

Lake Steamers.

The Owego is the fastest steamer on the lakes, having made the run from Buffalo to Chicago, 839 miles, in 54 hours and 15 minutes—16 4 miles per hour. With her sister ship, the Chemung, she has the finest coefficient of displacement of any steamer on the lakes, and on her regular runs develops more power than any other lake vessel. At 80 revolutions and with 160 pounds of steam the Owego's engines, the largest on the lakes, developed 2,606 horse power. Her engines are 28, 42 1/2, and 72 by 54 inches stroke. Smaller steamers make 12 and 14 miles an hour with from 1,200 to 1,400 horse power and carry almost twice as much. This is only an example showing the great amount of power required to add a mile to the normal speed.—*Marine Review.*

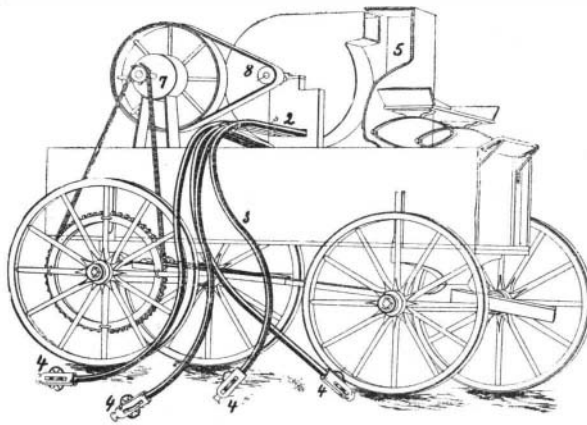
NEW BROAD STREET STATION AT PHILADELPHIA.

We show in this issue a perspective view, reproduced from the architect's drawing, of the new passenger station of the Pennsylvania railroad at Broad Street, Philadelphia. The drawing explains itself and little description is necessary. It will be observed that the existing station, which appears at the extreme right of the cut, will remain of the same height as at present. The most novel feature of the completed building will be the arcade, extending over a portion of the sidewalk throughout the entire front and a part of the sides. At the extreme left of this arcade is a platform extending out to the curb line. This platform is on the track level and affords a convenient means of transferring baggage from the station to wagons without lifting it. The currents of arriving and departing passengers are entirely separated, the main exit being on the Market Street side. The east front has a large number of entrances. The principal entrance for the offices in the upper stories will be at the main entrance, corner of Broad and Market, and at the corner of Fifteenth and Filbert. Definite plans for the upper floors have not yet been made, but it is estimated that there will be about 200 offices, so as to accommodate all the officers and clerks now housed at Fourth and Walnut Streets.

The train shed is 307 feet by 707 feet, and will be 140 feet high at the center. The main arches have a clear span of 294 feet and a clear height of 104 1/2 feet. The structure will require 3,000 tons of iron, and there will be about 1 1/4 acres of glass in the roof. The officers of the road, who have made careful comparisons, state that this train shed will be the largest in the world, larger even than those of the Midland, the London, Chatham & Dover, and others in London.—*Railroad Gazette.*

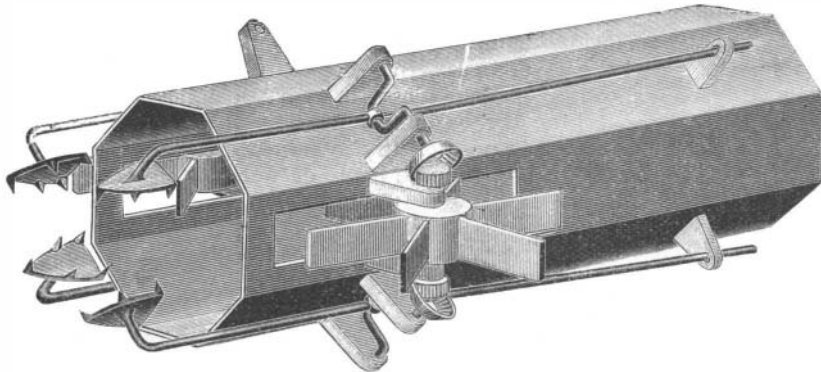
AN IMPROVED COTTON PICKER.

The cotton picking machine shown in the illustration is of simple and inexpensive construction, as com-



HYDE'S COTTON PICKER.

pared with many other devices which have been brought forward for facilitating the gathering of the



HYDE'S COTTON PICKER—MECHANISM OF THE PICKER."

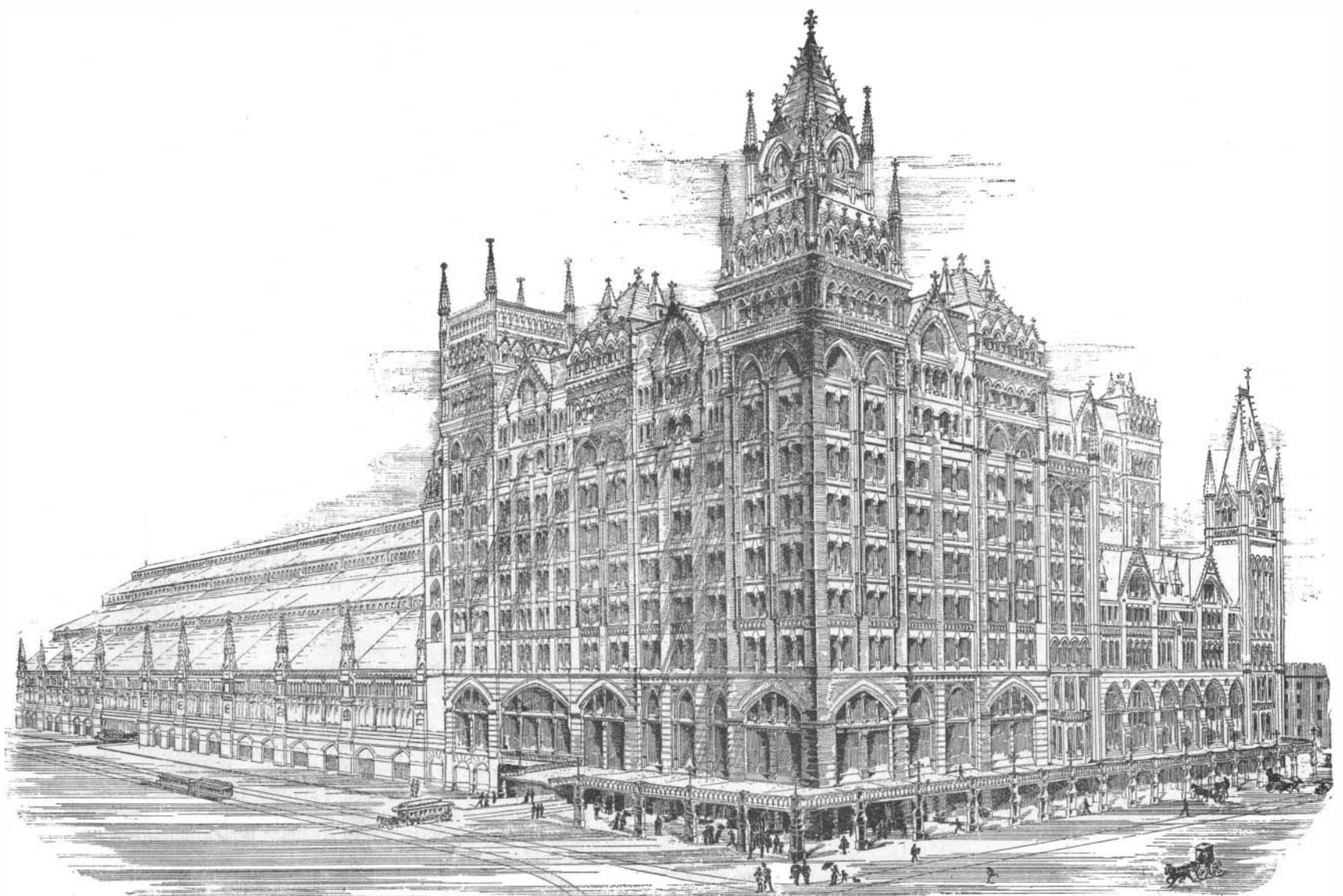
cotton crop, and is designed in its operation to simulate the action of the hand as nearly as possible. The improvement has been patented by Mr. Thomas B. Hyde, of Taylor, Texas. The apparatus is mounted in a wagon to be drawn over the field, a fan case, 1, being connected with tubular conveyers, 2, having flexible extensions, 3, at the ends of which are the "pickers," 4, the mechanism of which is shown in one of the views. The power to operate the fan is preferably obtained by belting from one of the wheels of the vehicle to a spring motor, 7, the latter being connected by another belt with the fan shaft, 8, the cotton being drawn up through the flexible tubes, by the suction thus made, to a suitable receptacle, 5, whence it may

also be delivered into the wagon, 6. An electric or other motor may be employed, if desired, in which power may be stored to operate the fan while the wagon is at a standstill long enough to permit the picking of all the cotton within reach. It is designed that four or more of the pickers shall be connected with the tubular conveyers on each side, each operator holding in each hand a picker, which is held successively to the different heads of the cotton plants in reach. The picker is inclosed in a shell having a handle to be grasped by the operator, a sleeve in this shell having a slot in each side, in which work oppositely arranged fans. The shafts of these fans carry pinions, which operate cranks attached to reciprocating arms on the sides of the sleeve, the front ends of these arms being bent inwardly and terminating in claws or fingers. The small fan wheels in the pickers are rotated by the suction caused in the conveyers as the main fan is revolved, and a rapid reciprocating motion is thus communicated to the picker arms, the toothed jaws of which detach the cotton from the boll and throw it back, the wings of the small fan wheels aiding in taking the cotton from the picker jaws, and the suction carrying the picked cotton through the flexible tubes to the receiver. The inventor of this machine has lived in the cotton country all his life, and the improvement is the result of much experimenting. It is said that by the use of this apparatus one man can pick 1,000 pounds of seed cotton in a day of ten hours.

Varnish for Celluloid Negatives.

We are often asked for a formula for a varnish for negatives on celluloid films that will not attack the celluloid. Here is one that answers well in our hands: White lac, or pale orange lac, four ounces; methylated spirit, eight ounces. When dissolved, add liquor ammoniæ, six ounces, and boiling water half a pint, and afterward a drachm and a half of glycerine.

This solution may be filtered, or it may be allowed to stand and settle and the clearer portion decanted. It will generally have a somewhat opalescent or turbid appearance, but that may be disregarded, as it will not affect the negative. The mode of using is this: After the negative has been fixed and washed, it is thoroughly drained. The varnish is then poured into a dish and the negative immersed and allowed to soak for a few minutes. It is then taken out and pinned by one corner to the edge of a shelf or other convenient article to dry. This varnish will also answer for negatives on glass, and it may be applied while the film is still moist; but, on the whole, for glass negatives a good spirit varnish is to be preferred.



NEW BROAD STREET STATION OF THE PENNSYLVANIA RAILROAD, PHILADELPHIA PA

Mistakes in a Boiler Room.

The *Locomotive* tells the following story, and the editor vouches for its accuracy:

A short time ago our attention was called to some most remarkable doings in a boiler room, which we proceed to relate. The boiler was originally built to furnish power, and was good for about 75 pounds steam pressure; but it is now used only for heating purposes. Some of the steam and return valves to the large coils leaked about the stems, and the owner of the boiler, instead of sending for a steam fitter to repack them, called in a plumber. The plumber, being busy, sent his boy helper. The boy began work on some of the valves that were within sight of the boiler front, but being troubled by the steam that escaped, he shut off the steam valves, leaving the return valves open. The coils were large, and when the steam in them had condensed, water began to back up from the boiler, for there was no check valve on the returns. As the boy worked away he noticed that the water in the gauge glass was going down somewhat rapidly, and also that the steam pressure was rising. He did not know where the water was going to, nor did he know how to feed it more; but he thought that if he opened the furnace door, and so checked the fires, the evaporation and the rise of pressure would proceed much more slowly. Jumping down into the pit in front of the boiler, he opened what he thought, in the darkness, were the fire doors, but it appeared subsequently that he did open the ash-pit doors, this making matters worse instead of better. The fire brightened up and the pressure began to rise rapidly and the water level to go down. The boy was greatly troubled at this, and when the rubber diaphragm in the damper regulator burst from the increasing pressure, he "went all to pieces," as the saying is, and ran for his boss.

The boiler being originally intended for furnishing power, the safety valve could not be set to blow at less than about twenty pounds, while the damper regulator was designed to carry not more than six pounds or seven pounds, so that its diaphragm burst, naturally enough, before the blowing-off point of the safety valve was reached. The plumber came in haste and found the people in the building overhead badly frightened, and the boiler room filled with steam, so that he could not make out precisely what had happened. He told the boy how to turn on the feed, however, and that well-meaning but badly "rattled" individual went to the back end of the setting, and, instead of opening the plug-cock in the feed pipe, he opened the plug-cock in the blow-off pipe, which only added to the noise and confusion. Meanwhile, the plumber hauled the fire out onto some pine boards that the regular attendant had laid in the damp pit. The boards took fire, and smoke was soon added to the escaping steam, to the intense horror of the occupants of the building, who by this time were on the other side of the street. When the fire had been hauled and the danger averted, the plumber soon learned the cause of the disturbance, and quiet was speedily restored by shutting off the damper regulator and the blow-off, and throwing a few buckets of water on the burning boards. It seems hardly possible that such a succession of mistakes could follow one after another in so orderly a manner, but we can testify, from personal observation, that they did. And we may add that not long afterward, when the boiler was out of use, a coal dealer put 100 tons or so of coal into the same boiler room, piling it up in such a manner that some of it ran down into the open man-hole, and the rest of it covered up the blow-off pipe and the rear door of the setting, which were both open, so that there was plenty of trouble digging them out before the boiler could be started again.

The Art of Thinking.

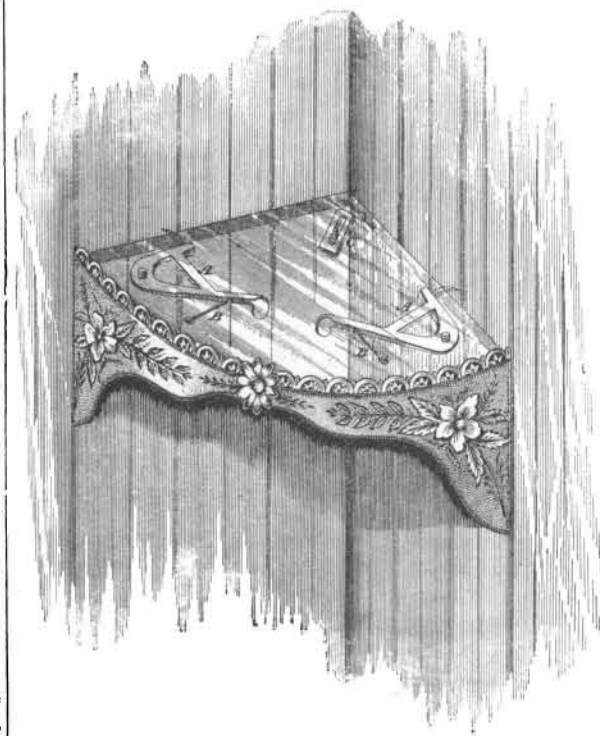
Did you ever notice how bunglingly some men think? There is as much or more difference in the way men use their mental faculties as there is in the way they use their tools. Just as one man will proceed deftly and systematically to the accomplishment of a piece of work with everything conveniently at hand, every motion intelligently directed to the furtherance of the main purpose, and an expedient ready for every irregularity or difficulty which presents itself, so the ready thinker proceeds at once in a right line to the pith of a subject, sifting out the extraneous matter, defining the main point, and bringing to bear upon it all his available information. On the other hand, a clumsy thinker will chase a question up one side and down the other, without getting anywhere or arriving at any relevant conclusion.

The mental like the manual faculties are susceptible and require cultivation. It is only by practice and continual use that the dexterity and skill of the expert machinist or other manipulator are acquired. No matter how naturally ingenious and handy a man may be, he will lack deftness when placed upon work to which he is entirely unaccustomed. In order to think with facility a man must be accustomed to thinking. It is one thing to let the mind roam about among the things one knows, and another to put it hard at work and keep it there, grinding at something you do not know, but want to. It is easy and enter-

taining to read an article which tells you something which you knew before and which you can indorse, but you learn nothing by reading it. It requires an effort to read an article which contains real information, however plainly expressed. It has to be studied, applied, digested, criticised, the suggestions raised by its perusal have to be followed out to their conclusions, and to conscientiously read an article of this character is a task which a man is inclined to shirk just as a lazy man might shirk a physical task. But compare the man who shirks with the man who reads, and you will find in the first a mental bungler, in the second the acute and able thinker, the man whose head saves his hands and who is valued, respected, and trusted with the conduct of work and the administration of affairs, and rewarded accordingly. Always read a little ahead of yourself. Read matter which requires an effort upon your part to understand. The effort will not only place you upon a higher intellectual plane, but the mental exercise will develop a habit of accurate thinking which will be of more value to you than volumes of average matter read only to be forgotten.—*Power*.

AN ADJUSTABLE CORNER SHELF.

The illustration represents a corner bracket she having simple attachments adapting it for a secure but removable connection with the walls of a room, without the use of tools. In the picture the shelf itself is shown as made of glass, through which may be seen the locking devices on its under side, whereby the shelf is secured in position in the corner of a room. The shelf, however, may be made of wood or other

**LEGG'S CORNER BRACKET SHELF.**

material, and in several pieces hinged together, so as to be collapsible, that it may be packed in small space. The locking mechanism for engagement with the side walls consists of pivoted D-shaped pieces, A A, on one member of each of which is a prong adapted to enter the wall, while the other member has a toothed surface to be engaged by a pawl, B, after the prong is forced into the wall, a thumb-piece forming the end of this member, and facilitating the forcing of the prong into the wall. Near the rear angle of the shelf a slotted pin, C, is secured in position to be conveniently projected or withdrawn, by means of a screw passing through the slot. The ornamental front edge of the shelf is removably secured in position by pins engaging slots in the upper border. It will be seen that this shelf can be quickly put up or taken down, being placed where it will afford the best position for displaying bric-a-brac, etc., thus also utilizing and ornamenting unused corners. The improvement has been patented by Mr. J. D. Legg, of Long Eddy, N. Y., of whom further particulars may be obtained, and the shelf is being manufactured by the Joy & Seliger Co., of Newark, N. J.

Tripe.

We have been challenged to pronounce an opinion on the dietetic virtues of tripe, an article of food which is largely consumed in certain parts of the country, especially during the winter months. Tripe consists of the soft muscular walls and mucous membrane of the stomach of ruminant animals, with a small proportion of delicate omental fat adhering, from which, however, all fibrous portions of the serous covering, or peritoneum, have been removed. From frequent experiments it has been proved that tripe stands high in the list of albuminous substances that are quickly acted on by the gastric juice and reduced to a state of solution, and has, therefore, acquired a reputation for digestibility. But plain boiled tripe in itself is a very insipid article of food, and in order to make it palatable the

art of the cook has to be invoked, which, while making it more "savory," causes it often, when so served, to be an offense to the stomach. The usual mode of serving tripe in this country is to boil it with milk and onions, and there can be little doubt that such a combination is not particularly digestible. Tripe is also sometimes fried in batter, but unless very carefully cooked it is apt to become leathery. If only plainly boiled in water it requires a considerable amount of condiments in the shape of salt, pepper, and mustard to make it acceptable to the palate. Therefore tripe, as usually cooked, though an excellent dish for strong stomachs, is, owing to the ingredients added to it, not always so suitable for persons of weak digestion as has been supposed.—*Lancet*.

Something About Paper Making.

A handsomely illustrated pamphlet on paper making has lately been issued by Messrs. Vernon Brothers & Co., the well known paper dealers of this city, from which we take the following:

For many centuries the stalks of the papyrus were used by the nations living about the Mediterranean in the manufacture of a material which served them for writing upon, and for wrapping purposes.

The papyrus is an aquatic plant having a soft cellular flower stem. This stem, of a triangular shape, grew from ten to twenty feet in height, and from its thin coats or pellicles the paper was made. These were separated by means of pins, or pointed mussel shells, and spread on a table sprinkled with water. On the first layer of these slips a second was placed crosswise, so as to form a sheet of convenient thickness, which, after being pressed and dried in the sun, was polished with a shell or other hard and smooth substance. Twenty sheets was the utmost that could be separated from one stalk, and those nearest the pith made the finest paper.

The principal manufacture of papyrus was carried on for a long time in Alexandria, and Europe and Asia were supplied therefrom during several centuries.

The art of making paper from fibrous matter reduced to a pulp in water appears to have been first discovered by the Chinese about eighteen hundred years ago. Chinese paper is made from the inner bark of the bamboo and mulberry trees, hempen rags, etc.

One description of the bark paper of China is as follows:

"The small branches of a tree resembling the mulberry (*Broussonetia*) are boiled in lye to loosen the bark; this is then macerated in water for several days, the outer part scraped off, and the inner part boiled and agitated in lye until it separates into fibers. It is then washed in a pan or sieve and worked by the hands into a pulp, which is afterward spread upon a table, and beaten fine with a mallet. The pulp is next placed in a tub containing an infusion of rice and a root called *oveni*, and thoroughly stirred to mix the materials. The sheets are formed by dipping a mould made of strips of bulrushes confined in a frame into the vat containing the pulp, and are, after moulding, laid one on another, with strips of reed between. A board and weights are laid on the pile to express the water, and they are then separated and dried in the sun."

The Saracens are supposed by their conquests in Bucharia, about the year 704, to have acquired the art of making cotton paper, and substituted it for the papyrus. In the eighth century the Saracens conquered Spain, and through that peninsula the art of making paper reached the rest of Europe.

The oldest manuscript written on cotton paper in England is in the Bodleian Collection of the British Museum, and bears date 1049. The most ancient manuscript on the same material in the Library of Paris is dated 1050. In 1085 A.D. the Christian successors of the Spanish Saracens made paper of rags instead of raw cotton, which is recognized by its yellowness and brittleness. A very early specimen of linen paper is found in a manuscript bearing date 1100 A.D.

In 1390 Ulman Strother established a paper mill at Nuremberg, in Bavaria, operated by two rollers, which set in motion eighteen stampers. This indicated the process of pulping the fiber by beating, which continued in use for nearly four centuries.

In 1690 the first paper mill was established in America by one William Rittinghuysen, now spelled Rittenhouse, a native of Broich, in Holland, who emigrated to Germantown, Pa., being one of its first settlers. He, in company with William Bradford, established the mill at Roxborough, near Philadelphia, on a small stream called Paper Mill Run. The paper was made from linen rags, the product of flax which was raised in the vicinity and manufactured into wearing apparel. The second mill was erected in 1710, in that part of Germantown, Pa., called Crefeld, on a small stream that emptied into the Wissahickon Creek, near the manor of Springfield, by William De Wees, a brother-in-law of Nicholas Rittenhouse, son of the first paper maker.

In 1729 a paper mill was erected upon Chester Creek, Delaware County, Pa., by Thomas Wilcox. In 1870 paper was still made there by hand. The first paper mill of Massachusetts with legislative aid was erected