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# "To Promote My Countrys Good":

## Joseph Whipple and the Oliver Evans Flour Mill in New Hampshire, 1788-1802

The idea that labor-saving technology could increase the efficiency of agricultural and mechanical production captured the post-Revolutionary imagination. Within the pantheon of eighteenth-century innovators to make significant changes to the material life of American society, Oliver Evans (1755-1819) has long been considered one of the world's most important inventors (fig. 1).[1] "He introduced into flour mills the prototype of the automatic factory," Eugene Ferguson has written, "and through its successful operation demonstrated the soundness of his conception." While not changing any of the essential steps in the milling of flour, Evans's plan eliminated the human labor needed to transport partially processed grain from step to step. In addition to this model of automated production, Evans proposed a second important prototype—a reliable high-pressure factory steam engine that developed from his idea for a "land carriage" and its practical use in steamboat propulsion.[2]

While much has been written about Evans and his inventions since his own day, modern interpreters still return to Grenville and Dorothy Bathe's *Oliver Evans: A Chronicle of Early American Engineering* for the basic materials of his life. This seminal work published all the then-known documents Evans wrote as well as many of the letters written to him. Together with his own books, *The Young Mill-wright and Miller's Guide* (1795), *The Abortion of the Young Steam Engineer's Guide* (1805), and the autobiographical *Oliver Evans to His Counsel Who Are Engaged in Defence of His Patent Rights* (1817), the documents collected by the Bathes constitute most of what we know about Evans's life and work.[3]

To these may now be added several unpublished letters to and from Evans. They not only reinterpret a small but much mis-


Fig. 1. *Oliver Evans, engraving after a portrait by Otis Bass, in Henry Howe,* Memoirs of the Most Eminent American Mechanics *(1844). Courtesy Portsmouth Athenaeum, Portsmouth, New Hampshire.*

understood part of the inventor's biography, but they reflect aspects of the republican ideology of improvement, the impact of improved methods of communication, and the practical difficulties of applying new technologies. At issue are the circumstances surrounding a 1789 patent on Evans's flour mill granted by the state of New Hampshire and the extent of Evans's influence on the flour mills of New England. While his early patents in Delaware and neighboring states are well known, the Bathes could find no explanation as to "why Evans went so far afield as the state of New Hampshire" for patent protection, "but the fact remains he did so, and obtained from the legislature of that state, 'An Act to grant Oliver Evans for a term of years the exclusive right of making and selling within the State machines herein described, etc. etc.' "[4] Yet they also state that "in the New England states Evans had always found a ready market for his products and New Hampshire was one of the most lucrative of these." This claim rested on one later piece of evidence:

> Evans's interests there still called for a good representative and in the following advertisement, culled from the *Arora* (Evans's favorite news sheet) of July 2, 1801, it appears that Evans was prepared to offer at this time particularly advantageous terms to the right man.
>
> *A MILLWRIGHT WANTED,*
>
> *To go to the State of New Hampshire to build a Merchant Flour Mill. . . . and carry on the Manufacture of Flour after the Mills are finished, either as agent or in equal partnership. Enquire of OLIVER EVANS*[5]

This reading of Evans's impact on New Hampshire flour milling contains several assumptions that are no longer warranted.

Far from being a lucrative market for his inventions, the new evidence suggests there were few flour mills in eighteenth-century New Hampshire and no example of an Evans mill in the state at the time of the 1801 advertisement. Indeed, Evans's New Hampshire connection seems to have been entirely the result of an extended correspondence with Colonel Joseph Whipple (1738-1816) of Portsmouth and Jefferson, New Hampshire, between 1787 and 1802 (fig. 2). These manuscripts, together with other letters to Presi-

dent Washington's Portsmouth-born secretary, Tobias Lear, portray New Hampshire's eighteenth-century agriculture in vivid detail–slash-and-burn clearance of newly settled lands, a discouraging experience in growing wheat, and a preference in the state for grist rather than flour production.[6]

The correspondence was sparked by a 1787 announcement of Evans's new flour mill improvements that the inventor and his partner, John Theophilus, both of Redclay Creek, Delaware, addressed "to the Millers." Their often-illustrated broadside at the Massachusetts Historical Society with its signed postscript by Evans (fig. 3) was probably the very one that stimulated Whipple to write Evans on New Year's Day of 1788.[7]

Having observ$^{d}$ in a late paper the description of a mill invented & own$^{d}$ by you (which I have copied from the paper & inclos$^{d}$) I have taken the liberty of writing to you respecting it.

. . . It has been a source of much pleasure to me to observe the great improvements in both the Arts & Sciences with which some of our sister States are blessed.–that of mills is among the most important of them & the improvements which you have made almost surpass all others for usefullness–they merit the Applause of your Country–& your publishing a description of them demand their thanks–as an individual of the Same Nation I tender you mine.–[8]

These sentiments on native invention were neither simply ingratiating nor entirely rhetorical. An educated coastal merchant whose brother William was a signer of the Declaration of Independence, Joseph Whipple joined the first scientific party to ascend and name New Hampshire's Mount Washington in July 1784. Moreover, when he wrote his will in August 1805, he bequeathed his residual estate for a cash prize or bounty designed to encourage practical mechanics to establish in the state of New Hampshire both window glass manufacture and factories to weave woolen cloth. Although the trusts were not actually established after his death, at the time Whipple assumed that they could be funded by the sale of his extensive landholdings in Jefferson and other western towns of New Hampshire.[9]


Fig. 2. *Joseph Whipple, engraving by C. B. J. Saint-Memin, 1805. Courtesy National Portrait Gallery, Smithsonian Institution. Washington, D.C.*

In 1772 a hunter discovered an Indian trail through Crawford Notch that opened a route to the lands beyond the White Moun-

tains. Grants were soon made to more than fifty proprietors from the Portsmouth area, and a road from the coastal capital was laid out to Lancaster on the upper Connecticut River. In 1773 Whipple became the first settler of a new frontier township called Dartmouth; he served as state representative for this western district from 1776 to 1778 and again in the early 1780s, and he was appointed colonel in the state militia in 1784. Returning to "the dreary confines of Portsmouth," according to his friend Thomas Thompson, "from that blissful solitude you have so often and so inchantingly described," Whipple was appointed the collector of state customs in 1786 and in 1789 became the first U. S. customs collector for the port of Portsmouth.[10]

Despite his new position, Whipple retained an active interest in the upper Connecticut Valley and in 1796 became sole owner of Dartmouth's twenty-five thousand acres. He renamed the town in honor of Thomas Jefferson during his own political conversion from Federalism to a zealous Jeffersonian Republicanism. After Adams's election in 1798 his politics cost him his appointment, although he won reappointment to the customs service after Jefferson's election and continued to serve as collector until his death in 1816.[11]

Whipple first demonstrated his desire to establish a flour mill in his early purchase of English bolting cloths and in his many conversations with millwrights and merchants familiar with flour milling elsewhere. It is seen most especially in his letters to Oliver Evans begun during his first term as customs officer in Portsmouth. While among his papers at Harvard University's Houghton Library are travel journals to his western landholdings for 1809 and 1813 that show something of his tenant empire, they do not show his special interest in the growing of wheat, which emerges from his letters to Evans, Lear, and his political mentor, Senator John Langdon of Portsmouth. These establish the practical problems of a member of the republican elite trying to adopt new technology in recently settled areas. Whipple not only sought the inventor's practical knowledge in the form of correspondence and drawings; he also sponsored the Evans patent in the New Hampshire legislature, encouraged his national patent in 1790, presumably read *The Young Mill-wright and Miller's Guide* after 1795, and asked Evans to advertise for a trained millwright to come north. Yet a delay of more than a dozen years ensued between his initial contact and the actual building of a flour mill at Jefferson.

## New Hampshire's "Culture of Wheat"

When Oliver Evans asked about the types and amounts of wheat grown in New Hampshire, Whipple provided a history that confirms what modern scholars have long known–that wheat rust disease had long since eliminated wheat from coastal agriculture.[12]

> You must note that for many years past say 50 or 60 years–the Lands on the Sea Coast for a depth of 20 to 40 miles will not produce wheat, scarcely at all, except the Siberian Wheat . . . which suceeded well for several Years. . . –it is said that Winter Wheat Suceeded well before the above period–this failure is not accounted for satisfactorily–it appears well at first, when in the milk a milldew strikes it–the Circulation of its juices is stopped, a rust appears on the Stalk which ends in its destruction a total failure to produce any thing–Some have imputed a failure

to manured lands–this is not ascertained, nor is any remedy yet discovered.[13]

While coastal lands no longer grew wheat, as Whipple reminded his boyhood friend Tobias Lear, "it is in the back Counties only that we raise any Considerable quantities of Wheat–large quantities of Winter Wheat of Several kinds are there produc[d]." While these were often subject to winter kill in depleted lands, this was not the case "40 Miles & upwards" from the coast, "on new intervale lands. These flat lands being very luxurient, yielding great Crops, have induc[d] farmers who are possessd of them to employ them in the Culture of Wheat."[14]

The Connecticut Valley was colonial New England's breadbasket; wheat culture began early around Hartford, Connecticut, and moved up the valley into Massachusetts, finally reaching the intervales in Vermont and New Hampshire in the years before the Revolution. In the 1770s New Hampshire's Coos meadows at an oxbow of the upper Connecticut "became to other infant settlements, north and south of them what the graneries of Egypt were to Canaan."[15] Portsmouth residents hoped that land grants like those establishing Dartmouth plantation would ultimately provide a domestic source of wheat. *The New Hampshire Gazette* noted on July 6, 1770:

> the Richness and Fertility of some of our Northwestern Lands, can be no Ways better known than by letting the public know, that at Haverhill, at the lower Cooss, o/ne Mr. Hazzen raised more than 700 Bushels of Wheat from 30 Acres of Land. We may shortly hope to see Wheat as cheap in this Town [Portsmouth], as in the city of Philadelphia.

The next year a road from Coos and a ferry across Lake Winnipesaukee was projected to feed the New Hampshire seacoast: "In a few years we shall be able to supply ourselves with Wheat Flour, . . . much cheaper than to import them."[16]

In fact, New Hampshire's coastal settlements generally imported grain and flour by ship from the south, and one historian notes that "saw-mills always far outnumbered Flour-mills in the principal lumber and ship-building sections of Maine and New Hampshire."[17] But the absence of flour mills in colonial and post-Revolutionary New Hampshire was even more drastic, as Joseph Whipple spelled out in his first letter to Oliver Evans.

> New Hampshire is among the most backward in improvements of this kind–& altho' we raise Wheat of excellent quality we have not a mill in the state Suitable for the manufacture of Flour–Indian Corn being the kind cheifly in use (a discovery of the practicability of raising Wheat being only of a few years standing) this with Rye & Wheat are promiscuously sent to the same Mills the stones of w[ch] are not calculated for making Flour–thus we are without the benefits resulting from so usefull a product as Wheat when attended with its proper manufacture.[18]

According to Whipple's next letter, this situation soon changed. "Since I wrote you," he reported to Evans early in March 1788, "I have seen a millwright brought up in Scotland who has finished a sett of Mills for a Gentleman in this State–which I have not seen–they are about 100 miles from hence." From the builder's own description, "This sett of Mills . . . Consist of a fulling mill, oyl

mill, Saw mill, Flour mill & several others," apparently built somewhere in western New Hampshire, was modeled on current British practices. Whipple considered sending that millwright to learn the new mill improvements directly from Evans:

If I could get this man to come & see you I think he wou[d] be capable of receiving your instructions in every thing respecting your mills–unless Attachments & prejudices to National fashions & inventions shou[d] produce in him a tenativeness [*sic*] too common with Europeans to suffer them to acknowledge the Superiority of American Workmanship on the merit of their inventions–[19]

While Whipple, as a member of a coastal merchant elite, may have known such a bias among other emigrant artisans, his belief in the ultimate superiority of American craftsmanship and mechanical ingenuity was firmly rooted in a republican ideology that differentiated the character of the new country from that of Europe. Nor was the idea that Americans were better able to find practical labor-saving solutions to technical problems limited specifically to mechanics, for the same ideology can be recognized in Whipple's completely Jeffersonian interest in the widespread agricultural improvement of his native state. Like so many experimental agriculturalists among the American elite, he inquired of others about English agricultural machinery and wrote extensively about local methods of land clearing and planting, as well as about the history and variety of wheats he and other farmers in the region grew.

Whipple understood, too, that his request for enough detailed information to build an Evans flour mill placed him under social obligation to the inventor. As he knew of no mechanical inventions from New Hampshire to trade for this valuable information, he wondered if "the manner of bringing new lands into cultivation without any expense for the Clearing of its natural growth may be new to you," and he offered to share this knowledge in a future letter.[20] When Evans accepted the offer, Whipple responded with the first of several detailed descriptions he wrote about the methods and purposes of clearing land by cutting and burning.

We fell the trees at almost any time of the Year, but prefer the months of June, July & August when the leaf is out & full which is much the best–these trees are either cut up immediately, that is the limbs lpd & the trunk cut off in lengths of 12 to 14 feet fit for handling or the limbs are only lop[d] so as to lay pretty close to the ground & among the logs & the cutting up of the trunks omitted as the owner may chuse.–They lay in this Situation to dry till the year after–In the month of May & as soon as the dry season in that month has thoroughly dryed the Wood & Surface of the ground, choosing a dry & windy day the fire is put to it in as many places as possible say 10 to 40 places in 5 to 10 Acres–The fire runs rapidly thro' the whole–burning up the limbs & Some of the Logs where they lay together, burning over the ground & the leaves & the Scarf thereon which facilitates the burning of the Wood–immediately after the fire is out sufficiently to work among it–say the next day–the ax men are put among it who cut it up in lengths suitable for 4 hands to handle (if not cut up before)–The timber is piled in heaps of 1 to 4 Cords in a heap as shall be most handy–When the whole is thus piled–which should be done as

expeditiously as possible (as the Season for planting is already arrived) these heaps are then fired choosing a dry day–while burning–(the fury of the fire being abated) the logs & brans are roll[d] together & attended being frequently repiled–& the brans of one heap (when reduced to a few) put to another till the whole is consumed.[21]

Burning not only cleared the land but, as Whipple noted, was seen to improve it and to permit rapid planting of Indian corn, wheat, and clover without the need for animals to pull up tree roots or the use of plows to prepare the ground.

The ground is now warmed by the fire & the surface covered with ashes,–in this state it is planted with Indian Corn, (it may be employed in other ways)–If the ground is free from Natural Grass which our thick woods generally is & has had a good burn no farther labour is requisite till the Corn is geathered–unless any weed shou[d] show up & render it necessary to pass through it with hoes to cut them down–No hoing of the Corn is wanted–the roots of the trees yet undecayed & fiberous receiving the running roots of the Corn supports the Stalk without hilling which old Ground requires[.] At the proper Season Say in August wheat is sowed thro' out the whole at the Rate of One Bush P acre (our usual quant[y]) this is cover[d] with the hoe the ground being raked over & loosened as much as possible what weeds that are up being hoed down at the same time–this takes 3 to 4 days work P Acre–Clover or other grass seed is sowed at the same time and hoed in with the wheat–Some omit the grass seed till the Spring following least it should hurt the Crop of Wheat, but this is not so well for the Grass & I have found it of but little injury to the Wheat, but this depends on the kind of grass–In October or when the Corn is ripe you geather it–The next Summer if any fire weeds have sprung up among the Wheat which Sometimes happens, they shou[d] be pulled up.–At the usual time the Wheat is harvested & you have before you a fine field of grass for future mowing or grazeing as your occassion may require instead of a tract of Wilderness & I have known the two Crops of Corn & Wheat afford an excess of 2 or 3 Doll[r]. P Acre profit when the season & other Circumstances have been favourable accounting all charges of labour from the felling the trees to the harvestg the produce of the Land.

William Cronon sees cutting and burning as a borrowed Native American practice, although much altered in purpose for quickly clearing large tracts of land. An alternative to the colonial farmer's tradition of girdling trees, Cronon believes it "became almost universal by the second half of the eighteenth century."[22] But Whipple in 1788 claimed that the practice "has not been known more than 20 years" in New Hampshire and was then used only in the inland counties of Strafford and Grafton.[23] His claim is confirmed by later accounts. "Sixty years ago it was thought impossible to raise Indian corn without the plow and hoe," explained the 1817 *New Hampshire Gazetteer*. According to Jeremy Belknap, "The mode of planting it among the burnt logs was practiced with great success at Gilmanton, about the year 1762, and this easy mode of culture soon became universal in new plantations." Despite its seeming wastefulness, Whipple saw cutting, burning, and planting as a "happy discovery for the poor Settler, requiring no labour of Cattle & affording a Speedy profit."[24] For him the scarcest resource was not land or trees, but human labor.

Variety of wheats, the number of bushels per acre they produced, and what lands best suited them were topics of great interest to the scientifically minded Whipple. Like many other progressive farmers of his day, he kept charts and lists of such statistics, and he wrote extensively about the history of wheat. In a 1789 letter to Tobias Lear, as Whipple sought appointment as U.S. customs collector without having to write the new president directly, he offered to send Washington "either Seeds or experiments that may tend to extend knowledge & improvements in Agriculture . . . being Confident that under the Philanthropic direction of Gen$^{l}$. W. its benefits will not be lost." While he sent his long text on the cultivation and production of wheat in New Hampshire, with accounts of "my lands at Dartm$^{th}$" and the "method of clearing & bringing into Cultivation new lands in N Hamp$^{s}$" to both Lear and Langdon, Whipple claimed they were actually written for "the view and information of Such Europeans or others that shoud be dispos$^{d}$ to try the healthful climate of New Hamp$^{sr}$."[25]

Whipple's account of the local cultivation of wheat, like his description of cut-and-burn planting, appears to have evolved from his earliest letters to Evans:

> We produce 20 Bushells of Wheat to the Acre generally–frequently 30–& once I had a Crop of 43 Bush$^{ls}$. I am speaking of Winter Wheat–of this kind we have White & Red, both ball$^{d}$ which has commonly a mixture of bearded wheat–We have a red bearded Summer Wheat which makes good Flour but of a darker colour–& a Summer ball$^{d}$ Wheat–called by us Siberian Wheat–this kind was introduced into this State about 13 years ago [1774]–& is said to be originally from Siberia–it Succeeded well in every part of the State for 4 or 5 years–but it is now degenerated & requires a Change of Seed–this yields an excellent white flour & the produce is 20 to 30 Bushells P acre it will grow best on a light soil & not very rich.[26]

He noted that because wheats were being "winter killed," New Hampshire farmers "have of late too generally adopted the Culture of Spring Wheat which is produced in great & unfailing Crops." He wrote of the spring-planted varieties:

> those I am acquainted with are the Red Bearded Wheat [which] has been many years growed in this State & is the kind generally produc$^{d}$–The flour is of a darker Colour than that produced from Winter Wheat which may probably be more owing to the Manufacture of the flour than the quality of the Wheat the skin of the kernal giving it the Colour–Siberian Wheat has been known only a few years & therefore less cultivated–it yields an excellent White Flour & is produced in great Crops on light Sandy Land.[27]

The subject of Siberian wheat was of particular interest to Whipple, as it was to many of New England's elite and progressive farmers. From his home in Quincy, Massachusetts, John Adams wrote Elkanah Watson, President of the Berkshire Agricultural Society, that during the Revolution "Siberian wheat was much in vogue in this town." Josiah Quincy planted a few bushels that appeared to be resistant to "the Hessian fly, mildew, blasting, or weavil," and it was expected that "it would become the staple of New England" until it totally failed in its second year of planting.[28]

Whipple elaborated on the introduc-

tion and history of Siberian wheat in his letters to Lear and eventually sent President Washington seeds for experimental purposes. This variety, he noted, was "cultivated in greater or less[er] quantities in several parts of this State & Massa. ever Since the year 1774." This was "all produced from one peck Sent from London to a person in this Town by a Capt. Ducket brother to the Celebrated Farmer Wm. Ducket at Richmond (or Kew) near London from whose farm it came."

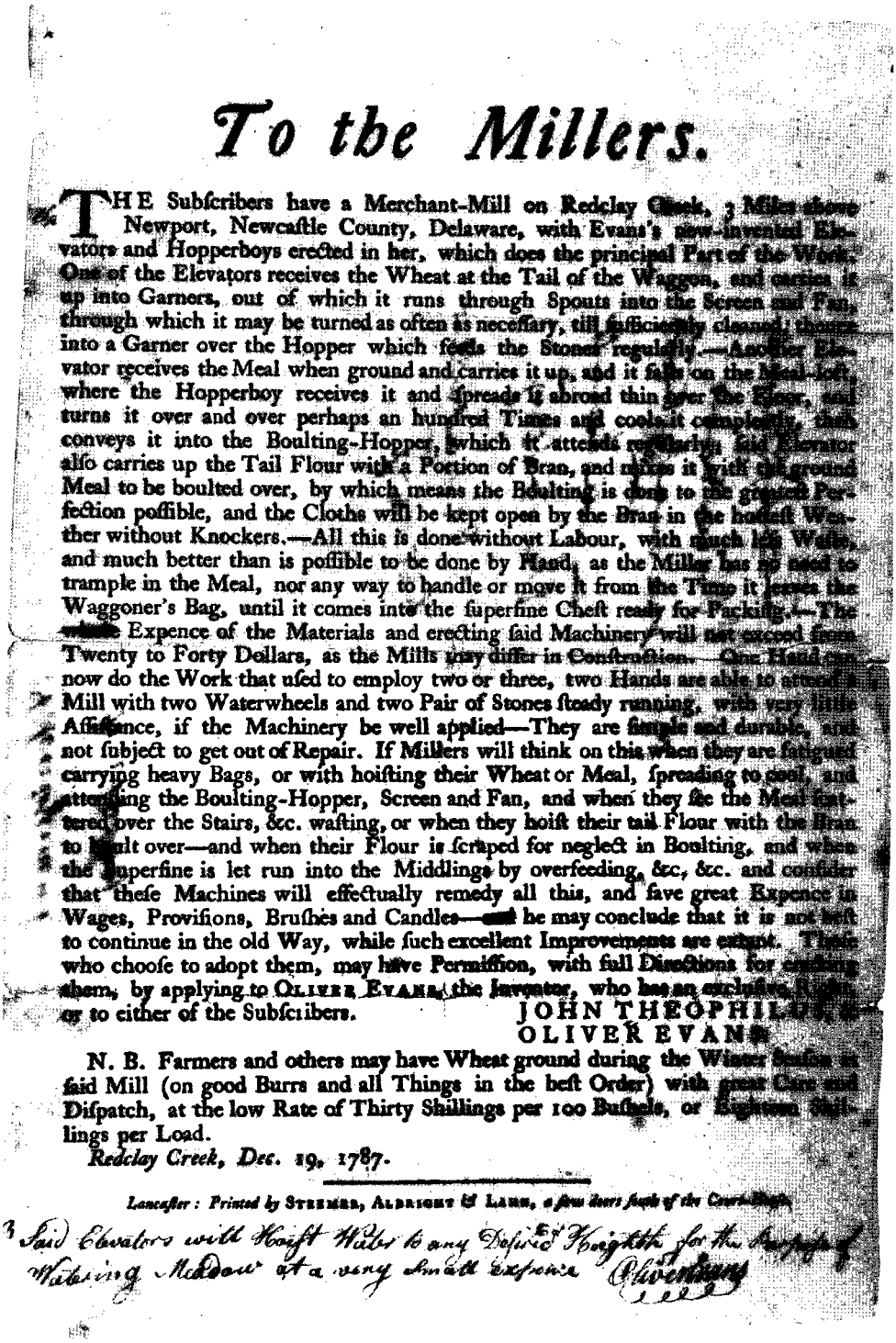
The name of Siberian induced a belief that it would Succeed in this Climate–it was divided into small portions not exceeding a gill each–& many made experiment of it–the next year each Farmer who had knowledge of it & cou$^{d}$ procure any sow$^{d}$ his quarts–& the third year his Bushells–by the 4th or 5th year thousands of Bushells were sown on New Hamp$^{s}$. & Massachusetts–it yeilded 25 to 35 Bushels Pr. Acre & 5 to 10 Dollars Pr Bushell was given for its Seed. The failure of Winter Wheat 60 or 70 years ago on the Sea Coast of Mass$^{a}$ & New Hamp$^{r}$. had induced the Farmers to the use of Indian & Rye as their only Bread–The Success of the Siberian Wheat by the year 1778–gave a different turn to their expectations and a great number of Farmers appropriated half their tillage Land to that product–I cannot now say precisely the year–but I think it was in 1780–that a general blast struck this kind of grain & scarcely a Bushell was producd from an acre–& on many Farms not a kernel . . . After this failure but very few people (towards the Sea Coast) have made further tryal & those few have been unsucessfull.[29]

Despite a decrease in the number of bushels per acre from this Siberian wheat seed, Whipple reported, it continued to be grown by those "remote from the Sea at the distance of 70 to 100 Miles" in the intervales of the Connecticut Valley, "but with much smaller Crops than at the first introduction of it."[30] He added that "several hundred bushells are raised every year" at his own plantation and "those who sow it in light & sandy soil scarcely ever fail of a good crop (20 to 30 Bush$^{l}$ P acre)."[31]

Siberian wheat crops declined from soil depletion, even before the "blast" or rust completely destroyed them, and "farmers easily elated or depressed with good or bad crops–have wholly rejected it in the lower Counties–& they have not attempted a tryal of it for several years." Nevertheless, Whipple believed that "fresh seed from Siberia or England would still succeed in any of our Lands."[32]

"Supposing that fresh Wheat from Europe would be possess$^{d}$ of the qualities requisite to a successfull crop in every part of the Country," Whipple wrote, "I sent to Russia a few years ago as the most probable Country from which to obtain the true wheat of Siberia–but this would not vigitate–having probably been hurt on the voyage."[33] Thus, in 1790, he explained to Lear,

I have lately introduced myself to a correspondence with Farmer Duckett (late of Kew now of Esher in Surry) of whom I have rec$^{d}$. by the last Vessel from London a Bushell of his Siberian Wheat . . . he informs me that the Seed was given him 20 years ago [1770] by the King of Eng$^{d}$. to whose Gardens Ducketts Farm was contiguous–but does not know from whence the King had it–so that I am still in the dark respecting its origin–tho' its name indicates its Country–It is a balled Wheat–produces excellent White Flour–grows on a light soil–produces abundently–& if by change of seed it will still



# To the Millers.

THE Subſcribers have a Merchant-Mill on Redclay Creek, 3 Miles above Newport, Newcaſtle County, Delaware, with Evans's new-invented Elevators and Hopperboys erected in her, which does the principal Part of the Work. One of the Elevators receives the Wheat at the Tail of the Waggon, and carries it up into Garners, out of which it runs through Spouts into the Screen and Fan, through which it may be turned as often as neceſſary, till ſufficiently cleaned; thence into a Garner over the Hopper which feeds the Stones regularly.—Another Elevator receives the Meal when ground and carries it up, and it falls on the Meal-loft, where the Hopperboy receives it and ſpreads it abroad thin over the Floor, and turns it over and over perhaps an hundred Times and cools it completely, then conveys it into the Boulting-Hopper, which it attends regularly. The Elevator alſo carries up the Tail Flour with a Portion of Bran, and mixes it with the ground Meal to be boulted over, by which means the Boulting is done to the greateſt Perfection poſſible, and the Cloths will be kept open by the Bran in the hardeſt Weather without Knockers.—All this is done without Labour, with much leſs Water, and much better than is poſſible to be done by Hand, as the Miller has no need to trample in the Meal, nor any way to handle or move it from the Time it leaves the Waggoner's Bag, until it comes into the ſuperfine Cheſt ready for Packing.—The whole Expence of the Materials and erecting ſaid Machinery will not exceed from Twenty to Forty Dollars, as the Mills may differ in Conſtruction. One Hand can now do the Work that uſed to employ two or three, two Hands are able to attend a Mill with two Waterwheels and two Pair of Stones ſteady running, with very little Aſſiſtance, if the Machinery be well applied—They are ſimple and durable, and not ſubject to get out of Repair. If Millers will think on this when they are fatigued carrying heavy Bags, or with hoiſting their Wheat or Meal, ſpreading to cool, and attending the Boulting-Hopper, Screen and Fan, and when they ſee the Meal ſcattered over the Stairs, &c. waſting, or when they hoiſt their tail Flour with the Bran to be boulted over—and when their Flour is ſcraped for neglect in Boulting, and when the ſuperfine is let run into the Middlings by overfeeding, &c, &c. and conſider that theſe Machines will effectually remedy all this, and ſave great Expence in Wages, Proviſions, Bruſhes and Candles—and he may conclude that it is not beſt to continue in the old Way, while ſuch excellent Improvements are extant. Thoſe who chooſe to adopt them, may have Permiſſion, with full Directions for erecting them, by applying to OLIVER EVANS, the Inventor, who has an exclusive Right, or to either of the Subſcribers.

JOHN THEOPHILUS,
OLIVER EVANS.

N. B. Farmers and others may have Wheat ground during the Winter ſeaſon at ſaid Mill (on good Burrs and all Things in the beſt Order) with great Care and Diſpatch, at the low Rate of Thirty Shillings per 100 Buſhels, or Eighteen Shillings per Load.

*Redclay Creek, Dec. 19, 1787.*

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*Lancaſter: Printed by* STEINER, ALBRIGHT & LAHN, *a few doors ſouth of the Court-Houſe.*

3 Said Elevators will hoiſt Water to any Deſired Height for the Purpoſe of Watering Meddow at a very ſmall expence

Fig. 3. *"To the Millers," broadside by Oliver Evans and John Theophilus, 1787. Courtesy Massachusetts Historical Society, Boston.*

grow to the perfection that it did in the Years 76 & 77 it may be considered as a valuable acquisition to this part of the Country.

With this letter Whipple sent Lear "a small Cask containing Summer Wheat, which I promisd Some time ago to send you for experiment on The President's plantation in Virginia." This seed was "contained in two Bags, marked Red & Siberian, the Red was rais[d] on my Plantation in the County of Grafton" while the Siberian was the English seed that he had just acquired from Duckett.[34] Ironically, without Whipple realizing it, Washington himself had been sowing imported Siberian wheat seed from England at his Douge Run farm for five years.[35]

John Adams, too, was sure that Siberian wheat could be grown in New England, but he understood that "the wheat will not procure a price equal to the labor" of early sowing, abundant manuring to replenish the depleted soils, and other costs of cultivation; "no Russian seed will retrieve this." Indeed, Massachusetts was so well supplied with flour from New York, Pennsylvania, Maryland, and Virginia that Boston merchants repealed a state subsidy for wheat production. Even before the Erie Canal brought inexpensive flour from the Midwest to eastern markets, Adams realized that "you will never get Siberian or any other wheat to grow in New England in quantities to constitute a steady staple." Yet Whipple continued to promote wheat, and wrote in the year of his death of its great success in newly burned lands in the District of Maine.[36]

## Whipple's Planned Flour Mill

During his first years experimenting with wheat cultivation, Whipple raised up to forty bushels an acre of red wheat, commensurate with yields later reported from the intervales along the upper Connecticut River. The red wheat's darker flour, he believed, "might be remedied by a proper Manufacture of it in Suitable Mills."[37] Like his neighbors, however, Whipple had used waterpower only for simpler saw and grist mills.[38] Clearly unhappy with the product of grist mills, he understood the need to use burr stones (millstones made from a coarse, flinty buhrstone) and boulting (a fine-meshed cloth used for sifting) to transform wheat into flour (fig. 4).

I have procured from Europe a pair of Burr Stones which I had determined to place in a mill in a part of the state where quantities of wheat is raised– The Mill which I should propose to erect would not be on a large plan for business, as it will be principally for making the experiment that is–I should have only one pair of stones & one Boulting Machine–& they will be in a (new) part of the Country that at present will not afford a constant employ in every part of the year–

Thus Whipple had already planned to build a small flour mill, but he changed his mind after "observing a description of your mill (which I presume is a late Invention)" in Evans's published broadside. Immediately recognizing its value, he wrote,

I am strongly induc[d] to adopt your plan & to endeavor to procure a workman from your neighborhood who is competant to the undertaking if such there are–& in the mean time to obtain from you (if I am not asking too much) another minute description of the works–& plans or

Sketches of every part of them with the cost so far as can be communicated. . . . your improvements are so aluring on account of the great saving of labour (which in no country is more needed than in this) also on account of the savings from waste of Flour and ease of working that I can not resist a propencity (natural to most people) to promote my countrys good by the introduction of an improvement so well calculated for that purpose & of which I have conceived the highest opinion.[39]

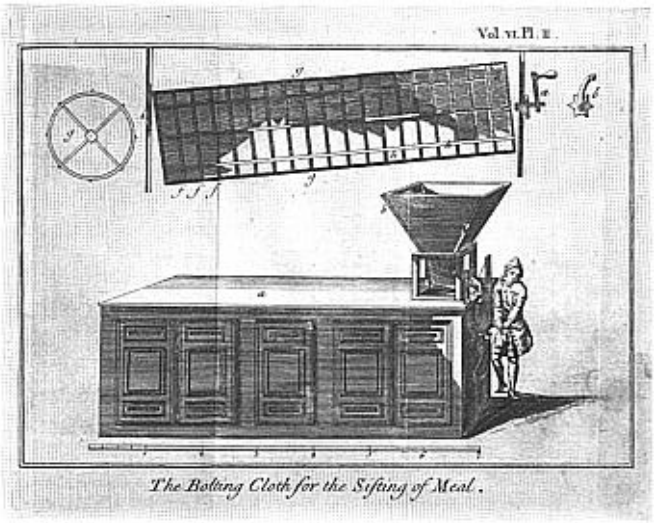


Fig. 4. *European bolting cloth and machine for sifting wheat, from* Spectacle de la Nature; or, Nature Display'd, *2d ed. after the French (London, 1749). Courtesy Portsmouth Athenaeum, Portsmouth, New Hampshire.*

In asking for a description and sketches, he told Evans "please to consider me totally unacquainted with the Construction & machinery of a Flour Mill in every part nor can one be got at in this part of the Country for a Model." Whipple demonstrated his difficulty learning exactly how key components of such a mill should actually work, even after considerable effort and expense, through his experience buying bolting cloths. Sending to England, Whipple received "three which are called Superfine, household fine & Common" but remained confused as to how to install them without an example immediately at hand:

they are made up–that is sewed ready I suppose to put on the boult or reel–they are made of woolen or worsted–are inside 5 feet 1 Inch long (besides a margin of leather) and 6 feet 2 Inches circumference–they appear to be intended for three different reels–I have understood that Boulting Cloths are of 3 finenesses put on One Reel the head having the finest, the Middle of the Reel the next & the tail the coarsest–& that they are made of other materials than Woolen, Viz Silk or Hemp . . . this kind is said to be an improvement of the manufacture & the only sort now used in England–but I cannot think these to be the best size or that the different qualities are put on different reels–your description & plan will set me right.[40]

Evans replied that the bolting cloth in his Delaware mill "is a fine Silk Guaze, Curiously woven in little squares with a Strong Smooth thread, far Superior I have heard to the English Worsted Clothe":

the flour passes more freely thro them, and is brighter, as the little Squares will admit to be smaller, the thread being Clearer from any fuzz or roughness–a good one well used will last 12 years in constant use–the length of the Superfine Clothe

is Different as 8 10 12 or 15 feet as Authors Differ in Opinion–I recommend the longest and fine, with Square Mashes . . . But I must advise you not to attempt without Burrs, a Roling Screen, and fan, and best silk Cloths: for on these depend the fate of your flour.[41]

Not long thereafter Whipple learned that "the difficulty of the Flours passing on account of the fuzz in the English Worsted Cloths is obviated by the different manner of fixing them." He was pleased to report to Evans:

The Scotch Millwright informed me that the kind which I shew[d] him were used in Scotland & Eng[d].– that they hung loose & flapped against pieces called by him beaters, placed within for the purpose of forcing the flour through–This is further explaind by a Note from the Maker which came with the Cloths in the following Words "the boulting Reel that these Cloths are used on here are 6 & 7 Inches in the Circumforence less than the Cloths are for without the Cloths are bigger than the Reel they cannot work"–at the head of the Cloth is a line reve[d] thro' the leather margin to draw the end tight about the head end of the Reel–I have patterns of these Cloths & others No. 1 to 15 in regular graduations from very coarse to very fine I have instead of them–I have been the more full on this head as I find you have not been acquainted with the Worst[d]. Cloths–& there is a possibility that they are as good or preferable to the others.[42]

Whipple also heard from Asa Porter, an American merchant visiting Quebec in 1789. "They Manufacture Flour extremely well in this Country making much better Flour out of worn Wheat than in our Country–They clean it well, use the Burr & cool the Meal immediately after grinding before [it is] bolted." Porter also wrote:

upon viewing the Mills in this Country I observed in some of Them the kind of Boulting Cloths which are used in England the Same which you shew Me at Portsmouth. The Method of using Them is by drawing Them loosely over a Frame much less in Circumference than the Cloth which is not fixed to it at the sides like other Cloths but hangs loose like a Bag & the whole is carried round with amazing Celerity which is necessary to force the flour thru–they do Business faster than the common Cloths, but for quickness of their Motion soon wear out–and being expensive are not generally used here–[43]

In addition to trying to understand the machinery for mounting his bolting cloths, Whipple wrote Evans in hopes that the inventor might suggest "Dementions of the Building–in length, width & heigth [*sic*] that would be suitable for one pair of Stones" as well as the size of "the several appartments that may be intended for drying Wheat, drying or cooling the Meal before or after boulting or for packing the Flour–& directions how this work is perform[d]." His key questions, however, were about "the several kinds of Machinery which is to lift the Wheat, feed the Mill, convey the Flour &c– "a system of leather buckets that Evans had invented and had called the Hopper Boy.[44] Whipple asked Evans to forward answers to these and other questions "through one of our Delegates to Congress now in New York," who was undoubtedly John Langdon.[45]

Evans immediately responded he was "sorry to hear that your State is so Destitute of So important a Branch of Trade as Manu-

facturing of Superfine Flour, Especially as you say your lands produce good wheat–But I doubt not but that a few enterprising geniuses . . . with the assistance of a few experienced workmen will soon remedy that Deficit." To Whipple's request for a description of his inventions Evans replied, "I must send you a Complete Draught of a Mill on the New Construction, with the Machinery applyed, with a full explanation of the whole, and Directions." As no drawing had yet been published, the inventor tried to answer his questions in words, commending "your intentions of getting experienced workmen and Instructions from every person of experience (it being the very road to improvement)–I doubt not that you will soon find yourself Possessed of one of the best Constructed Merchant Flour Mills in the world." To this end, he answered all Whipple's queries in detail:

1st A description and plan of the Building & dimentions Suitable for one pair of Stones.
Answer A House 33 feet by 36 three Stories high the first [story] 9 feet 2nd [story] 8 1/2 [3rd] 8 and the Collar Beams 7 feet high is Quite Sufficient for one Waterwheel and two pair Stones, tho but one pair is to run at once–
2nd Answer we dry no wheat, except wet by Accident, which seldom happens–But it is often too Dry for Manufacturing into Superfine flour to advantage–The floor for Cooking the Meal 25 feet by 25 is Quite Sufficient, if the Machinery be applied, if not 4 times as large will be little enough.

To illustrate the cost of his system, Evans noted that a "Millwrights Bill for Building all the Necessary works for one pair Stones and Boulting Machine" might range from £60 to £75, but "My Machinery [for] about 30 or 40 Dollars, will probably last 50 years." The mill structure itself was usually built of stone in the middle states, but, he advised, "Masons & Carpenters Can best inform you, this expence is separate from the Millwrights work, tho he Should Direct it."[46]

## Evans's New Hampshire Patent

"Your favor of the 1st Instant is Before me," Evans responded to Whipple's long letter of January 1788, "and I . . . entreat your Friendship and Interest in Serving me in a matter that I shall esteem as a full recompence for all Services I may be Capable of rendering you at Present, or in future in return."[47] To the question whether his mill matched all the published claims, Evans replied, "The Mill fully answers the Description you have Seen and Surpasses it, as I have Since made Some improvements," and, he noted, "I must send you a Draught of a Machine for" packing the flour "lately invented and very usefull." His own inventions were now patented in several surrounding states, he said, and he sought Whipple's aid in acquiring a patent in New Hampshire.

My Country has been Generous enough to make it my Interest to employ myself in Invention, and improvement, by Granting me a Pattent in every State to which I have applied–and I intend to apply to the whole 13–What I request of you is, to lay the enclosed Petition before the Legislature of your State, By an Assiduous, Attentive Member, and use your influence & Interest in getting the law passed in my favour–I doubt not but what you can do this Business for me better than I Could myself & I shall esteem it as a most singular favour[48]

"The Petition of Oliver Evans of New Castle

County Delaware State" written to the "Hon[ble] the Representatives of the Freemen of the State of New Hampshire, in General Assembly met" still survives in the State Archives. In it Evans argued:

That your Petitioner at a Great expence of his Study, Time and Labour, in various Experiments made for the Purpose: hath Invented Discovered and introduced into real Practice and exercise, two Machines for the use of Merchant Flour Mills–The one Denominated by your Petitioner an Elevator is calculated for Hoisting Wheat from the lower floor, and the Meal from the Stones as fast as ground to fall on the upper loft of any Mill; also for Hoisting water to any Desired Height for watering Meadow, at a very small expense (without Manual labour). The other Denominated (by your Petitioner) an Hopper-Boy, So Constituted as to spread the Meal over the floor, Stir it and cool it Compleatly, and gather it into the Boulting Hopper, which it attends regularly, without Manual labour–Wherby the labour and expence of Manufacturing flour is greatly lessened–

With Whipple to guide the bill through the legislature, Evans asked its members "to Consider his Personal Attendance as wholely unnecessary."[49] Unfortunately, Evans's letter arrived in mid-February 1788. If it had come only "a fortnight earlier," Whipple said, he might have "laid your petition before our legislature which lately sat in this Town, and I have no doubt but I shall have succeeded." Now, he told the inventor,

The next session will be in June & at a Town 50 mile hence & a new Court–this shall not discourage me from presenting it–the good understanding which I generally have with those who have been elected members encourages me to hope that I shall find in a New Court many who will join in my sentiments in giving every incouragement to your improvements with a liberality becoming united Americans–You may rely on my treating the matter as if it was my own immediate interest.

He underlined his plea that Evans "endeaver to make it the interest of a Millwright to come to this State properly furnished with Draughts &c as soon as I shall have inform[d] you of the passing of the Act for your Patent."[50] If the patent was his price for acquiring the new technology, he still needed someone to build the mill.

Meanwhile, Whipple wrote, "I should be glad to be instructed in the leading principles" about another invention mentioned in Evans's petition, so "that I may in some measure satisfy the doubtfull respecting its practicability." This was Evans's idea for a "Steam Carriage," or a high-pressure steam engine to power a wagon, for which he sought patent protection even before he built a working model. "This is a most extraordinary invention," Whipple said, "& what I have long wished to see." He asked Evans if he yet knew "what burthens it is capable of–whether a Smooth level road is essential to its performance or whither it will pass on a rough new Road as well as a waggon drawn by Cattle."[51]

As the New Hampshire patent ultimately made no mention of this steam-powered wagon, the Bathes hypothesized that "as the states' right to grant patents was about to be transferred to Congressional control, Evans may have felt too uncertain of his position to press the

point" and ask New Hampshire to patent his steam vehicle.[52] But, as Evans wrote Whipple:

Fifteen years back I first had in Contemplation of the Possibility of making a Waggon to be propeled by an inanimate Power; the Several Methods of Sails, Springs, Weights, or Manual fource offered, but they all appeared as only Worthy of Childrens amusements; tho I have since heard they have been attempted in the Different European Countries–About 5 years ago, the only Rational Plan offered, and having by much Study, and various Experiments, reduced it to a Moral Certainty I thought it proper to insert it with my Mill Machinery in my Petition to the Legislature of the State of Maryland; It Seemed (at first) to be received as a Subject of Ridicule; but having appointed a Committee to hear me on the Subject, I to their very great Surprise, Convinced them of the Posssibility therof; and they Saw Proper unanimously to grant me the Pattent, the only encouragement that I asked–I enclose you a Copy therof and wish a similar law in your State–I fear I trouble you importunently, But having received a high Idea of your Public Spirit; I am encouraged to go thus far.[53]

In his New Hampshire petition Evans noted that "his first Proposed Plan, was to obtain a Pattent for his Elevator and Hopper Boys only, and let his Steam Carriage lay Dormant a few years, untill the Mill Machinery was Sufficiently Established."

But finding them far to exceed even his own Most Sanguine Expectations, and finding by experience the great expence and loss of time in attending the Different Legislatures, and having a very great and insatiable desire of having his Steam Carriage reduced to real Practice also . . . Therefore he thought it expedient to insert it in his Petition to the Legislature of Maryland, not doubting of Receiving the encouragement he asked, as neither the Community nor any individual Could Possibly be injured therby–It Seemed at first to be received as a whim; but a committee being appointed to hear him on the subject; He (to their great surprise) by explaining and Demonstrating to them, the very great and irresistable Power of Steam, and the great Weight or Pressure of the Atmosphere (two of the greatest Powers in Nature) and the new invented Simple Method by which your Petitioner applys these Powers; Convinced them of the Possibility and Probability therof; and they unanimously agreed in granting him the Pattent Right.

Evans thus sought exclusive use in New Hampshire, as he had in Maryland, of "all the above Described Machines"–the Archimedian screw (elevator), the hopper boy, and the idea of a steam-powered land carriage–"for and during the term of Fourteen years."[54]

Whipple's "Memorial" on Evans's behalf went to committee in June 1788. The committee recommended, with the House and Senate concurring, that he "might have leave to bring in a bill." While the House passed his bill as submitted the next day, the Senate voted that it be laid aside until the next session.[55] In January 1789 a bill granting a fourteen-year patent on the two flour mill machines as well as the steam carriage passed the New Hampshire House, but again the Senate failed to concur. However, after removing the steam carriage and reducing the time of protection to seven years, in February 1789 both House and Senate passed the act, "provided nonetheless that Oliver Evans shall within one year from the passing

of this act have some person or agent to represent him within this state until the expiration of the term of seven years."[56]

Writing to Tobias Lear in July 1789, Whipple asked if he was familiar with Oliver Evans, "who claims the invention of Several improvements on Mills & the application of Steam to propel Carriages & plows." He noted that in the process of his "researches after improvements that might be useful in this State . . . I fell into a Correpondence with this man . . . he applied to N.H. for a patent for those improvem[ts]. which I obtaind for him under some restrictions which I dislik[d]–I advis[d] him to apply to Congress–which now is open to him–I wish he may there succeed & I have no doubt but that he will on liberal principles."[57]

Thus it appears that well before 1790, when Congress passed the first federal patent law under which Evans received the third United States patent protecting his right to the key improvements to automate flour mills, Whipple had already encouraged him to seek national protection to void the unwanted restraints under his state patent. While the original federal patent document is lost, a January 1791 description of the elevator and hopper boy, as well as of a new conveyor and descender mechanism (neither claimed in the New Hampshire petition), was published together with an engraved plate (fig. 5) of his new patented mill in the *Universal Asylum and Columbian Magazine*.[58]

Although a skeptical New Hampshire Senate forced Whipple's supporters in the House of Representatives to drop Evans's unproven claims for a steam engine, the requirement to retain a resident agent merely modified an idea inherent in the inventor's correspondence with his Portsmouth patron in January 1788. Whipple's very first question had been, "could a Millwright be procured to come here who coud construct a Mill on your plan & at what wages would he undertake it [?]"[59] To this Evans replied, "A Millwright may Probably be Procured to go to you, Capable of Constructing a Mill after the New plan . . . providing he can have a good Prospect of business." Moreover, "with 4 good hands to assist him" construction might take "about 64 Days as appears by my Booke kept whilst Building, exclusive of the House." But, he added,

> Could I meet with a Millwright (Ingenious) to whom I might deliver Draughts, and Directions, both written & verbal, that would go to you and Superintend the Building of your Mill, I might engage it to be so Compleat that the Waggoner might untie his Bag into a spout in the Door, and the Miller need not touch it at all until ready for packing, & it be more Completely done than is possible to be done by hand, the flour be brighter and more of it–The Mill to run the whole week without stopping, the Hopper never run emtie, nor any thing go out of Order–Therefore if you engage a Millwright within 100 Miles of me, Send him to See me, for though the Machinery be very Simple, yet there is a nicety in fixing them that most men will miss at first, and have a lasting Disadvantage. . . . I shall in the mean time be preparing to serve you and using the utmost of my endeavours to agree with a Millwright and make it his Interest to come to your State, Properly furnished with Draughts and instructions, Completely to serve you as soon as you shall inform me of the law being passed–[60]

It was between January and March that Whipple found the "millwright brought up in Scotland who has finished a sett of Mills

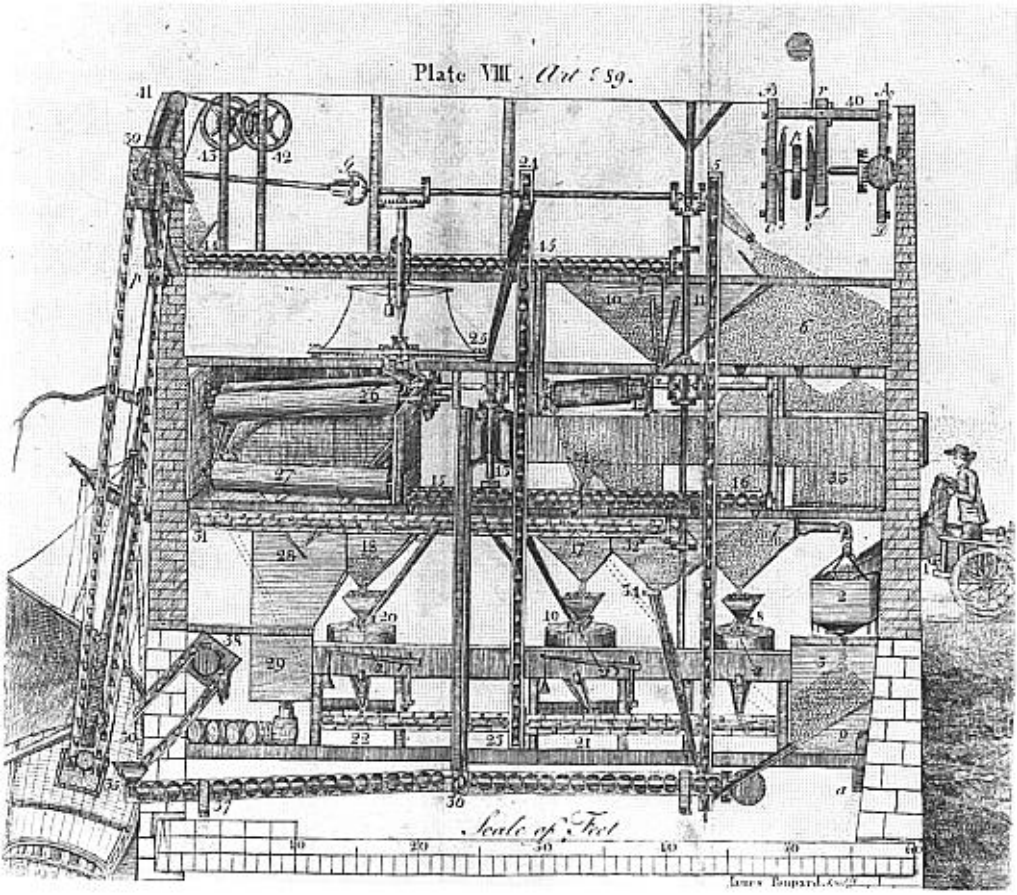


Fig. 5. *"Evans' improved Grist Mill," engraving in* Universal Asylum and Columbian Magazine *(January 1791). Courtesy the John Carter Brown Library at Brown University, Providence, Rhode Island.*

for a Gentleman in this State" and he suggested that perhaps "I could get this man to come & see you." While Whipple believed the Scot "capable of receiving your instructions in every thing respecting your mills," he feared that his "Attachments & prejudices to National fashions & inventions" might create "a tenativeness [*sic*] too common with Europeans to suffer them to acknowledge the Superiority of American Workman-ship on the merit of their inventions." What he preferred was "a Workman brought up with you & practiced in building Mills in your quarter, if he coud be perfect in your plan & fully instructed in your new improvements." The great problem in importing a millwright from the mid-Atlantic, however, was "how to offer the requisite incouragement":

> our country people like most others of their class may be slow to conceive of the Advantages of imploying such a person–if the price of his labor & manner of pay is more difficult than the terms on which millwrights work here,–which is 4 to 5/ P day (Doll[rs]. 6/)–The incouragement must probably rest wholly with me at present–I could

wish to get a workman–not meerly to build a Mill for me–but to Set down in this State–we have many Millwrights here–but I want to disseminate improvements–which we shall never accomplish by employing our old prejudiced workmen who will follow the old track of their predesessors–A man with you who is Settled in business–much employed & perhaps has a Family would not come on the Plan of a Settlement here–A Young Single man of an adventerous disposition would be the most likely–such an one if capable, honest, industrious & in all respects well disposd is the man I cou[d] wish to prevail upon to come to New Hampshire with a view to Settling in the State. . . . I shou[d] assist in this respect by offering a gratuity in Lands for a Millwri[t]. who wou[d] set down upon it.[61]

## Whipple's Jefferson Mills, 1800–1802

Despite his correspondence with Evans in 1788 and 1789, clear evidence of his interest in wheat in later letters to Lear, and similar evidence documenting his interest in flour mills, Whipple's ability to attract a trained millwright and miller to New Hampshire was long an insurmountable stumbling block. While no correspondence with Evans has yet been discovered for the 1790s, Whipple's federal appointment as collector of customs for the port of Portsmouth and the consolidation of his landholdings may have diverted his attention from this project. It was not until 1796, when he became the sole owner of the twenty-five thousand acres known as Dartmouth, that he petitioned the legislature to rename Jefferson, New Hampshire. Two years later he lost his federal position and did not win reappointment to the customs service until after Jefferson's election. In this interregnum from office Whipple may have relocated to Jefferson for a longer part of the year. It was during this period, in any event, that he renewed his apparently interrupted correspondence with Evans and began to erect his grist and flour mills.

Evans's position, too, had changed in the intervening years. By 1792 more than one hundred mills using his machinery had been licensed, and he began to think about an illustrated pamphlet that would help disseminate details of how to construct his patented mills. In 1795 the first edition of *The Young Mill-wright and Miller's Guide* was published in Philadelphia. In more than 440 pages it laid out the principles of hydraulics, described traditional elements of the flour mill, illustrated details of his patented improvements, and even incorporated millwright Thomas Ellicott's new instructions for constructing mills and mill wheels (fig. 6). Evans, who had neglected to earn much of a living while he wrote this work, clearly hoped to profit from the mill building of others. As he advertised, "THE AUTHOR keeps for Sale, A good assortment of imported and American manufactured bolting cloths. He will supply those who apply to him, with *Mill-Stones, Boulting-Cloths, Rolling-Screens, Iron work, Stones for Gudgeons*, &c. compleat for merchant or country mills, all warrented good and suitable for the purpose.–He plans and draughts for building mills containing his patented improvements."[62]

Moreover, ten millwrights in Delaware, Pennsylvania, Maryland, Virginia, North and South Carolina, and New York were listed as authorized to license (and presumably to build) his mills. While no millwrights from New Hampshire or from any other New England state were named, Whipple's friend

Langdon was listed among the congressional subscribers to Evans's opus with ten other members of the federal House of Representatives from wheat-growing parts of New England. Whipple renewed his correspondence with Evans by 1800 to order a "balance-ryne" and iron gudgeons that were part of the "large Irons for a mill of two Pair of Stones" described in Evans's *Guide*.[63] That spring Evans billed Whipple for "5 pieces in all" purchased of Benjamin Price of Philadelphia for which John Langdon provided the payment.[6] This "Mill Iron" arrived in Portsmouth by Capt. Woodward's ship, and on June 6, 1800, Whipple wrote Evans to warn him that the metal "Rine has a flaw in the Socket or eye . . . whereby if there is any strain it will be liable to lock off–I mention this meerly for the benefit of future applicants to the same workmen as it may operate greatly to the injury of the person using it–& also to the workman's reputation."[65]

In a missing letter written May 24, 1800, Evans must have responded to Whipple's renewed request for a miller-millwright to build his proposed flour mill, for the latter wrote that he regretted "that Wm French declines to See the premises we had in Contemplation."

> I greatly incline to have him with me for his tryall or view of the Objects and although I have agreed with a Miller y[t] I will employ him to erect the Tub Mill which I formerly talked of & will employ him also on the Mills I have [built?] if he is disposed to come & I will also give him encouragement in other projects–but he must not come against the will of his family & this for tryal only. . . . Should he after further consideration still decline please to propose to any others whom you can as well recommend.[66]

In June 1801 "another year having revolved Since my last letter respecting a Miller and Millwright," Whipple again sought help in finding one who combined the qualities Evans ascribed to French. "If such an one is within your reach," wrote the would-be mill owner, "I pray you will engage him for me and Indeavor to send him by the Sloop Amily Cap[t] Rugg of this port who sailed few days ago for Phila." Whipple also reported, "My Mill is erected and one pair of stones for common Grist is in use. The others (my Burrs) I reserve to be put in by a workman who has been used to your Construction of Mills." He then laid out the terms Evans might offer :

> The work I should employ him about would be to make the water wheel . . . & all the gears for the Burrs–the Boulting Screen forms & all the apparatus for flour making–This would be completing the Mill I have started which I should put under his care on his own terms as to share in the profits, paying him such wages as you shall agree to give him–pay his passage here & pay him so much of his lost time in coming as you shall agree on or all that lost time if you so agree–and also after the work is done if he does not incline to [remain here?] to pay his passage back & his time also in returning if you cannot agree otherwise.[67]

Thus, on July 2, 1801, Evans placed an advertisement in the Philadelphia *Arora* for a millwright and miller to go to New Hampshire. Applicants must, he wrote on Whipple's behalf, be "of strict integrity, and one who can erect tub-mills of best construction, for such a person very good offers are made, and there

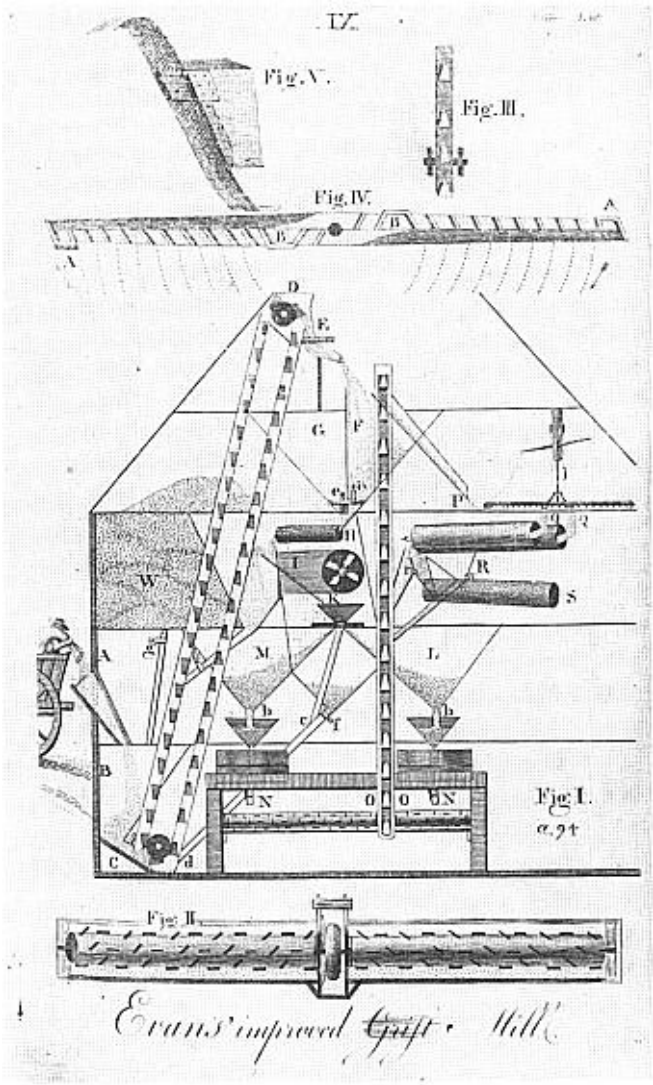


Fig. 6. *Detail of the Evans mill, engraving in Oliver Evans,* The Young Mill-wright and Miller's Guide *(Philadelphia, 1795). Courtesy the John Carter Brown Library at Brown University, Providence, Rhode Island.*

is a prospect that he may do well in accepting them, he is wanted to remain there, and carry on the Manufacture of Flour after the Mills are finished, either as agent or in equal partnership. Enquire of OLIVER EVANS."[68] Less than two weeks later Whipple thanked Evans for "the application of a Millwright who has agreed to come for the purposes mentioned. I hope him completely competent to the Undertaking."

Please to hasten his dispatch–or if he feels–or you have reason to prefer any other–you know the man that will answer any purpose . . . I will fulfil your agreem[t]. with them–I wrote you that the Sloop Amily wd be in Phil[a].–I hope the Man you agree with will come in her [or] if she has sailed–in the first that comes . . . the price required is 10 to 15–he will ingage as low as he can–when the time of his departure is known please to give me a time by post that I may know when to expect him in order to appoint the necessary assistance.

If you have any particular kind of tools suitable for making Burr Stones pray send them by him, I hope he will understand the object–will you [*instruct him* crossed out] send some instructions.[69]

As the known correspondence with Evans ends with this recognition of his many services, the actual construction of Whipple's flour mill remains almost undocumented. Only the £900 value in Whipple's 1816 probate inventory for a "Mill farm & buildings (being a small house & barn) cont[g] abt. 100 acres–20 improved–with a *flour mill* and saw mill" [emphasis added] confirms its actual existence in

Jefferson.[70] This farm and its mills along the Israel River were, in fact, only one of Whipple's industrial improvements to the state's rural landscape. He died also owning another 100-acre farm in nearby Bethlehem, New Hampshire, "with a large new house, 2 barns (one of them new), Saw Mill & Grist Mill" plus one "unfinished building intended for a woolen factory & carding machine" that was valued "with the stock, utensils, furniture in same" at £2000.[71] Thus, Whipple had also adopted mechanized improvements in wool carding. That this was called a woolen factory is reminiscent of the terms set forth in his earlier will to establish a prize for the best woolen cloth from a waterpowered factory in New Hampshire.

While Merrill's 1817 *Gazetteer of New Hampshire* listed only "2 grain mills and 1 saw mill" in Jefferson a year after Whipple's death, local antiquarians later recalled that he had built a sawmill and gristmill near his place as well as "other expensive mills" at Jefferson Mills, a section of town later called Riverton. These stood only until about 1820, when they were destroyed by fire.[72] Thus, in a span of less than twenty years, Whipple's use of the newest technology to increase the value of his northern wheat farms seems to have come and gone without apparent comment from his contemporaries.

At nearly the same date Evans, in an effort to identify unlicensed flour mills using his ideas, traveled to several parts of Vermont. On the western side of the upper Connecticut River he discovered more than twenty mills with his elevators, many constructed by a millwright named Gilbert Brewster. Throughout that state Evans found owners were apparently unaware of his protections; Judge Jonathan Hubbard of Windsor, Vermont, "knew nothing of any claims to a patent right and supposed no man in the State knew anything of such a claim."[73] Whether Brewster may have been Whipple's imported millwright or simply one of many who worked from Evan's published description cannot be determined. He was not, however, one of the millwrights from the middle states who earlier represented the inventor.

Nor did flour mills based on the Evans plan dot the eighteenth-century New England landscape, as earlier writers have suggested. Rather, attempts to find and hire a millwright and miller familiar with Evans's plan who would come to New Hampshire's northern frontier was fraught with delays and problems. Introduction of the Evans patent there now appears to have been the dream of a single visionary practicing an ideology of civic responsibility requiring him to improve his country. This was impossible to achieve with New Hampshire's available technology, which as late as 1791 consisted of only a few local forges, a "Works for Manufacturing Bar Iron, One Furnace, One Rolling and Slitting Mill, 4 or 5 oyl mills, a number of Fulling Mills and one Manufactory of Sail Cloth," as Whipple himself reported to the Secretary of the Treasury.[74] Attempts to locate materials and skills unavailable within the region–initially from England and later from Philadelphia–help explain how long it took just to begin his flour mill. Whipple's vast New Hampshire landholdings, like those of other Portsmouth contemporaries, were not readily liquid assets, as many who tried to sell land during this period discovered. His investments in tenant farms in Jefferson and

other north country towns continued older land practices of the colonial elite well into the next century. The harnessing of waterpower to the newest technologies, however, put him well in advance of his neighbors. This complex story not only sheds new light on the early dissemination of the Oliver Evans flour mill, but suggests that what impact it had on the agricultural landscape of New England occurred only during the fifteen years before Evans's Vermont 1817 visit. Rather than protecting his ideas, Evans's own publication disseminated them to clever mechanics who may have easily believed the system was now freely available.

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## Notes

The author wishes to thank his former Boston University colleague Shirley Wajda, MIT doctoral candidate Gregory Clancey, and Jane Porter, keeper of the Portsmouth Athenaeum, for reading earlier drafts of this essay.

1 Henry Howe, *Memoirs of the Most Eminent American Mechanics* (New York: Harper and Brothers, 1847), 68-82; Victor S. Clark, *History of Manufactures* (1929; reprint, New York: Peter Smith, 1949) 1:180.

2 Eugene S. Ferguson, *Oliver Evans, Inventive Genius of the American Industrial Revolution* (Greenville, Del.: Hagley Museum, 1980), 1, 63.

3 Grenville Bathe and Dorothy Bathe, *Oliver Evans: A Chronicle of Early American Engineering* (Philadelphia: Historical Society of Pennsylvania, 1935; reprint, New York: Arno Press, 1972); Oliver Evans, *The Young Mill-wright and Miller's Guide*, reprint from the 1st ed. (1795) with foreword by Eugene S. Ferguson (Wallingford, Pa.: Oliver Evans Press, 1990); Oliver Evans, *The Abortion of the Young Steam Engineer's Guide*, reprint from the 1st ed. (1805) with a foreword by Eugene S. Ferguson (Wallingford, Pa.: Oliver Evans Press, 1990); Oliver Evans, *Oliver Evans to His Counsel Who Are Engaged in Defence of His Patent Rights* (Philadelphia, 1817). A good technical summary of colonial grist and flour milling is Charles Howell, "Colonial Watermills in the Wooden Age," in *America's Wooden Age: Aspects of Its Early Technology*, ed. Brooke Hindle (Tarrytown, N.Y.: Sleepy Hollow Restorations, 1975), 120-59. For how little is known about changes in colonial British milling see John J. McCusker and Russell R. Menard, *The Economy of British America, 1607-1789* (Chapel Hill and London: University of North Carolina Press for the Institute of Early American History and Culture, 1985), 321-25.

4 Bathe and Bathe, *Oliver Evans*, 20.

5 Ibid., 73.

6 These letters are now located in several New England manuscript collections, as Whipple papers have been dispersed by his descendants among various institutions since the 1960s. A sister, Mary, married Robert Trail and another married Dr. Joshua Brackett, both of

Portsmouth; many papers descended through his executor to the Charles Lowell family of Boston and are now at the Massachusetts Historical Society (hereafter cited as MHS), Boston, Mass. Others have been given to Houghton Library, Harvard University (hereafter cited as HL), Cambridge, Mass., and the Portsmouth Athenaeum (hereafter cited as PA), Portsmouth, N.H.

7 The broadside is in the Charles Lowell Papers, MHS, where it is catalogued with a letter from William Triall to Joshua Brackett, Whipple's brother-in-law, dated Oct. 3, 1787, some three months before the broadside was published. As these cannot have been associated documents at the earlier date, it is more likely that the broadside is the one that was inherited among the Whipple papers. Its reverse is marked "Advertisement to Millers/ No. 4" in contemporary script, and a note, "The standing & character of Oliver Evans as a manufacturer &c are well known to History," is signed and dated "Chas. Lowell Sept. 1859."

8 Joseph Whipple to Oliver Evans, Jan. 1, 1788, PA.

9 Will of Joseph Whipple, Rockingham County Probate #9254; see Chester B. Jordan, "Col. Joseph B. Whipple," *Proceedings of the New Hampshire Historical Society* 2 (1895): 317. In 1888 the governor and council were asked to appoint trustees under the terms of the original will to seek reparations due Whipple for French spoilation claims then valued at $3,140 and to use the income for "bounties to manufacturers of woolen cloth and of glass." *Portsmouth Journal*, Apr. 14, 1888, 5. No action was taken.

10 Thomas Thompson to Joseph Whipple, Apr. 30, 1780, MHS.

11 A. S. Batchellor, ed., *Early State Papers of New Hampshire* (Concord: State of New Hampshire, 1894), 25:160-67; George A. Nelson, "Joseph Whipple: Life and Letters," *Early U.S. Custom Records and History* 1: 1-26 (typescript, PA); Jordan, "Col. Joseph B. Whipple," 289-321; Levi W. Dodge, "Colonel Joseph Whipple and His Dartmouth Plantation," *Granite Monthly* 15, 1893, 20-31; Carl E. Prince, *The Federalists and the Origins of the U.S. Civil Service* (New York: New York University Press, 1977), 48-49.

12 Howard Russell, *A Long Deep Furrow: Three Centuries of Farming in New England* (Hanover, N.H.: University Press of New England, 1982), 151.

13 Joseph Whipple to Oliver Evans, Mar. 1, 1788, Charles Lowell Collection, MHS. Russell notes, "It took about two generations for farmers in the older towns to decide what caused the blight of their wheat crop. They noticed that the rust was most destructive in the neighborhood of barberry bushes, a fruit introduced from England. In 1726 Connecticut ordered the bushes destroyed. . . Doubters remained until scientists showed in the nineteenth century that the farmers' observations had been correct." Russell, *Long Deep Furrow*, 68.

14 Joseph Whipple to Tobias Lear, Mar. 23, 1787, private collection of Dudley Stoddard (hereafter cited as Stoddard Collection), New York City, cited with permission.

15 Grant Powers, *Historical Sketches of . . . Coos Country and Vicinity* (Haverhill, N.H.: J. F. C. Hayes, 1841), quoted in Russell, *Long Deep Furrow*, 68.

16 *New Hampshire Gazette*, Mar. 15, 1771. In reality, as Whipple reported in 1791, "the greater part of the Produce of the new Townships are transported by land to Massachusetts whence many of the Settlers emigrated. The Situation of the Roads admitting of a conveyance equally eligible . . . little commer-

cial intercourse is formed between [Portsmouth] and the back country." Joseph Whipple to Alexander Hamilton, Secretary of the Treasury, June 4, 1791, typescript copy in Nelson, *Early U.S. Custom Records*, 1:55.

17 J. Leander Bishop, *A History of American Manufactures from 1608 to 1860*, 3d ed. (1868; reprint, New York: Augustus M. Kelley, 1966) 1:129-30.

18 Joseph Whipple to Oliver Evans, Jan. 1, 1788, PA.

19 Whipple to Evans, Mar. 1, 1788, MHS.

20 Whipple to Evans, Jan. 1, 1788, PA.

21 Whipple to Evans, Mar. 1, 1788, MHS; see also Whipple to John Langdon, July 23, 1790, Langdon Papers, PA. "Last year I inclos$^{d}$ you a parcell of papers containing descriptions of my Lands in Dartm$^{o}$ which you did not receive till you returned home, you then delivered them to me.–These papers set forth the method of clearing & bringing into Cultivation new Lands in N Hamp$^{sh}$[.] they containd accounts of the cost of Sundry experiments & directions for improvements on Lands for the view & information of Such Europeans or others that shou$^{d}$ be disposd to try the heathfull climate of New Hamp$^{sh}$. When Mr. Lear was last in Portsmo I put these papers into his hands–If you shou$^{d}$ find time I beg you will peruse them–& join with M$^{r}$. L in making such use of them as may tend to obtain the end proposed in stating them, I shall be greatly obliged by your kind endeavors in this matter."

22 William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 1983), 116-19, quote 117; also see Jeremy Belknap, *The History of New Hampshire* (Boston: by the author, 1794), 3:131-36, who attributed the girdling method to the Indians and whose description of later cut-and-burn planting owes much to Whipple's emphasis that rapid clearing was related to ease of planting. Whipple to Evans, Mar. 1, 1788, also notes, "Some Seasons are unfavourable for burning in the Spring–in that case it may lay over till another year–carefully avoiding accidental fire getting among the trees which would be fatal to the plan–or it may be cleared up in the Summer at any time after a good Burn & sowed with Winter Grain in this case the Crop of Indian Corn is lost– but I shod prefer this to its laying over to another Season, as altho' you miss the Corn of Indian, you get the English Corn a year sooner in its place–in Some kinds of groth [*sic*] & some kinds of Land they choose to let the trees lay unburnt 2 years, as the wood will then consume more effectively according to the quality of timber or the moisture or the dryness of the Land–I Choose my time for burning as early in the Spring as may be, when the weather has been drying long enough (say 6 to 8 days) to dry the timber, the leaves that cover the ground & Scarff if any is on it so that the fire will run freely–and before it has been drying so long as to render the Soil liable to burn up (which however will be the case when large heaps are burnt & it will take Some time to recover the Soil in those places) This is not always attended to but I think it essential to the future good of the Land."

23 Whipple to Evans, Mar. 1, 1788, MHS.

24 Eliphalet and Phineas Merrill, *Gazetteer of the State of New Hampshire* (Exeter, N.H.: C. Norris and Co., 1817), 45; Cronon, *Changes in the Land*, 116-19; Belknap, *History*, 3:137; Whipple to Evans, Mar. 1, 1788, MHS.

25 Joseph Whipple to Tobias Lear, Mar. 23, 1787, Stoddard Collection; Joseph Whipple to John Langdon, July 23, 1790, Langdon Papers, PA.

Whipple also gave copies of the materials he provided Lear "when he was last in Port[s]." to John Langdon in hopes he would undertake similar experiments.

26 Whipple to Evans, Mar. 1, 1788, MHS.

27 Whipple to Lear, Mar. 23, 1789, Stoddard Collection.

28 John Adams to Elkanah Watson, Aug. 11, 1812, in *Men and Times of the Revolution; or, Memoirs of Elkanah Watson*, ed. Winslow C. Watson (New York: Dana and Company, 1856), 379.

29 Whipple to Lear, July 24, 1787, and Mar. 31, 1790, Stoddard Collection.

30 Whipple to Lear, Mar. 31, 1790, Stoddard Collection.

31 Whipple to Lear, July 24, 1789, Stoddard Collection.

32 Whipple to Lear, July 24, 1789, Stoddard Collection.

33 Whipple to Lear, Mar. 31, 1790, Stoddard Collection.

34 Whipple to Lear, Mar. 31, 1790, Stoddard Collection; Belknap, *History*, 3:141, summarizes Whipple.

35 *Washington's Agricultural Diary*, vol. 12 of *The Writings of George Washington*, ed. Jared Sparks (Boston: American Stationers Co., John B. Russell, 1837), 379-80, Apr. 12, 1785: "Sewed sixteen acres of Siberian wheat, with eighteen quarts, in rows between corn, eight feet apart." "[Apr.] 14th.–At Dogue Run began to sow the remainder of the Siberian wheat, about fourteen quarts, which had been left at the ferry; run deep furrows in the middle, and made five-feet ridges."

36 Watson, *Men and Times*, 379-80; Joseph Whipple, *A Geographical View of the District of Maine* (Bangor, Maine: Peter Edes, 1816), cited in Percy Wells Bidwell and John I. Falconer, *History of Agriculture in the Northern United States, 1620-1860* (Washington, D.C.: Carnegie Institution of Washington, 1925; reprint, New York: Peter Smith, 1941), 236-37; for the later impact of western competition on New England ca. 1830-60, see ibid., 323-27.

37 Whipple to Lear, Mar. 31, 1790, Stoddard Collection: "In interval lands on Connecticut river, wheat often yields 40 to 50 bushels to the acre; but on the uplands 20 is considered a good crop." Merrill and Merrill, *Gazetteer*, 45.

38 "I have lost a grist mill & a saw mill by inundations to which our Country is subject." Whipple to Evans, Mar. 1, 1788, MHS.

39 Whipple to Evans, Jan. 1, 1788, PA. For information on burr stones and bolting, see Howells, "Colonial Watermills in the Wooden Age," 146-59.

40 Ibid.

41 Evans to Whipple, Jan. 25, 1788, HL.

42 Whipple to Evans, Mar. 1, 1788, MHS.

43 Asa Porter to Joseph Whipple, July 25, 1789, Stoddard Collection.

44 Whipple to Evans, Jan. 1, 1788, PA.

45 Only two members of Congress from New Hampshire subscribed to *The Young Mill-wright and Miller's Guide* (1795), Langdon and Rep. Jeremiah Smith, who later caused Whipple's removal from his customs post.

46 Evans to Whipple, Jan. 25, 1788, HL.

47 Ibid.

48 Ibid.

49 Oliver Evans, Mss. Petition to the New Hampshire General Assembly, Jan. 28, 1788, New Hampshire State Archives, Concord.

50 Whipple to Evans, Mar. 1, 1788, MHS.

51 Ibid.

52 Bathe and Bathe, *Oliver Evans*, 20.

53 Evans to Whipple, Jan. 25, 1788, HL.

54 Evans petition, 1788, N.H. State Archives.

55 Committee Reports, 1788, "Joseph Whipple in behalf of Oliver Evans," June 12, 1788, N.H. State Archives; Batchellor, ed., *Early State Papers of New Hampshire*, 21:273, 311-14.

56 *Report of the Commissioner of Patents for the Year 1849*, House Doc. 20, Part I (Washington, D.C.: Office of the Printer to House of Representatives, 1850), 580-83; the Bathes inaccurately state that the bill was enacted on Jan. 20, 1789. See Bathe and Bathe, *Oliver Evans*, 20.

57 Whipple to Lear, July 24, 1789, Stoddard Collection. The 1787 U.S. Constitution included a patent provision, which may account for Whipple's statement in advance of the Patent Act of 1790. See Brooke Hindle and Steven Lubar, *Engines of Change: The American Industrial Revolution, 1790-1860* (Washington, D.C.: Smithsonian Institution Press, 1986), 78.

58 Bathe and Bathe, *Oliver Evans*, 24, 28, 40-42; Ferguson, *Oliver Evans*, 26-29; Eugene S. Ferguson and Chistopher Baer, *Little Machines: Patent Models in the Nineteenth Century* (Greenville, Del.: Hagley Museum, 1979), 6; and Kendall J. Dood, "Patenting and Patent Models in Nineteenth Century America," in *Icons of Invention: American Patent Models*, ed. Barbara Suit Janssen (Washington, D.C.: National Museum of American History, Smithsonian Institution, 1990), 11-13.

59 Whipple to Evans, Jan. 1, 1788, PA.

60 Evans to Whipple, Jan. 25, 1788, HL.

61 Whipple to Evans, Mar. 1, 1788, MHS.

62 Evans, *The Young Mill-Wright*, endpages.

63 Thomas Ellicott, "The Practical Mill-Wright," part 5 in Evans, *The Young Mill-wright*, 46-47, 70-71.

64 Oliver Evans, bill to Joseph Whipple, 4th mo, 8th, 1800, HL. The full bill reads:

Philad$^{a}$: 4 m$^{o}$: 8th: 1800—Oliver Evans

Bo$^{t}$ of Benj$^{n}$: Price

1 Spindle Rines & Gugeons wt. 280 lb: @ 1/2 £16:6:8

43.57 Dolls.

Commission 2.17

Received Payment of John Langdon Esq. 45.74

65 Whipple to Evans, June 6, 1800, HL.

66 Ibid.

67 Whipple to Evans, June 15, 1801, HL. It appears that he planned to build a second flour mill, for "in addition to this jobb, I will also erect a Tub Mill with 2 P$^{r}$ Stones—one to be Burrs w$^{ch}$ I shall send to you for together with a Sett of Irons for the other Mill."

68 Cited in full in Bathe and Bathe, *Oliver Evans*, 73.

69 Whipple to Evans, July 19, 1801, HL.

70 Rockingham County Probate #9254, Joseph Whipple probate inventory, 1816.

71 Ibid.

72 Merrill, *Gazetteer*, 149; Jordan, *Col. Joseph B. Whipple*, 303; J. M. Cooper, "Jefferson," *The Granite Monthly* 25, 2, August 1898, 65.

73 Bathe and Bathe, *Oliver Evans*, 263-64; Evans lost his U.S. patent in 1807, and in 1808 Congress granted him a special extension.

74 Whipple to Alexander Hamilton, Secretary of the Treasury, June 4, 1791, typescript copy in Nelson, *Early U.S. Custom Records*, 1:53-55.