old. John Dennison was in the little Engine-house at this building and was buried in its' ruins. He was not much injured and soon recovered.

A missile thrown from the Hexagonal Press room blew the Graining Mill in which was a pressground, and killed Martin Dolan, Newill Dougherty and John Hurleke. Kelly the driver of the team was in front of and he talked to John Deevy and stopped him from going into the mill, saving his life. The men in the mill were bewildered and could not get out. The mill was not running. Kelly was very cool and after all was over unharnessed horses from the cart. One of these horses had its leg broken. In the Graining Mill was about 3000 lbs. of powder, making nearly 100 tons [estimated later as 150 tons] in all that exploded. Toomy the boss of the yard was in the Dry Glazing Mill and ran out and got some distance away when the last explosion occurred. The stones from the Hexagonal Press were thrown through the roofs of both Glazing Mills and the Dust Mill was set on fire. This Press Room must have blown the Graining Mill, and at the distance it is away, it is a pity it went.

To sum up, the number of buildings that blew up was seven. The Magazine, the Mixing-house, the Canister-house, the Dry-house, the Separating-house, the Hexagonal Press Room, and the Graining Mill. The Separating-house situated as it was about 150 ft. from the houses on the upper banks and containing 13 tons of Eagle powder made terrible havoc with houses. The roofs were torn off and the sides torn out of frame houses and floors caved in in stone houses. In these houses was killed Mrs. Dougherty a very old woman, mother of John Dougherty the Magazine and Packing-house man, and a baby of George Dougherty, who worked in the Prismatic Press room. The soda-house was a complete wreck, the entire roof falling in, girders trusses and all, the stack falling, the gable being knocked down and the boiler-house gable also, the boiler fronts being broken. The Specific Gravity-house was unroofed and large parts of the wall knocked down, a stone weighing 100 lbs. falling on the table of the balance and crushing it to pieces. A keg of powder from the Canister-house also fell into this room. The old soda-house was unroofed as well as every one of the coal houses, the new coal house having every truss broken and splintered. Charles and Pierre were in the laboratory. Charles was about to go up to the Magazine where Green was working. Almost nothing at all was found of the men who were killed except Green and McGarvey. A horse in a team near the small coal house was struck by a stone and killed, and with the one whose leg was broken, made two horses killed, as the latter had to be killed. A white dog was killed as well as innumerable

chickens whose bodies strewed the ground. Out of the Magazine were thrown eleven boxes of Prismatic unburnt.

Why Martin Dolan and the three men in the Graining Mill could not get out is a mystery. Grant who was standing in the door of the Press Room had time to put 60 ft. between himself and the Press Room before the Graining Mill blew. It is strange that the men could not have got at least far enough from the door to have had their bodies saved whole. One of the men, Patrick Dougherty, did, his body was found whole in the race afterwards. The barn was unroofed and the Soda Store-houses at the du Pont Station had holes blown in the slate and timbers cracked. Windows in Hagley and Wilmington were broken; the damage in Wilmington being quite large and the crowd of people that came out was very annoying. A guard of 125 men was placed around the place on the Sunday following as a matter of precaution, and it was found necessary before the day was over as the crowd was excessive. The loss and damage by this explosion is very large and the amount cannot now be estimated. As for the cause, it is hard to find. Green was a very careful man and the soldering was done with a solder that melted at about 240 degrees and could hardly have set fire to the powder. The only plausible reason for the explosion would seem to be that Green carried fire in on his sleeve from his furnace, and setting fire to the box, escaped far enough from the door for his body to remain whole. The affair is wrapped in mystery, for though soldering boxes of powder would seem to the uninitiated to be dangerous, it really was not so if carefully done. The destruction of the Upper Yard removes historic buildings and obliges the complete and safer rebuilding of the plant. There has not been much demoralization among the men, only two have left (Oct, 24) – Kelly, the driver and a man named Jones who worked at the prismatic press. The behavior of all the men employed in and about the mills has been considerate and excellent, and all have been willing to put themselves to inconvenience to improve the sad condition of affairs.

The 1890 explosion had an effect in many ways throughout the family. "On that fateful afternoon of October 7, 1890 young Louise du Pont, age 13, was sitting in the big room at Winterthur – about two miles from the mills by the way the crow flies – with her mother, brother and cousins the Robinsons from New York making crosses on chestnuts they were about to roast. Her mother cautioned her to be careful of the plate she had

taken, one of the best ones. "Oh," said Louise, "Nothing can happen to it." At that very moment a tremendous blast sounded, the plate shot across the parquet floor in twenty pieces, every pane of glass in the five windows of the room and most of those elsewhere broke." Fortunately, Louise, her mother, brother and cousins the Robinsons were unhurt.

Louisa Gerhard du Pont, widow of "Boss" Henry, lived at Eleutherian Mills which suffered substantial damage in the 1890 blast. Old Cousin Louisa had had enough of explosions and moved out. Eleutherian Mills was left vacant except for occasional use as a mens' club. About thirty years later Col. Henry Algernon du Pont bought the house from the DuPont Company and restored it for his daughter, Louise, the little girl from whose hands flew the precious plate across the parquet floor. Louise du Pont Crowninshield beautified and lived happily in Eleutherian Mills for the rest of her life.

It is a wonder that any of the family houses just up the hill from the mills remained standing through those many terrible explosions which occurred throughout the 19th century. Remember, it takes only one ounce of black powder to propel a twenty-four pound ball seventy-five yards from an eprouvette and some of those explosions consumed tons; the 1890 blast was 150 tons! It's a mystery.

The destruction of plant, equipment, windows and even plates in the 1890 explosion was unfortunate, but the loss of human lives as in any of the explosions was the real tragedy; twelve lost their lives that day including William Green, a fellow worker and good friend of Francis Gurney du Pont. It was a terrible day.



*Windows broken in  
Christ Church after  
1890 explosion  
Taken October 7, 1890*



*Lower yard rolling mills after explosion on July 5, 1889. Mr. and Mrs.  
Francis Gurney du Pont are at the left edge of the photograph. Photograph taken  
on July 6, 1889 by Pierre Gentieu.*