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Abstract	Samuel Slater constructed the first waterpowered machinery in the United States in 1790. Slater Mill, however, was characterized by the mixture of new technology and old methods, and embodied the change and continuity of the industrial revolution. One would think that all the important facts about his factory had been unearthed by generations of scholars. It however occurred to me that a new approach to the old Slater Mill is feasible through the examination of forms and contents of account books. They provide another testimony of the continuity and discontinuity of the American industrial revolution.
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**SLATER MILL REVISITED:  
INDUSTRIAL REVOLUTION THROUGH ACCOUNT BOOKS**

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*Abstract:* Samuel Slater constructed the first waterpowered machinery in the United States in 1790. Slater Mill, however, was characterized by the mixture of new technology and old methods, and embodied the change and continuity of the industrial revolution. One would think that all the important facts about his factory had been unearthed by generations of scholars. It however occurred to me that a new approach to the old Slater Mill is feasible through the examination of forms and contents of account books. They provide another testimony of the continuity and discontinuity of the American industrial revolution.

It is a commonplace to criticize the use of the term “Industrial Revolution”, and the traditional view — that it was a sudden and abrupt change — is no longer fashionable among economic and, especially, econometric historians. Although the controversies over the continuity and discontinuity of the industrial revolution have been mainly centered on the British case, a similar debate on the American case might be quite possible. A recent writer aptly describes the course of industrialization in New England as “a blend of changes and lack of changes.” It is the purpose of this paper to consider the change and continuity from a slightly different viewpoint than existing literature.<sup>1</sup>

According to the traditional interpretation, the American industrial revolution started in the Slater Mill at Pawtucket, Rhode Island. This view may seem rather dated, but it still has a fairly wide acceptance, and Samuel Slater, who constructed the first waterpowered machinery, is usually called the father of American

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<sup>1</sup> Rondo Cameron, “A New View of European Industrialization,” *Economic History Review*, 38 (1985), 1-23; Julian Hoppit, “Counting the industrial revolution,” *Economic History Review*, 43 (1990), 173-193; Maxine Berg and Pat Hudson, “Rehabilitating the industrial revolution,” *Economic History Review*, 45 (1992), 24-50; William N. Parker, *Europe, America, and the Wider World: Essays on the Economic History of Western Capitalism*, Vol. 2 (Cambridge, 1991), 183-214; Jonathan Prude, *The Coming of Industrial Order: Town and Factory Life in Rural Massachusetts, 1810-1860* (Cambridge, 1983). The quotation from Prude, p. xi.

manufacture. However, it is well-known that Slater's factory produced only cotton yarn, and that weaving had to be done by handloom weavers. Besides, the workers at the mill were children employed on the family basis. Compared with the full-fledged factory of the Waltham type, the mill at Pawtucket was characterized by the mixture of new technology and old methods. The Slater Mill thus embodies the continuity and discontinuity of the industrial revolution.<sup>2</sup>

One would think that almost all the important facts about the Slater Mill had been unearthed by generations of scholars, and every aspect of the development of cotton industry had been examined. The Almy and Brown Papers, held by the Rhode Island Historical Society, are the major source materials concerning Slater and his Pawtucket mill. As might be expected, these records have been scrutinized by scores of researchers since the days of Caroline Ware, whose classic, *The Early New England Cotton Manufacture*, was published more than sixty years ago. Although I was given an opportunity to examine the Almy and Brown Papers, it was hardly expected that I could find anything new. While scanning these records to reconfirm and reascertain the well-known facts, it however occurred to me that a new approach off the beaten path to the old Slater Mill is feasible.<sup>3</sup>

What intrigued me were the forms of account records during the period when Slater was constructing the spinning frame. The forms as well as the contents of Almy and Brown's accounts are worthy of attention, since they reveal the way the partners perceived their undertaking. The question is: "How did Almy and Brown record the historic event — the birth of the factory system — in their account books?" To put it differently, we would like to find out the perception of Almy and Brown through their business records.<sup>4</sup>

In retrospect, it is hard to deny that Samuel Slater was at the center of the stage. But, the directors of the play were William Almy and Smith Brown to whom Moses Brown had committed the daily management of the business. The role of Slater seen through their business records is somewhat at variance with the traditional view. This side of the story, which has been debated in recent literature, will also be touched upon in this paper. The major contention is that

<sup>2</sup> George S. White, *Memoir of Samuel Slater, The Father of American Manufactures* (Philadelphia, 1836); George R. Taylor, *The Transportation Revolution, 1815–1860* (New York, 1951); David J. Jeremy, *Transatlantic Industrial Revolution: The Diffusion of Textile Technologies Between Britain and America, 1790–1830s* (Oxford, 1981).

<sup>3</sup> Caroline Ware, *The Early New England Cotton Manufacture: A Study in Industrial Beginnings* (Boston, 1931); N. S. B. Gras and Henrietta Larson, *Casebook in American Business History* (New York, 1939), 209–230; Peter J. Coleman, *The Transformation of Rhode Island: 1790–1860* (Providence, 1963); Barbara M. Tucker, *Samuel Slater and the Origin of the American Textile Industry, 1790–1860* (Ithaca, 1984); Brendan F. Gilbane, "A Social History of Samuel Slater's Pawtucket, 1790–1830," Ph. D. diss., Boston University, 1969; James L. Conrad, Jr., "The Evolution of Industrial Capitalism in Rhode Island, 1790–1830: Almy, the Browns, and the Slaters," Ph. D. diss., University of Connecticut, 1973; Gary B. Kulik, "The Beginnings of the Industrial Revolution in America: Pawtucket, Rhode Island, 1672–1829," Ph. D. diss., Brown University, 1980.

<sup>4</sup> Almy and Brown Papers, Rhode Island Historical Society. (hereafter cited as ABP); Moses Brown Papers, Rhode Island Historical Society. (Hereafter cited as MBP).

the forms and the contents of their account books provide another testimony of the continuity and discontinuity of the industrial revolution. Although frequented by researchers and tourists alike, the Slater Mill is worth revisiting.

Let us first take a look at the treatment of the Slater Mill in standard works. James Hedges, the late professor of history at Brown University wrote:

On December 20, 1790, almost one year from his first arrival in Providence, Samuel Slater set in motion the power-driven machinery he had made. . . . Thus was born cotton manufacturing in America, which marked the entrance of the young country into the first stage of the Industrial Revolution.<sup>5</sup>

In a spirited textbook of Jonathan Hughes, it is written:

Samuel Slater, one of the Arkwright's English workmen, arrived in America in 1789 with Arkwright's machinery designs memorized. By 1790, with American backers, Slater built the machines and launched the spinning factory of Almy and Brown at Pawtucket, Rhode Island. At that point, the industrial revolution in America can be said to have begun.<sup>6</sup>

These descriptions seem to indicate that the significance of Slater's achievement is similarly recognized both by old and new generations of historians. It is of course possible to argue that the American industrial revolution originated in Waltham, not in Pawtucket. The superiority of the Waltham system over the Rhode Island system was already emphasized in the nineteenth century by Nathan Appleton and Samuel Batchelder, both of whom were closely connected with Waltham venture. This notion has been adhered to by a number of scholars up to the present time. Recent studies, however, show the similarity rather than the difference between these two systems. The fact that Slater's spinning frame is given a prominent position among the exhibits at the Smithsonian Institution seems to indicate the historical importance attached to the Slater Mill in the popular mind.<sup>7</sup>

The circumstances surrounding Slater's migration and the origin of the Slater Mill are too well-known to be repeated here. Nevertheless, a letter from Moses Brown to a Custom House officer in New York is worth quoting, as it provides additional information to the familiar story told by George S. White. The letter was written in July 1790, when Slater was still working on Arkwright machinery. According to Moses, Slater had "a trunk of clothing detained at New York on account of the duties," and he wanted to have them for his own use without

<sup>5</sup> James Hedges, *The Browns of Providence Plantations: The Nineteenth Century* (Providence, 1968), 164–5.

<sup>6</sup> Jonathan Hughes, *American Economic History* (Glenview, 1983), 75.

<sup>7</sup> Nathan Appleton, *Introduction of the Power Loom, and Origin of Lowell* (Lowell, 1858. repr. 1969), 12–16; Samuel Batchelder, *Introduction and Early Progress of the Cotton Manufacture in the United States* (Boston, 1863. repr. 1969), 73–75; Prude, *The Coming of Industrial Order*, xv.

payment of duties. Slater had “meditated a design to come to America to set up the cotton spinning business by water,” and “as he was made sensible if it was known he would be stopt (sic), he came off without even his own parents being acquainted with the voyage he intended.” Slater arrived at New York, but was disappointed as “there was no undertaking of the kind he was acquainted with.” He then learned that Moses had “elected some mils (sic),” so Slater wrote Moses and proposed to go to Providence. At the invitation of Moses, Slater came to Providence and was “steadily employed in erecting and completing the business.” In Moses’ words, Slater “appears to have come away short of clothing on an account of the secrecy he came into, though there is a considerable of them for a person of his circumstances, I believe they were designed for his own use and that an indulgence of such importations duty free will tend to induce useful manufacturers much wanted in the country.” This letter mostly corroborates White’s account, although the story that Slater disguised himself as a farmer might be questioned.<sup>8</sup>

Let us now proceed to examine the account books of Almy and Brown, and look at the way they recorded the beginning of the factory system. Needless to say, the entries in account books do not show the feeling or thought of book-keepers. The prosaic nature is not the weakness but the strength of these records, through which we may read the mind of merchants and manufacturers in the time of economic transformation.

The important dates to remember are as follows:

September 1789	Almy and Brown started.
November 1789	Slater arrived in New York.
January 1790	Slater arrived in Providence.
December 20, 1790	Slater set the water frame in motion.

The journal, day book, and individual accounts of the period shown above, i.e. from 1789 to 1791, will be examined. Unfortunately, the ledger for these years could not be located. The individual accounts are unbound papers in a variety of forms and sizes, some with only a few entries, and others with more than fifty entries covering several years. Although they contain valuable information, individual accounts are too diverse in forms and contents. Therefore, journal and day book will be taken up first.

There are three journals for this crucial period. One is the account book of Smith Brown, which began in 1785 as a record of his store. On September 1, 1789, it was entered:

All the past entries on this book are on Smith Brown’s own private account and those of the pages forward the Company of Almy and Brown.

On September 3, there was a note: “Finished Moving goods Down Town to

<sup>8</sup> Moses Brown to Custom House officer, New York, 3 July, 1790. MBP.

Moses shop.” The above entries show the start of Almy and Brown. Although most entries afterward continued to be those of sales of groceries and dry goods, the records of distributing raw materials, mostly to women, were on the increase. For instance, on September 22, they distributed 4 lb and 2 oz of wool to Hannah Darling and Rachel Callen to spin and weave. On September 25, they delivered 10 1/2 lb sheep wool to Samuel Fuller’s wife to be spun into yarn suitable for warp. These were apparently the records of putting-out system.<sup>9</sup>

Another account book with a title, “Journal,” on the cover began on September 16, 1789. The first entries concerned stocking frame and cotton loom. They were followed by entries like “Cr by woolen cloth, 17 yards,” “Dr to 1 load wood to weaving shop,” and “Cr by 26 yards cotton and linen cloth.” This book must have been the journal of Almy and Brown’s manufacturing shops which produced woolen and cotton goods as well as stockings.<sup>10</sup>

On the cover of the third book, it is inscribed, “Almy and Brown Day Book, Commencing with the Manufactory Business 9th Mo. 89 but afterwards made use of as a Common day book No. 3, 1 Mo. 1793.” This Day Book also began on September 16, 1789, and the first entry reads, “Dr to the cost of machinery and sundries by Moses Brown in his Acct up to this date.” This entry makes it clear that the firm of Almy and Brown took over the business started by Moses Brown, although “the cost . . . up to this date” was not stated. The entries in this book also include cotton cloth, woolen cloth, stockings, and so forth, and there are considerable overlaps among three journals. Nevertheless, the last one seems to be most well-organized, and each item is given a code number such as 97 for cotton cloth, or 157 for woolen cloth. These codes were probably recorded in order to transcribe these accounts into a ledger, which cannot be found for this period.<sup>11</sup>

There is one more account book containing records about flax spinners. As was shown above, the book of Smith Brown included the accounts of putting out raw materials. This flax spinners’ book similarly recorded the names of spinners, the amount of flax delivered, the skeins of yarn received, and the amount and method of payment. Before the introduction of water spinning machinery, it was necessary to use linen for warp, since cotton yarn was weak and suitable only for weft. This book must have been kept separately because of the above situation.<sup>12</sup>

Among these account books, one named “Journal” and another named “Day Book” are most important for our purpose. How did they record the arrival of Slater who had “memorized” Arkwright machinery? How can we recreate the process of building the first water spinning machinery at Pawtucket mill? Is it possible to ascertain the beginning of successful operation of the water frame on December 20, 1790? How did the account books picture the earliest stage of the

<sup>9</sup> Account Book, ABP, Vol. 67.

<sup>10</sup> Journal, ABP, Vol. 25.

<sup>11</sup> Day Book, ABP, Vol. 21.

<sup>12</sup> Spinner’s Account Book, ABP, Vol. 74.

industrial revolution in the United States?

It will be necessary to survey the situation before the arrival of Slater. As mentioned above, Almy and Brown were engaged in the manufacture and sale of cotton and woolen goods. In September 1789, when they started their business, they made entries on the cost of producing cotton yarn and cotton cloth, including files, nails, iron, hinges, candles, and so on. On October 27, 1789, the sales of Fustian, Canton, Jane, Denim, and plain cloth were recorded showing the variety of cotton goods produced. From the opening of the firm in the fall of 1789 to the end of that year, there were twelve entries amounting £36 on the debit side and three totalling £27 on the credit side. In the case of woolen cloth, the number of debits was two (£5) and credits seven (£62). Moses Brown later wrote, "Linnen Warps were wove and the Jennie Spining was performed in Different Sellers of Dwelling Houses" during this period.<sup>13</sup>

No particular entry can be found for the month of January 1790, when Slater was supposed to have arrived in Providence. There were six entries for cotton cloth, two for woolen cloth, and two for stocking weaving in Day Book. On January 23, 1790, under the code number 110, there appeared "Spinning Mills" with "Dr to 5 files and 2 lb candles." Since files and candles were already mentioned in the records of 1789, it is difficult to infer anything from this entry. However, from the evidence in an individual account which will be mentioned later, it is likely that the above entry related to Slater.

In the case of William Mclure who operated spinning jenny, there is an account showing that he received "4 guiney 5 pound 12 shill" from Moses Brown as an advance to remove his family to Providence. It is probable that Moses Brown provided money to invite artisans who had some special skills in cotton and woolen manufacture. Although Slater was certainly one of these artisans, there is no such record for him. Neither Day Book nor Journal inform us of the arrival of a young man from England.<sup>14</sup>

On March 21, 1790, there was an entry in Day Book with a code number 110, which was formerly used for "Spinning Mills." In this case, however, we find "Machines for Spinning by Water" instead. Again, on May 23, 1790, "Water Spinning Machines" appeared under the code number 110, and this expression can be found frequently both in Day Book and Journal afterward. A "Spinning Mill" may denote a workshop having spinning jennies or spinning wheels. But, "Water Spinning Machines" can hardly mean anything but Arkwright machinery, which should not be there until December 20, 1790.

When we turn to individual accounts, there is an unbound sheet of paper with the heading, "Water Spinning Mashene to Almy and Brown." Surprisingly enough, this record began from May 1789. In other words, Arkwright machinery existed not only before the arrival of Slater but the beginning of Almy and Brown

<sup>13</sup> Moses Brown to John Dexter, 22 July, 1791. MBP. This letter is included in Arthur Cole, ed., *Industrial and Commercial Correspondence of Alexander Hamilton* (Chicago, 1928), 71-79.

<sup>14</sup> Account with William Mclure, 19 September, 1789. ABP.

Water Spinning Machine to Almy & Brown		1840	
1799	To Mr John Reynolds for his frame	22	10
	To Mr John May for two sets of wheels	5	2
	Work added		
	1 hand wheel cast and half day to make the frame finished of Mr Reynolds		3
	1 hand wheel of G. Smith sent to Mr Brett		5
	To Mr W. D. Dexter for three more frames	15	-
	1 doz wheels all taken from Mr Browns last year and sent to Boston		4
1800	5 lbs of 2 <sup>nd</sup> cast iron		2
1801	2 lbs of 2 <sup>nd</sup> cast iron	2	10
	3 <sup>rd</sup> cast iron	3	10
	20 lbs of 2 <sup>nd</sup> cast iron	2	3
	13 <sup>th</sup> cast iron	5	5
1802	To Mr Reynolds for turning	16	10
21	105 lbs of Oak and Pine Wood	13	9
	To Mr Brett for turning the same to Boston	2	7
	1 <sup>st</sup> hand wheel frame for turning	9	-
	Work added		
	15 1/2 lbs of 2 <sup>nd</sup> cast iron	8	1/2
	65 lbs of 2 <sup>nd</sup> cast iron	3	9
	2 <sup>nd</sup> cast iron	3	-
	1 <sup>st</sup> hand wheel frame	3	2
	To Mr Brett for turning the same to Boston	3	-
	2 <sup>nd</sup> cast iron	7	1
	1 doz large hand wheels	2	0
	500 lbs of 2 <sup>nd</sup> cast iron	3	9
1803	To Mr Brett for 26 feet bands	1	2
	To Mr Brett for 17 1/2 feet of 2 <sup>nd</sup> cast iron	2	1
1804	To Mr Brett for 2 <sup>nd</sup> cast iron	4	6
	To Mr Brett for 2 <sup>nd</sup> cast iron	2	10
30	38 lbs of maple	1	0
	16 lbs of cast iron	1	0
	6 sheets of small 1/5 of large double Sims		
	To Mr Dan Jackson as per list of 1 doz 2 inch screws	2	9
	7 1/2 inch 1/2" @ 3	4	10
	16 1/2 doz 1 1/2" @ 3	3	10
	1 doz 3/4 inch 7" @ 3	1	6
	1 doz 1 1/2" 7" @ 3	1	4
	Carried forward	£	87 9 7

Fig. 1. Water Spinning Machine to Almy & Brown. (Courtesy of the Rhode Island Historical Society, RHi X3 8299)



in their account records. In order to sort out the muddle, it is necessary to examine the above account in detail, the first page of which is shown in Fig. 1.<sup>15</sup>

This account is a folio with four pages of entries, all of which are on the debit side. The first entry on "5th Month [May], 1789" reads "[Dr] To paid John Reynolds for his frame, £22, 10s." This is apparently the record of purchase of the water frame, or Arkwright machinery. The next entry is "Paid John Bayley for two sets Clock Work added, £5, 2s." Then the expences to carry Reynolds' frame to Potuckett(sic) are recorded. "Paid Peck and Dexter for their spinning frame, £45," is the final entry for May 1789. It is also added that "the Above all taken from M. Browns Acct against Factory." These entries indicate that Almy and Brown, at the start of their firm, owned two water spinning machines which had been purchased by Moses Brown.

In an oft-quoted letter to John Dexter, Moses Brown wrote, "In the Spring of the year 1789 some persons in this Town had procured Made a Carding Mashine a Jenney and a Spining Fraim to work by hand After the manner of Arkwrights Invention." He purchased these machines as well as "One Other on nearly the same Construction." It is evident that the water spinning machines in Almy and Brown's account were the same spinning frames mentioned in the above letter, though they were worked by hand and not driven by water power at the time of the first entry.<sup>16</sup>

The actual accounts of Almy and Brown began on December 23, 1789, when 5 files and 2 lb candles were purchased. In Day Book we have examined before, the identical entry was however made on January 23, 1790. Since Day Book must have been entered first, and should be more reliable on this point, the files and candles were probably obtained in January 1790.

As we mentioned before, we have no record of Slater's arrival. But, there is an interesting piece of evidence among individual accounts with artisans and other people. In an account with one Benjamin Harris, the entry on January 27, 1790 says, "To 6 Days Work @ 3s per day at Turning Wheel for Slater." Slater should have arrived in Providence by mid-January, and probably experimented with the existing spinning frame which was worked by hand. According to George S. White, Slater said, "these will not do," when he saw the old machines. Moses Brown also wrote, "on viewing the Mills he declined doing anything with them." The account with Harris, however, seems to suggest that Slater did try to operate the existing machinery for a while. The files and candles purchased on January 23 must have been the first things Slater needed at Pawtucket mill.<sup>17</sup>

Moses Brown did mention his earlier attempt, which failed, to operate the spinning frame by water. From the vantage point of our time, we know that Slater was the one who completed the first Arkwright machinery that worked

<sup>15</sup> Water Spinning Mashene to Almy and Brown, 1789-. ABP.

<sup>16</sup> Moses Brown to John Dexter, 22 July, 1791. MBP.

<sup>17</sup> Account with Benjamin Harris, 27 January, 1790. ABP; White, *Memoir*, 74; Moses Brown to John Dexter, 22 July, 1791. MBP.

satisfactorily. In 1790, Slater was but one among several craftsmen who might succeed to perfect the machines. Richard Anthony, who did “11 1/2 day work for the factory” in September 1789, settled another account on January 20, 1790. It shows, “26 Days Work done on the spinning frame at Pautucket @ 3s per day.” In the eyes of Almy and Brown, Slater simply took over Anthony’s job and his technical skill was uncertain at that time.<sup>18</sup>

In February 1790, wood screws, nails, wires, and more candles were obtained at the mill. Then, on March 1, Benjamin Harris again turned wheel. Yet, oak and pine stuff, plank, maple board, screws, hinges, and nails were purchased later in the same month. Although there was another entry of “turning the wheel,” this time by Samuel Prime, on March 21, these entries seem to indicate that the work on the Arkwright machinery continued. It is likely that there were attempts to operate the machines in March, but the result is not clear. Recent studies suggest that the water frame had been completed by the middle of March 1790. Nonetheless, the record of production is lacking at this point. Besides, it would be unnecessary to turn the wheel by human hands if the water frame had been perfected.<sup>19</sup>

As far as the Water Spinning Machine account is concerned, the entries in the months following show no particular changes. The fact that pine and maple boards were purchased in May and June seems to indicate that the wooden parts of spinning machines or some other machinery were still in the process of construction. On June 30, 1790, Daniel Jackson was paid £7 8s 3p, and on July 26, John Field was paid £4 6s 3p. Other records show that Jackson as well as Field were engaged in brass and iron works. The metal parts of the machines were undoubtedly supplied by these people in addition to Oziel Wilkinson whose contribution to the whole project will be mentioned later. The name of another important artisan, Sylvanus Brown, who provided wooden parts, also appeared on July 26, 1790. So far, Slater’s name has not been recorded in this account.<sup>20</sup>

In August 1790, there were entries concerning carding machines which prepared cotton for the water frame by producing a continuous rope or sliver. This process was previously done by hand cards. In spite of the fame and importance of the water frame, the mechanization of spinning was not complete without the carding machine. On August 12, 1790 they paid a horse to ride to Leicester [Mass.] for cards, and obtained large paper for carding machines. Later in November, there was an entry showing the payment of £12 to Plinney Earle for cards. An individual account with Earle on November 16, 1790 recorded “£12 in part pay for 2 set of cards for 2 carding machines belonging to their water spinning machine at Pawtucket.” The expression “belonging to” clearly indicates the fact that Arkwright machinery was not a single unit of water frame but a set of carding

<sup>18</sup> Accounts with Richard Anthony, 26 September–23 November, 1789; 20 January, 1790. ABP.

<sup>19</sup> Conrad, “Evolution,” p. 58; Kulik, “Beginnings” p. 142.

<sup>20</sup> Account with Daniel Jackson, 27 June, 1791, ABP; Account with John Field, 23 January, 1791. ABP.

and spinning machines. The inclusion of carding machine in the Water Spinning Machine account itself testifies that Almy and Brown were aware of the above fact. It should also be noted that the most important part of the carding machine was provided by a local artisan. One Solomon Keith was also paid £4 19s for “Molding 13 Frames for Spinning” in October, 1790.<sup>21</sup>

Another artisan, Oziel Wilkinson, needs to be mentioned here. There are two individual accounts, “Almy and Brown to M. Brown for O. Wilkinson Acct,” and “Almy and Brown in Acct to Oziel Wilkinson.” The former began on March 24, 1789, and the latter on December 11, 1789. As the former account continued until June 3, 1790, the transactions were obviously made through Moses Brown even after the firm of Almy and Brown started their business. Although Moses Brown “committed the immediate management of the business” to Almy and Brown, he was deeply involved in the construction of Arkwright machinery. Some of the key components of the water frame were therefore recorded in the account with Moses Brown, not in the Water Spinning Machine account. According to this account with Moses Brown, Wilkinson provided 6 rollers, 24 spindles, 6 spinning shafts and steel plate and tap on February 1, 1790. These must have been the parts of the spinning machine which Slater constructed from his “memory.” Wilkinson probably followed Slater’s directions, but Slater could not have succeeded without the help of skilled artisans like Wilkinson.<sup>22</sup>

It seems rather strange that Slater’s name neither appeared in Day Book nor Journal, though the individual account of Benjamin Harris did refer to Slater. Wilkinson’s account also recorded “Samuel Slater Board” in June 1790. In the Water Spinning Machine account, Slater finally appeared on December 10, 1790, when he ordered some baskets. The next entry in this account was for the historic day, December 20, 1790. Curiously enough, the very date was written as December 30, which was however followed immediately by an entry for December 21. Since the contents of entry for December 20 in Journal were identical with those for December 30 in the above account, it is quite likely that the bookkeeper made a mistake when he transcribed the date from Journal to the Water Spinning Machine account.

The entry for the above date included payment for “lead, ten penny nales, oil, thread, oil potts, and candles.” But, there is nothing special in this entry. They may have needed oil and oil pots for the newly completed machinery which began to run by waterpower. In any case, it is not possible to single out this historic day from the account books of Almy and Brown. Moreover, entries following this date continued as before without any noticeable changes. They bought iron, pine board, candles, files, screws, and so forth. On February 24, 1791, Slater is mentioned for the second time when he ordered 6 baskets. The

<sup>21</sup> Account with Pliny Earle, 16 November, 1790. ABP; Account with Solomon Keith, October 1790, ABP. The entry in the Water Spinning Machine account is slightly different: “George Keith’s Bill for Casting Setts for spinning mill, £4 19s.”

<sup>22</sup> Accounts with Oziel Wilkinson, ABP.

first folio of the Water Spinning Machine account continued until April 11, 1791. The final entry contained wrapping paper, oil, sacking twine, pewter, chest lock, nails, screws, and stuff for writing desk. The total amount of debit from May 1789 was £138 2s 10p.

From the viewpoint of bookkeepers, the water spinning machines had already been in existence when Almy and Brown started their firm, and it was not Samuel Slater who first constructed the machinery. In addition, Slater's role during the crucial period is hardly recognizable in the account books of Almy and Brown. The Water Spinning Machine account shows that Slater was simply one of the artisans who collaborated to perfect the machinery. It probably mirrored what Almy and Brown were thinking, as they proposed to Moses Brown to employ "some person or persons" besides Slater during this period.<sup>23</sup>

Let us return to Day Book to assess the relative value of the water spinning machinery in the textile business of Almy and Brown. Among various items included in Day Book, cotton cloth, woolen cloth, and water spinning machines appeared most frequently during the period from 1789 to 1791. Table 1 shows the number of entries and the amount of debits and credits for these items. As for the water spinning machines, all the entries were on the debit side until the end of 1790. The first entry on the credit side was made on January 19, 1791. It was recorded: "Cr By 25 lb cotton yarn received at several times up to this date." Although the amount of money was not shown, this entry confirms the fact that the water frame began to produce cotton yarn. Since the yarn was "received at several times," it is obvious that January 19 was not the first day of production by the water spinning machinery. If the operation started, as has been said, on December 20, 1790, the account book kept silence on this matter for a period of one month. Probably the bookkeeper did not think much of the occasion, neglecting to record the beginning of the factory production in the United States. The negligence was unfortunate but understandable.

As is shown in Table 1, cotton and woolen cloth brought regular earnings for Almy and Brown from the beginning. The water spinning machinery, in contrast, simply accumulated debits without any returns until 1791. By the end of that year, cotton cloth was still dominant, and yarn production by the water frame brought no profit yet. We can easily lose sight of the water spinning machinery even after it began to operate successfully. Its modest earnings were mixed with various accounts and hardly discernible in Day Book.

Almy and Brown kept an account book for flax spinners, which was mentioned before. Flax spinning under the putting-out system continued still in 1791. Linen was formerly used for warp. The introduction of the water frame, the yarn of which was suitable for warp, should have eliminated the need for linen warp. Yet, the delivery of flax to spinners continued in May 1791. However, these spinners were also employed in cotton picking to prepare cotton for carding. This process was

<sup>23</sup> William Almy to Moses Brown, 1790. MBP.

TABLE 1. Almy and Brown's Accounts

	Debits		Credits	
	Number of Entries	Amount	Number of Entries	Amount
1789				
Cotton Cloth	12	£36	3	£27
Woolen Cloth	2	5	7	62
Water Spinning Machine	0	0	0	0
1790				
Cotton Cloth	30	169	13	503
Woolen Cloth	1	34	10	131
Water Spinning Machine	26	51	0	0
1791				
Cotton Cloth	51	64	22	720
Woolen Cloth	0	0	0	0
Water Spinning Machine	90	695	35	188

Source: Day Book, Almy and Brown Papers.

not mechanized and done by hand after the completion of carding and spinning machines, which embodied the continuity in technological change.

Flax spinners were wives and daughters of nearby farmers. One Eliza Simmon was delivered 9 pounds of flax to spin, and 12 pounds of cotton to pick between February and May 1791. To Elizabeth Ormsbee, Almy and Brown delivered "4 1b Cotton to pick for the Water Mill" on April 6, 1791. She was later credited with "3 1b 10 oz cotton sent to Potucket." Until the end of 1790, flax spinning occupied most of the pages of spinners' book, but the entries of cotton picking gradually became more numerous in the next year. Flax spinners' book was eventually succeeded by cotton pickers' book.<sup>24</sup>

An important new account book which signifies the change is the one titled "Invoice Book of cotton yarn received from spinning mills." This should be called the record of factory production, which started on January 19, 1791, the very day when Day Book first reported the production of cotton yarn by the water spinning machines. The entries in the Invoice Book corresponded with those in Day Book, recording 25 pounds on January 19, and totalling 116 pounds 6 ounces by March 21, 1791. The amount rose to 550 pounds in April, then fluctuated between 200 pounds in May and June, and 920 pounds in October. The total amount of yarn produced in 1791 was about 3,200 pounds.<sup>25</sup>

Another new record which accompanies the above is "Accounts of Sales of Cotton Yarn." As a matter of fact, this record is attached to the latter part of the same volume that includes the Invoice Book. The sale of yarn was first

<sup>24</sup> Spinner's Account Book, ABP.

<sup>25</sup> Invoice Book, ABP. Vols. 75, 87.

recorded on January 25, 1791 to James Mckarras. The amount was “3 lb 13 oz of twist at 6s 6d” totalling £1 4s 9d. Incidentally, the same entry can be found in the Water Spinning Machine account as the first entry on the credit side. It is interesting to note that the record of sales seems to have been started soon after the first sale, while that of production was delayed for a month. Perhaps Almy and Brown put more emphasis on the mercantile side of their business. The second sale of 6 pounds of yarn was made to C. Leffingwell on March 10. Then came the sale of 40 pounds of yarn to J. Reynolds, who had initially constructed the water spinning machinery obtained by Moses Brown. John Reynolds was engaged in woolen and cotton business in nearby East Greenwich, and apparently tried hand at water spinning. He, however, gave up the idea, and eventually became a good customer of Almy and Brown’s yarn. Had he continued to own the water frame and employed Slater, John Reynolds rather than Moses Brown should have been remembered as a historic figure. In 1791 there were fourteen other customers, including the firm of Almy and Brown which used their own yarn to produce cotton cloth. The total amount of sale for this year was £125 11s. Although this did not match the amount recorded in Day Book, the figure in Day Book should be regarded as the amount of production.<sup>26</sup>

The Invoice Book and the Accounts of Sales do indicate the changes in Almy and Brown’s business, but their forms are rather traditional. Probably the bookkeeper did not find it necessary to innovate in the method of record keeping, and made use of conventional forms of accounts. There is, however, another account with entirely different style from others, which at the same time demonstrates the birth of the factory system. It is a piece of paper recording the names of workers and the number of days they worked in a week. Although the account has no title, it began on December 20, 1790, showing the names of Torpen Arnold, Ann Arnold, Unis Arnold, and others with the number of days they worked or were absent in a particular week. This is the very first account recording the attendance of workers in a factory, and those in this account were the first workers at the Slater Mill. (See Fig. 2)<sup>27</sup>

There was an essential difference between mill workers and flax spinners who were soon to be displaced by the former. Spinners were basically on piecework, being paid for by the amount done rather by the days of work. When the water spinning machines began to produce yarn without ceasing, the regular and daily attendance of workers at the mill became an absolute necessity. It was imperative to create a record with a new format for a spinning mill where machinery dominated the production. Flax spinners’ book under the putting out system did not answer the factory’s needs. The attendance record of factory workers, which may have been kept by Slater, somehow reminds us of the roll book of schools. Everyone knows that these first factory workers were children.

It is important to note that this attendance record began on December 20, 1790,

<sup>26</sup> Account of Sales, ABP. Vol. 87.

<sup>27</sup> Account, December 1790–February 1792. ABP.

The table is a handwritten ledger with approximately 12 columns and 40 rows. The columns are headed with names: 'John', 'James', 'Thomas', 'Charles', 'George', 'John', 'John', 'John', 'John', 'John', 'John', 'John'. The rows contain numerical entries, likely representing time or wages. At the bottom of the table, there are several rows of totals and percentages, such as '10 5%', '19 26', '9 6', '23 6', '26 5%', and 'Feb 10'. An arrow points to the left margin of the table.

Fig 2 Account of the time each child was wrought (Courtesy of the Rhode Island Historical Society, RH1 X3 8300)

which establishes the fact that the factory system was born on that day. So far, neither Day Book nor Journal have helped us to determine the exact date. December 20 was Monday, and Torpen Arnold, Charles Arnold, Jabez Jenks, and Smith Wilkinson all worked 6 days in that week. According to the recollection of Smith Wilkinson, he was then ten years old and tended a carding machine. It is worth noticing that these children were quite diligent. During the first year of factory operation which ended on the second week of December 1791, Torpen Arnold worked 300 days and took only 12 days off, while Smith Wilkinson worked 299 and a half days and took 12 and a half days off. In the first week of August 1791, all the workers got four days holiday, probably due to the low water level.

The factory records of the nineteenth century contained not only the number of working days or weeks but also the amount of wages for each workers. The first record of attendance at the Slater Mill, however, did not accompany the record of wages. As a matter of fact, the wages were not paid to the children but to their parents. Day Book contained following kinds of entries: "Labor of David Arnold children as credit him up to 6th of 2 Mo. 1792, £34 17s 6 3/4d," or "Work of Oziel Wilkinson Son up to 6th of 2 Mo. 1792, £8 8s 6d." Such accounts can also be found in individual accounts with artisans. The fact that the new record only went halfway towards the complete factory workers' record suggests the nature of changes at the Slater Mill.<sup>28</sup>

We have traced the beginning of the water spinning machinery and the birth of the factory system at Pawtucket through the account books of Almy and Brown. We have followed their accounts in order to reconstruct the way they perceived the historic events and recorded them in their business journals.

One of the conspicuous points which attracted our attention is the role assigned to Samuel Slater who, according to the legend, memorized the designs of Arkwright machinery and brought the new technology to the young nation. In the account books, Slater was hardly the principal actor in the play. To begin with, an account titled "Water Spinning Mashene" reveals the fact that Slater did not introduce the water frame. Almy and Brown had already owned two locally made machines when they started their business in September 1789. As is well-known, Slater did not arrive in Providence until January 1790. Although it is difficult to decide whether Slater remodeled the existing water frames or constructed a new one using parts of the old machines, water spinning machines antedated the arrival of Slater from the viewpoint of the bookkeeper.

Starting afresh or not, Slater did not construct the machinery alone. The essential metal parts such as spindles and rollers as well as wooden parts were provided by local artisans, whose accounts were most prevalent in the early years of Almy and Brown. The carding machine, which was an integral part of the system, was also constructed with the parts made by other artisans. Of course it is not the purpose of this paper to debunk the legend of Slater, which has already

<sup>28</sup> Day Book, ABP. Vol. 21; Account with Oziel Wilkinson. ABP.



been done effectively. It is simply to confirm the fact that New England artisans were skillful enough to make the transatlantic transfer of technology possible.<sup>29</sup>

What can we say about the beginning of the factory system? We do not claim that the water frame ushered in the industrial revolution. Yet it is undeniable that Arkwright machinery was one of the key elements of the whole development, and the forms and contents of Almy and Brown's account books during the critical period clearly show the continuity and change of the industrial revolution.

In neither Day Book nor Journal did Almy and Brown record the beginning of cotton spinning by power-driven machinery on the very day, December 20, 1791. Presumably, entries such as oil and oil pots suggest that the machines began to run. Nevertheless, when these entries were transcribed to the Water Spinning Machine account, the date was mistakenly copied out as December 30. For the firm of Almy and Brown, cotton and woolen goods produced by hand spinners and hand weavers were the major items of merchandise at that time. In the hustle and bustle of daily business, the production of cotton yarn by the water frame was not duly recorded until after the lapse of one month. The lack of entry in Day Book and Journal seems to indicate that Almy and Brown did not recognize the significance of the beginning of machine spinning.

The change brought by the machine-made cotton yarn is hardly discernible in spinners' accounts. Arkwright's frame should have eliminated the need for linen warp produced by hand spinners. Nonetheless, flax spinners continued to work under the putting-out system for more than six months after the water spinning machines had begun to produce cotton warp. It is not to say that everything was at a standstill in the account books. Increasingly the entries of cotton picking for the water frame intermingled with those of flax spinning by hands. Accounts show that the same women handled both spinning and picking. In Day Book, too, the entries of payment for metal and wooden parts of machines were on the decrease, while those for raw and picked cotton were increasing. However, the discontinuity is most clearly demonstrated by the appearance of new account records.

As merchant-manufacturers, Almy and Brown had kept records of production of goods and employment of weavers and spinners. The beginning of factory production probably necessitated new kinds of account books. The Invoice Book and the Account of Sales of cotton yarn thus came into being, as well as the record of attendance of factory workers. The exact date of the birth of factory system is ascertained by this attendance record.

The age of industrial revolution in Europe was also the period of political upheaval. In the United States, the beginning of factory system approximately coincided with the American Revolution and the making of the Constitution. As one recalls, Rhode Island ratified the Constitution in May 1790, the year Slater arrived in Providence. In the case of political revolution, the leaders were probably

<sup>29</sup> James L. Conrad, Jr., "The Making of a Hero: Samuel Slater and the Arkwright Frames," *Rhode Island History*, 45 (1986), 3-13.

aware what they were doing, and their achievements were duly recorded. In contrast, Almy and Brown, the chief characters of economic revolution, did not grasp the full significance of what they were doing, and the major events were not properly recorded in their account books. What about the local artisans who helped Slater and those children who were the first factory workers? They certainly had no interest in their historic roles. However, if we borrow phrases from Eileen Power, history is largely made up of these people.<sup>30</sup>

<sup>30</sup> Eileen Power, *Medieval People*, 1924 (Anchor Books, 1955), 36.