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HARKNESS' MAGAZINE

SCIENCE

LITERATURE

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MARCH, 1873

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dead. And while living please do not forget that your interest in the concern gives you editorial influence. Hence a hint to the wise, get the best friend you have in the world, outside of your family, to pay you one dollar for a year's subscription to HARKNESS' MAGAZINE, to which send it, at *Wilmington, Delaware,* and believe you have sown seed in good soil, and that seldom in your lifetime have you done a wiser act.

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It is because it will enable the enterprising, industrious, honest, worthy and moral city of our choice and adoption, struggling as she now is, to shake off the vestments of a second-class city, and don those of a first class American metropolis.

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Therefore let no Delawarean forget the value of that dollar, or fail to send it to us immediately. Thousands of the friends of Delaware in other States, are helping her also to get what the most of them heartily rejoice in,—AN ORGAN WITH A NATIONAL CIRCULATION. LET DELAWARE BE TRUE TO HERSELF.

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MANUFACTURERS' AND MECHANICS' DEPARTMENT.

A SKETCH OF THE LIFE OF OLIVER EVANS,—A REMARKABLE MECHANIC AND INVENTOR.

BY REV. GEORGE A LATIMER,

Rector of Calvary Church, Wilmington, Delaware.

The following sketch was prepared in compliance with a resolution of the Historical Society of Delaware, and was read at its annual meeting, on the 10th of October, 1872. It was also read on the occasion of the opening of the Wilmington and Western Railroad, on the 19th of October, 1872.

The opening of a new Road is not a single work, but has its manifold connections with persons, places and things. The Geographical, Historical, Biographical, Commercial, Mechanical, Scientifical, Artistical and even the Moral, are all thereby developed. Hence the inestimable value to the immediate neighborhood, the State, and the Country of any such enterprise. It brings into activity, latent power, mental, moral, social and political; which power seems to fall in, as a necessity, to meet the rapid progress of the world at large. If this be true, what an incalculable advantage to the State of Delaware is the opening of such a Road as the Wilmington and Western Rail Road within its boundaries. With a splendid terminus on the Christiana near the Delaware River, at the busy City of Wilmington, increasing wonderfully as it has for the past few years, in size, population and business—running through a magnificent and fertile portion of the State,—crossing other roads in the same State, and connecting with roads in other States—it is destined to make immense advances in all departments of our Commonwealth.

THE BIOGRAPHY

which this road has called up from the depths of forgetfulness, is that which concerns us, in this article. Biography, which would, otherwise, have scarcely been recovered from the mouldering remains of by-gone days. How strange! that the opening of the Wilmington and Western Rail Road should call forth, as it were, the spirits of those who were first and foremost in the propulsion, by steam, of carriages, over land and water, in this and other countries.

Fulton, on his farm at one end of the line—Evans, in his mill at this end. From first to last, as their names are now united by the iron rail, so were they united in their experiences, while living. In childhood, while other boys of the same age were at play, they were both engaged in planning, drawing from the very amusements of their companions the foundation stones of all their future, noble, and world-renowned designs and inventions. As they opened their secret thoughts to the public, and gave their plans to the world, each received as his reward, the ridicule of the community. And after struggling against opposition, and at times, even beggary, they departed this life, leaving a name, and not much more, to their bereaved children.

It was once observed concerning one of the smallest of the cities of Palestine, "though thou be little among the thousands of Judah, yet out of thee shall He come forth, that is to be Ruler in Israel." "And of Zion, it shall be said, this and that man was born in her." Thus have certain places been made memorable, not by their size, nor beauty, nor wealth, nor power, but by the birth of some, perhaps, poor and apparently unknown individual, within their borders, who afterward became famous in the annals of the world. Many great men, great minds, have come from little, quiet, unnoticed, out-of-the-way places. The surroundings were very unpretending and unfavorable, yet all the time, great powers of mind were being developed therein.

The little town of Newport, Delaware, is one of these places. Near its borders was born the subject of this sketch, who, though not always a resident, lived long enough thereabouts to have the saying applied to it, *This man* was born there; and thus gave to it, a name and a degree of importance. From this place, from this individual, has gone forth the development of a power which has benefited the world. Although the source of intense labor, mental and physical, to him, yet to us, what pleasure to see the gradual growth of a thought—an idea assuming shape; rude and apparently unmeaning at first, becoming the substantial, graceful, useful machine, used in nearly all the civilized portions of the globe, almost essential to the health and happiness, the progress and prosperity of mankind.

OLIVER EVANS

was born in Newport,* New Castle County, about three miles south of Wilmington, in the State of Delaware, in the year 1755. He was the son of Charles Evans, and a descendant of the Rev. Evan Evans, D. D., the first Episcopal Minister in Philadelphia, who died in 1728.

He had seven brothers, named respectively, Joseph, Thomas, Theophilus, John, Jonathan, George and Evan. His father owned the property in Newport, now in possession of John Jordan, John Evans and John Stewart, and fifty acres more or less, now owned by Franklin Fell Esq., and upon which the Faulkland Spice Mills are located, on the Faulk Road. Oliver seems to have been born with an inventive mind, which manifested itself early in life, walking with his head downward, his hands behind him, as if in a deep study.

When a mere boy, he was led to the study of the possibility of moving land carriages without animal force, which he considered a very desirable object. He had heard of various attempts having been made, by means of cranks, wheels, pinions, springs, wind, &c., all of which appeared to him, as too futile to be worthy of application, for the want of original power. When about 18 years of age, being an apprentice to a wheel-wright, on a Christmas evening, one of his brothers informed him that he had that day been in company with a neighboring blacksmith's boy, who for amusement had stopped up the touch-hole of a gun barrel, then put in about a gill of water, and rammed down a tight wad; after which they put the breech of the gun in the smith's fire, when it discharged itself, with as loud a crack as if it had been loaded with gunpowder. "It immediately occured to me," says he, "*here is the power that I want to propel my wagon*, if I knew how to apply it, and I immediately set myself to work to find out the means." From this simple amusement of the boys, he discovered that great fundamental principle in nature, the increase of the elasticity of steam, by a more rapid ratio than the heat of water may be increased, and that this principle could be applied to work very light and powerful engines, to propel land carriages and boats; which discovery finally produced his Columbian Steam Engine, which for 43 years he endeavored to introduce into public use. Here we see the development of *a thought.*

At the age of twenty-two, he discovered and invented two machines for making wool and cotton cards, to take the place of the tedious hand-tools then in use. His time was so much occupied, that it was a long while before he could find leisure to test the principles of his discovery, until he met with an accident, being dangerously wounded in the foot, by a scythe. While in this condition he took the opportunity and succeeded in making small models, with wood. His father's family becoming acquainted with his plans, united argument with ridicule to dissuade him from what they termed his *visionary* schemes. Not succeeding in their efforts, they gave him up as lost, as a "metamorphosis" from an industrious man to a whimsical projector. Indeed, such little value was attached to his model, that even the blacksmith to whom he

* Since the above was in type, authentic information has been received, that OLIVER EVANS was not born within the bounds of Newport, but on the property now belonging to Mr. John Jordan, in Christiana Hundred, New Castle County, Delaware, between two and three miles north-west of said village.

applied, considered it a useless gim-crack, and Mr. Evans, an infatuated inventor. The blacksmith refused to work for him, on such visionary schemes, until George Latimer, Esq., (who about that time was a member of the Legislature of the State of Delaware) by his persuasive arguments, aided by the eloquence of some good old Jamaica spirits, of which no other person had any near that place, at that time of scarcity, and which he promised to place at the smith's service while on the work, prevailed on him to undertake the job; which succeeded so well, that they all changed their language, and nothing could surpass the wonderful ingenuity of Oliver. The card manufacturers of Wilmington, having learned the excellent qualities of his machinery, made offers for the secret, but so patriotic was Evans, that he could not think of selling it to individuals, to the exclusion of the public; and, as the Legislature of Pennsylvania was in session, he presented a memorial to it, stating the nature and importance of his discovery, and praying for the loan of $500, to enable him to construct a wire-mill in the State of Pennsylvania, with a machine attached to it, for the purpose of bending and cutting the wire into card teeth, agreeable to the principles of his invention. The Legislature appointed a committee to take the memorial into consideration; who, like the parson in the fable, lavished their eulogiums, but would lend no money. After this, he showed his cards, and described his invention to a person of celebrity in the City of Philadelphia, stating to him the individual offers that had been made, but that he preferred the public loan. This person treated his patriotism with seeming ridicule, which caused him to relinquish all hope of success from that quarter, and he returned to Wilmington, where, urged by necessity, he contracted to make a machine which should manufacture five hundred complete card-teeth per minute, and obligated himself to keep the art a secret for two years, for the trifling sum of $200, reserving only the privilege of selling one other machine. While this machine was being constructed, the contractors suspended their manufacture for twenty days, saying, so inferior was the old workmanship, when compared with Mr. Evans' method, that it only spoiled the wire. The machine was soon completed; and, instead of five hundred, as per contract, it made three thousand per minute, and so far exceeded their expectations, that they immediately contracted for the machine which had been reserved, and both parties were penally bound to keep the art a secret. It nevertheless became known, and others obtained the use of the machine.

A plan for pricking holes in the leather for two hundred pair of card-teeth in twelve hours, and also, for cutting, bending, and setting the teeth, soon after devised by him, he is said to have abandoned, because of his failure to secure a due share of the benefits of the previous invention.

In the following year (1782) he contracted, in company with two of his brothers, to build a merchant flour-mill in New Castle County, in the State of Delaware; and in the fall of 1783 left his store in Queen Anne's County, to superintend its erection.

He now began to study how he could make this mill exceed all others; and having been successful in inventing several useful improvements, he had strong hopes of succeeding in this also. He first conceived the great design of applying the power that drives the mill-stones, to perform all those operations which were hitherto effected by manual labor, viz: for receiving the grain from the wagon or ship, until manufactured into superfine flour, ready to be packed into barrels; but being neither millwright nor miller, he had first to ascertain what operations were to be performed by manual labor, and conceived it possible to execute the whole by the power of water, and that the improvement would be extraordinarily great. Intense was his joy when he found that the principles he conceived might be applied to raise both grain and meal, and convey them in any direction, or angle, ascending or descending, or horizontal, which joy was still further increased when he put the principles in operation, and were found to work very satisfactorily. These improvements in mill-machinery for the manufacturing of flour, consisted of the *Elevator*, or endless chain, with buckets to raise the flour or grain to any required

height; the *Conveyor*, to carry the grain or meal from one place to another; the *Hopper-boy*, to spread or gather the grain or meal, and thus to dry or cool it; and the *Drill*, to move the grain or meal in any direction, like the Conveyor, but by means of rakes instead of buckets; to which he added originally, *the Kiln-dryer*, to dry and cool the meal as it passed through the elevator, and hopper-boy. But these improvements, and their introduction into public use, cost an immense amount of time and labor,—a great expenditure of money which he could not well spare—much criticism and ridicule—and many law-suits. Months of the most intense thinking were spent in baffling with apparent absurdities, but hoping against hope, he worked with a zeal and dogged perseverance, peculiar only to inventors, until his ideas resulted in discoveries, inventions, and patents.

It is said, that the board on which he would lie for hours, cogitating upon his plans and improvements was only lately destroyed by fire at the burning of the old mill at Brandywine Springs, Delaware.

Some time in September, 1784, he declared to several individuals that he intended to build a flour mill that would perform what these improvements were intended to do, without the aid of manual labor in the attendance, but no one would believe it possible. He got the name of a visionary projector, about to ruin himself by attempting an impossibility. Yet his arrangements for the construction of the mill were so far completed, before he began to build, that he declared he had in his bed viewed the whole in operation with much mental anxiety.

On the 5th of September 1785, the mill was set in operation, in the old way, requiring three men, and a boy one-half of his time, to attend it, in the manufacture of 20 barrels of superfine flour, besides the middlings and stuffs every day. But on the introduction of his improved machinery, one man could always after attend the mill, night and day, make the same quantity, (20 barrels of flour per day) and making about four barrels more out of every hundred bushels of wheat, than had usually been made. These improvements to the mill, though perfect in theory and in principle, met with many unforseen difficulties on being put into practice; and besides, they were so expensive, that he was often greatly discouraged. Unwilling to proceed at his own expense in completing the whole of his improvements, he asked aid of the rich and established Brandywine millers, and others, by way of subscription. But they declined, saying, they believed no man, who had neither been bred a miller nor millwright, could ever make any improvement on the manufacture of flour *in their mills*; they believed the art to be perfect in their own establishments, and would not, therefore, subscribe a dollar; which refusal on their part, caused others to withhold any aid.

These Brandywine millers stood very much in his way, discouraging him by word and deed.

He showed his proposition to James Latimer, Esq., one of the millers, describing his invention and improvements. With a significant tone, he exclaimed, "Ah! Oliver, you can not make water run up hill, nor can you make wooden millers." But when he saw the hopper-boy doing its duty incessantly, day and night, better than man could do the same labor, he expressed great astonishment; and his son, the above mentioned George Latimer, Esq., coming in at that moment, advised him to petition the different State Legislatures for an exclusive right to use his inventions.

Evans now thought that every millwright and miller, as soon as they saw the mill in operation, would be anxious to adopt the improvements, yet these were the last to be convinced, and, generally speaking, the most violent opposers. One day in 1789, when superintending the mill, having left it to attend itself whilst he made the hay of a clover lot, he observed two of the Brandywine millers coming to view it. He pretended not to see them, preferring their going into the mill, and not finding any person there; so that on seeing every operation performed by machinery alone more perfectly than it was possible by the hand of man, they would be fully convinced of its utility. They stayed in the mill about half an hour, then

came and requested him to go in and explain, which he did; and after parting, went back to the hay. He supposed they were perfectly satisfied, but soon after heard that on their return, they reported the whole to be *a set of rattle-traps*, unworthy the notice of any man of sense; which fixed, more firmly, the opposition of all the rest.

A year or two after, he exhibited the model of a mill (which he had made to send to England) in the streets of Wilmington, Delaware, when a number of respectable men gathered around, and were admiring it. They espied a Brandywine miller on the opposite side, whom they called to see it, and so completely shamed him, that he said with apparent reluctance, "Oliver, thee must come tomorrow morning, and prepare to set it up in my mill." When the whole was set in motion, in the completest order, in the mill, all the millers round the hopper-boy remained in silent astonishment, until one of them exclaimed, "It will not do! It cannot do!! It is impossible it should do!!!"—it doing perfectly well at the same time.

In accordance with the advice of his friends, the Latimers, he petitioned the Legislatures early in the year 1786; and acts were passed early in 1787, in Pennsylvania and Delaware, in favor of his improvements in the manufacture of flour; and in Maryland, and New Hampshire for the same, including carriages to be propelled by the powerful Steam Engine which he had invented. During this year, while waiting on the Legislature of Maryland, he was introduced to an old sea captain, named Masters, at Annapolis, who had obtained the name of a projector, by having contrived a machine to draw trees up by the roots. At the Captain's request, Evans explained his Columbian Steam Engine, that he might explain it to the engineers and people of England.

Soon after the establishment of the present Federal Government, the first Patent Laws were passed, and Evans applied and obtained a Patent for his mill improvements, dated January 7th, 1791, thereby relinquishing his State Patents. These inventions were one of the three objects for which patents were granted during the first year that the present Patent Office was in existence. His price to those who wished to avail themselves of his improvements, was so small, that the term of his Patent right expired without sufficient money in hand to compensate himself and his agents for their time and expenses; besides, leaving by supposition some $10,000 in the hands of infringers of his rights, who neglected or refused to pay.

About this time he removed to Philadelphia and kept a Flour store at the corner of Ninth and Market Streets. Nearly the same time, he met with a description of the curious toy called the pulse-glass; and at once he conceived that the principles and operations therein, might be applied to mechanical purposes, for raising water, or turning mills. He set his mind immediately to discover the means of application. After being engaged in this study, at leisure hours, for nine years, and having formed a great variety of plans, of which none appeared sufficiently simple to be worthy of experiment, he at last brought forth what he considered, "the simplest and perhaps most philosophical steam engine ever conceived." Specifications and drawings thereof, described, were filed by him in the Patent Office, that they might not be lost. He also sent drawings and descriptions to England, by Joseph Stacey Sampson, of Boston, for the purpose of seeking some one to take out a Patent there, on shares with him; but Sampson wrote from London, that he could find no one to believe the scheme would prove useful; they could not understand the project, and had no faith in it. "Thus, at the age of forty" Evans says of himself, "I was reduced to such abject poverty that my wife sold the tow cloth which she had spun with her own hands for clothing for her children to get bread for them; my head was covered with many gray hairs, and I required spectacles." This was brought about especially by his intense study in the preparation (for three years previous) of his Millwright's and Miller's Guide; the first practical work, it is believed, on the subject of mill construction, published by an American author. But when finished and ready for

publication, he had not the means, and it would probably have been lost, had not John Nicholson, Esq. been informed of the case, and his circumstances, who assumed the expense to the amount of a thousand dollars. The first edition of his work appeared in 1795, and amongst the names of the subscribers thereto, were George Washington, Thomas Jefferson, Edmund Randolph and Robert Morris. Evans thought it would sell rapidly, but in that he was sadly disappointed. Many had subscribed to encourage the work, who did not really want it. 2000 copies were published, some few of which sold at three dollars. "My agents," says he, "carried them to show the millers and millwrights, and gave away a great proportion of the edition to them, by orders from me, for the purpose of getting my improvements introduced. One of my agents traveled for *thirteen years*, to instruct millwrights and millers to make and use the improvements, and to sell licenses; he often declared his belief that he rode about 100,000 miles on that business." Evans having prepared a plate and printed descriptions of his improvements in the manufacture of flour, distributed them in different parts of the United States, to be set up in public places. One of his brothers traveling to disseminate the improvements, put up at a tavern where one of these plates was placed. He observed a number of Germans looking at it, and heard one of them exclaim, "now dis mus peen sum tampt lazy fellow do mak dem gondrivers; quite too lazy to work," which was confirmed by a hearty laugh. At another time, a German falling into conversation with Evans himself, at a public place, and not knowing him, informed him amongst other things, "that a grazy man comes py our millers, he tinks he gut mak wooten millers."

In 1801, he commenced, and at a cost of $2000, besides his own time and labor, which he valued at $1000 more, at last, produced a steam engine, realizing in practice, the whole of his theory; and in the winter of the following year had it in full operation, its performance exciting considerable attention and curiosity.

During the next year, he became the first regular steam engine builder, in the City of Philadelphia, at the Mar's works, on the corner of Ninth and Vine Streets.

About this time he entered into a solemn contract with a Mr. Edwards, Engineer, from England, and spent two months in furnishing him with complete drawings and specifications and descriptions of his Columbian, Inexhaustible, and Volcanic steam engines; all of which he could execute, and set up with his own hands. Edwards sailed from Philadelphia, but Evans never heard a word from him.

When Evans petitioned the Legislature of Pennsylvania for the exclusive right to his improvements in making wool and cotton cards, steam carriages, &c. the committee to whom his petition was referred, conceived him to be crazy, because he said he could make steam-wagons, and would have nothing to do with it, notwithstanding the utmost efforts of the above named George Latimer, Esq. to convince them that all his inventions were worthy of their attention. While Evans was exhibiting his little steam engine in Philadelphia, during this year (1803) driving 12 saws, cutting stone at the rate of 120 feet in 12 hours, he discovered the Chairman of the said committee in the crowd of spectators, viewing the powerful operations with evident marks of astonishment. Saluting him, he said, "Sir, this steam engine goes on the principles with which I had intended to propel my steam carriages when I petitioned the Legislature in 1786, or '7, and which I endeavoured to explain to the committee. If you had granted me then, the exclusive right for 25 years, it might have been driving wagons, boats and mills many years ago." His reply was, "to tell the truth, Mr. Evans, we thought you were deranged when you spoke of making steam wagons."

On the 26th of September 1804, he laid before the Managers of the Philadelphia and Lancaster Turnpike Company, a comparative statement, in detail, of the superiority of his steam engine to transport merchandise from Philadelphia to Columbia, and from thence to Philadelphia, over the tedious and expensive method by horse wagons, asking an appropriation, by them, of the sum necessary to put

it in operation. The Company, however, declined to accept his proposition, having no confidence in it.

In the month of December, following, Evans petitioned Congress to extend the term of his patent for an exclusive right to his improvements on flour-mills; in which petition he gives an insight to the ups and downs of an inventor's life. It was referred to the Committee of Commerce and manufactures, to whom he gave a more comprehensive statement of the various objects he had in view. The Committee reported favorably, and obtained leave to bring in a bill. By the principles of this bill, every patentee who survived the first term of his patent, had the privilege of extending it for another term of seven years, provided he had complied with the requisites necessary for taking out the original patent. The bill was well received in Congress. Evans was highly pleased at the prospect which now opened, of his becoming instrumental in rescuing his fellow laborers, when engaged in new and useful discoveries and improvements, from the oppression, perhaps injustice, and privations, under which they generally labor, and placing them on equal ground with the rest of mankind. During these flattering appearances, he issued proposals for publishing by subscription a new work, to be entitled "The Young Steam-Engineer's Guide," that he might be collecting subscribers while waiting the passage of the bill. But on the third reading, a most energetic opposition arose on grounds unexpected; the friends of the bill were not prepared to meet the arguments used, and it was consequently lost. He says of this, "his plans have thus proved abortive, all his fair prospects are blasted, and he must suppress a strong propensity for making new and useful inventions and improvements; although, as he believes, they might soon have been worth the labor of one hundred thousand men."

Notwithstanding all these trials, during this same year he constructed for the Board of Health of Philadelphia, at the corner of 9th and Market streets, a machine for cleaning docks, which he called, the Orukter Amphibolos or the Amphibious Digger. There were other dredging machines in existence, but this was the first, moved by the application of steam. It consisted of a heavy flat-bottomed boat, 30 feet long, and 12 feet broad, with a chain of buckets to bring up the mud, and hooks to clear away sticks, stones, and other obstacles. These buckets were worked by a small steam engine of five horse power, set in the boat, the cylinder of which was five inches in diameter, the length of stroke, nineteen inches; and the weight of the whole machine, was equal to two hundred barrels of flour. "To shew," says he, "that both steam carriages and steam-boats were practicable(with my steam-engine) I first put wheels to it, and propelled it by the engine a mile and a half up Market street, and around Centre Square, to the river Schuylkill. I then fixed a paddle-wheel at the stern, and propelled it by the engine, down the Schuylkill, and up the Delaware, 16 miles, leaving all the vessels that were under sail full half way behind me, (the wind being ahead,) although the application was so temporary as to produce great friction,and the flat most illy-formed for sailing; all of which was perfomed in the presence of thousands." There are those now living, amongst whom I may name, the venerable John McAllister, father of the well known, present, Opticians, on Chestnut street, Philadelphia, and Dr. Elder, of the same City, who were eye-witnesses of the performance of this singular craft. While the experiment was being made, some wags exultingly ridiculed it, saying, "it went quite too slow ever to be of any use for carriages," to which Evans replied, "if you will, amongst your jockeys, make up a purse of $3000, I will make a steam carriage that shall outrun the swiftest horse you can produce, on a smooth, level, hard bottom."

This successful attempt to move a locomotive carriage in the streets of Philadelphia, and a boat on the Schuylkill, with the same apparatus, by means of paddle-wheels, in the opinion of the British Engineer, Mr. Galloway, fully establishes his claim to the first contrivance of a practical steamboat."

In a work published by Evans some time after this experiment, after giving an account of its success, he adds by way of a foot-note, "Mr. Evans makes no

pretensions to exclusive right to steamboats, although he believes that he was the first in the United States who conceived the practicability of propelling both carriages and boats by steam. Yet Fitch, Rumsey, and others were engaged in making steamboats as early as 1784, 5, 6, or 7, and succeeded to make them run perhaps as fast as Fulton has yet done. But at that time (1814) the profits did not so well support the expense, where they were tried, so they were abandoned. Rumsey went to England to introduce them there, and died. Fitch went to introduce them on the Western waters, and died also, before he succeeded. Mr. Evans only claims the right to apply his own steam-engine and other improvements which he invented for the purpose of being applied to his boats and carriages, and which he endeavored to induce Fitch to adopt, as early as in 1784-'5, or '6, but could not prevail on him."

During the years 1804 and '5, quite a sharp written controversy was carried on between Evans and one John Stevens, of Hoboken, New Jersey, the latter intimating that Evans had "stolen his powder," whereas, it seems, the reverse was the fact. A part of this controversy was based upon a printed Circular Letter, which Evans laid before the members of Congress, individually, in the month of January 1805, giving a concise description of the principles of Steam-Engines and especially of his inexhaustible and volcanic steam engines, and his perpetual Still. His letter was sent by Dr. Mitchell, a Senator from the State of New York, to his friend, Dr. Miller, one of the editors of a periodical work called, "The Medical Repository," for publication. Stevens having read it, thought proper to publish an answer in the very same number of the work.

About this time Evans published his "Steam Engineer's Guide," to explain the principles of his inventions, which he considered "as abstruse and difficult a work as ever was published." In this year, also, he entered suit in the United States Circuit Court, against Benjamin Chambers, for infringement, &c., which resulted in his (Evans') favor.

On the 5th of October, 1805, he published another work, entitled, "The Abortion of the Young Steam Engineer's Guide," to meet the arguments of his opponents, which caused the failure of Congress to pass the Act for his relief, as hereinbefore mentioned. The book contains "An investigation of the principles, construction and powers of Steam-Engines; a description of a Steam Engine on new principles, rendering it much more powerful, more simple, less expensive, and requiring much less fuel than an engine on the old construction. A description of a machine, and its principles, for making ice and cooling water in large quantities in hot countries, to make it palatable and wholesome for drinking, by the power of steam; invented by the author; and a description of four other patented inventions," with an appendix containing a concise account of the invention and improvements of Steam-Engines, and also, the controversy between himself and Stevens.

A short time afterward, reflecting upon these trials and discouragements, he says, "I was left in poverty at the age of 50, with a large family of children and an amiable wife to support, for I had expended my last dollar in putting my Columbian Steam Engine into operation, and in publishing the Steam Engineer's Guide, a work still more difficult and abstruse than the Millwright's Guide, to explain my principles, and those improvements. It had brought on grey hairs again, and the use of spectacles, and greatly injured my constitution and health a second time, but which I soon regained upon quitting intense study, and resuming active bodily exercise—but the grey hairs and the use of spectacles I could never get rid of."

A year after, an opinion by a Judge of the United States Circuit Court was communicated to him, that a patent right for a useful invention was an infringement of the public right. To infringe the public right he despised; and on account of this decision, in a fit of vexation and despair, at the request of all his family in heart-rending tears (because they had reduced them to abject poverty) he committed the drawings and specifications of eighty inventions and discoveries to the

flames, wishing to rid himself of their burden, that he might pursue the means of procuring an honest livelihood without infringing the public rights.

On the 23d of October, 1807, in the Circuit Court of the United States for the District of Pennsylvania, before Judges Washington and Peters, he was non-suited, on account of a deficiency in the description of an invention; its butts and bounds were not described, infringements could not be ascertained. The Judges, therefore, declared the patent invalid, null and void. Whereupon, on the 21st of January, 1808, he presented to Congress a petition stating the facts; and, on the day following, an Act for his relief was passed and Letters Patent granted, securing to him exclusive right, and extension for fourteen years. This Act stimulated his inventive genius considerably, so that, against the current of prejudice and opposition he was enabled to push forward his improvements on Steam Engines to such an extent, that in a few years he had constructed and put in operation no less than twenty-five Engines, in Pittsburg, Natchez, Cincinnati, Louisville, Frankfort, Lexington, Middletown, (Connecticut), Providence, (Rhode Island,) and other places throughout the States. Now he strove to retrieve from their ashes some of his most important inventions, specifying them over again, with great labor, leaving them to await their time when, as he himself states, "Congress shall make it possible for any of my posterity to put them into operation." But he was not to enjoy the advances he had made, without opposition. A memorial was presented to Congress by John Worthington and others, complaining of the injurious effects of these Letters Patent, on account of certain innovations of Evans, between the expiration and renewal of his patent, and the high prices at which he rated his licenses. Evans also presented a memorial. They were both committed to a committee of the Senate, who, on the 22d of February, 1813, reported through Mr. Bayard, "That the subject of the memorials is of considerable interest and importance to the community, and involves difficulties which would require more time and patient investigation fully to understand than can be bestowed upon it during the remnant of the present session," and asked to be discharged.

Previous to this time, the Brandywine millers were his studied opponents, now the Baltimore millers beset his way, with considerable opposition. Evans instituted suits against them as infringers of his rights, which were tried before the Circuit Court of the United States for the District of Maryland, Judges Duval and Huston being on the bench. Upon a few days sifting of the whole matter, verdicts were obtained in favor of Evans, upon all the suits instituted. Considering that these verdicts were rendered in a Maryland Court, by a Maryland jury, against a stranger, surely is an evidence of the lawfulness and justice of the verdicts. Yet the defendants were not at all satisfied nor did they allow the matter to pass without further effort. On the 28th of December, 1813, they presented a memorial to Congress, "praying relief from the oppressive operation of Oliver Evans' Patents" * * * "with evidence to show that the said Evans was neither the original inventor nor first applier of said machinery, and consequently not entitled to the reward," &c. But the committee of the Senate, to whom it was referred, deemed it improper to interfere with a decision which properly belonged to the Judiciary, and upon which they had passed their verdict; and hence, they reported adversely to the petition of the memorialists. A letter from Thomas Jefferson, presented with other documents in the above mentioned petition for relief, contains some very unsound views in regard to the Patent Right System. According to his theory, Archimedes should have been the patentee and not Oliver Evans, for his Steam Engine and Mill Machinery. The inventor alone should be entitled to a Patent and not the applier. On the 7th of January, 1814, Evans answered this memorial of the Baltimore millers, and the letter of Jefferson, fully and satisfactorily, which was published in "Niles' Weekly Register," as an addenda to volume V, under the sarcastic title of "A Trip made by a small man in a wrestle with a very great man."

In this answer, he says, "The mind of the inventor was entirely too fertile for his means. When he applied to the millers of his vicinity to contribute to the

expense of constructing and maturing his improvements in flour mills, and to share in the use of them when completed, they refused, and no one could be found to pay anything. Of this he complained to influential gentlemen, who advised him to petition the legislature for exclusive rights—and thus originated his first application to government, before the patent laws or federal government existed. He observed at that time, 'that if government would purchase all his inventions (meaning all that have been named) and sell licenses to the people, it would be sufficient to pay the public debt and free the country from taxes.' These were his expanded conceptions at that early period, and these are but a part of what he has conceived. At that time he had but feint conceptions of the opposition to the introduction of his improvements, and the insult, abuse and robbery, he had to meet as soon as the value of his inventions would appear, of the great labor and expense of maturing his improvements, of the tedious law-suits he should have to sustain, to defend his rights, to wear away his patent term before he could begin to realize any profits. Now the great thirst many would have to be thought the inventor, after the utility of his discoveries should be known—the numerous and false pretensions they would set up, the intrigues and corruptions that would be practiced to support their claims and defraud him of his rights; the powerful combinations that would be formed by the unjust and hypocritical to calumniate him, the glaring falsehoods that would be propagated to excite the indignation, even of the best and most just, most eminent men against him, until they could be undeceived. Little did he think that 29 years should pass away, instead of 14, before half of his improvements could be commenced, or that they should die with him."

He also alluded particularly to the immense sum, annually, which his inventions would produce in the hands of the government, which he desired would purchase, or take in charge. "The writer forbears to calculate the vast amount, for the reader would say the man is deranged. The whole truth would not bear to be told in this case; for the Indian who had seen Fitch's steam-boat, when he returned to his country, and was relating the many wonders he had seen, was listened to until he said he had seen a great canoe run up stream by fire and smoke, was knocked down by one of his hearers, who exclaimed, 'I knew that you were lying all the while, but this is too great a lie to be borne with !'"

In another place he says concerning his mill improvements, "I may suppose that those who have refused to use my invention for thirty years since they might have had it, have hired and paid at least 3000 millers, at the expense of 300 dollars each for wages and boarding per year for thirty years, amounting to the enormous sum of 27.000.000 dollars, which my improvements might have saved them in labor. But as there is ten times as much gained by the improvement of the manufacture, as there is in labor, that saving or gain would amount to 270.000.000 more, making a total of 297.000.000 of dollars—enough to pay the National debt. If the figures have erred in making the sum too large, I am not the inventor of them; all will allow that the labor is saved." And again, he says, "if they," (the United States) "had purchased or had taken control of all his improvements, and sold licenses at their own price, they would have defrayed the entire debt of the Nation, paid the current expenses of the same, and freed the people from the payment of any Tax whatsoever."

During this year, he published, in the form of a satire, under the assumed name of "Patrick N. I. Elisha, Esq., Poet Lauerate," his celebrated "Patent Right Oppression Exposed," dedicated "to the Right, the Honest millers throughout the United States." It is a sharp, stinging rebuke of those who so persistently and unreasonably attempted to interfere in his dearly purchased rights, in the use of his many inventions. In this work, we find the celebrated "Prophecy by the Poet," that "the time will come when people will travel in stages moved by steam engines, from one city to another, almost as fast as birds fly, fifteen or twenty miles in an hour. Passing through the air with such velocity, changing the scene in such rapid succession, will be the most exhilarating delightful exercise. A carriage will set out from Washington in the morning, the passengers will breakfast at Baltimore, dine at Philadelphia, and sup at New York, the same day. To accomplish this, two sets of rail-ways will be laid so nearly level as not in any place to deviate more than two degrees from a horizontal line; made of wood or iron, or smooth paths of broken stone or gravel, with a rail to guide the carriages, so that they may pass each other in different directions, and travel by night as well as by day; and the passengers will sleep in these stages as comfortably as they now do in steam stage-boats."

Two years before his death, in reviewing the past, he says, "if I could receive the value of the flour that my improvements save from waste, or one dollar out of one hundred that the millers gain by their use, or one sixth part of the interest for one year only, of the sum they may gain by their use in fourteen years, more than they can gain without them; or if I could receive one dollar out of a thousand that my country may gain by the use of my Columbian steam engine, more than by that of Watts and Bolton, for fourteen years only, I would be quite independent and satisfied.

If patents had been granted me at first for twenty eight years instead of fourteen, I believe I could have found aid to put into operation for steam mills, boats and carriages twenty years sooner than they have been or will be, ten times as many of my useful discoveries as I have been able to get into use; and my patents would now have expired, and the public been in full posession of them—but they lay dormant or are lost; I have abandoned them in disgust, deeming my talent lost, for I am sixty-two years of age, and my time is wholly engrossed in law-suits, having fifteen of the most eminent counsel engaged, to recover the small sums I demand, and to defend my rights. And I believe there are hundreds if not thousands of useful discoveries of others, dormant also, for want of the patronage which would not cost the public a cent, nor monopolize or deprive any person of a single right."

On Sunday morning, April 11th 1819, the extensive buildings, occupied by Evans, as a foundry and factory, on the Ridge Road, Philadelphia, were set on fire, in a wanton, unprovoked and mischievous spirit, by a lad of about 20 years of age. The loss, in mouldings alone, was estimated at $15000. Doubtless, this had something to do in hastening his death, for in one of the newspapers of the day, published on the Saturday following the fire, we read, under the head of "Deaths,"—"at New York, on Thursday, the 15th inst, at the house of Elijah Ward, Oliver Evans, Esq. of Philadelphia, in the 64th year of his age. His remains were interred yesterday afternoon." He died, neglected and poor; adding another witness to the words of Franklin,—"A man's useful inventions, subject him to insult, robbery and abuse." And, as a greater than Franklin has said, "and herein is that saying true, one soweth, and another reapeth" * * * "other men labored, and ye are entered into their labors."—John 4: 37, 38.

Oliver Evans, was about 5 feet 8 inches in height, rather portly, but very active. He was the first man that took possession of property at "Bush Hill," in the northwestern part of the City of Philadelphia. From his foundry at Ridge Road and Vine streets, were sent forth, a goodly number of prominent mechanics.

Few, if any, capital improvements have been introduced into the machinery of Flour mills since his time, although numerous minor changes in the manufacture and running of the stones, and in the bolting apparatus, have been patented and adopted. His machinery is now in almost universal use in the extensive merchant mills of this country, and has been very generally adopted in Europe, and particularly in Great Britain.

So great has been the influence of the high-pressure Steam Engine, and other contrivances of Evans, so admirably adapted to the use of all kinds of factories as to justify the eulogium of a talented writer, in an address before the Amercan Institute, in New York, in 1850 (S. G. Arnold, Esq.) who says, respecting their inventor. "Wherever the steam mill resounds with the hum of industry, whether grinding flour on his native Schuylkill, or cutting logs in Oregon" (and the same might be said of the Steam Engine) "there do you find a monument to the memory of

OLIVER EVANS."