THROUGH THE GLASS WINDOWS

"[I]t is not possible to understand the social fabric properly until one has studied three or four of its component threads in detail."

— Hippolyte Taine

In 1845 Thoreau's cabin had two windows. What kind of panes would they have been constituted of — would these have been small oblongs of crown glass?

In 1857 Thoreau ambled through Concord's "Milldam" business district and there inspected a plate-glass shop window. Was that at the time a great novelty? How large could the individual panes of such a shop window have been in this year — and where was such plate glass coming from, and how was it being produced?

1180 CE

Glazed windows were introduced into England.

GLASS WINDOWS

of the German bishops. Henry in penance walks barefooted to the pope, towards the end of January.

1076 Justices of Peace first appointed in England.

1080 Doomsday book began to be compiled by order of William, from a survey of all the estates in England, and finished in 1086.

The Tower of London built by William, to curb his English subjects, numbers of whom fly to Scotland, where they introduce the Saxon or English language; are protected by Malcolm, and have lands given them.

1091 The Saracens in Spain, being hard pressed by the Spaniards, call to their assistance Joseph, king of Morocco; by which the Moors get possession of all the Saracen dominions in Spain.

1096 The first crusade to the Holy Land is begun under several Christian princes, to drive the infidels from Jerusalem.

1110 Edgar Atheling, the last of the Saxon princes, dies in England, where he had been permitted to reside as a subject.

1118 The order of the Knights Templars instituted, to defend the Sepulchre at Jerusalem, and protect Christian strangers.

1151 The canon law collected by Gratian, a monk of Bologna.

1163 London bridge, consisting of nineteen small arches, first built of stone.

1164 The Teutonic order of religious knights begins in Germany.

1172 Henry II. king of England (and first of the Plantagenets) takes possession of Ireland; which, from that period, has been governed by an English vice-roy, or lord-lieutenant.

1176 England is divided by Henry into six circuits, and justice is dispensed by itinerant judges.

1180 Glass windows began to be used in private houses in England.

1181 The laws of England are digested about this time by Glanville.

1182 Pope Alexander III. compelled the kings of England and France to hold the stirrups of his saddle when he mounted his horse.

1192 The battle of Ascalon, in Judea, in which Richard, king of England, defeats Saladin's army, consisting of 300,000 combatants.

1194 *Dieu et mon droit* first used as a motto by Richard, on a victory over the French.

1226

Broad sheet glass was first made in Sussex, but it was of poor quality and fairly opaque.[1]
(Manufacture would slowly decrease, and would cease by the early 16th Century.)

GLASS WINDOWS

1330

French glassmakers were producing crown glass for the first time, at Rouen. Some of this French crown and broad sheet was imported into England.

GLASS WINDOWS

1608

The 1st glass factory in America was built, and glass would be carried in the 1st cargo exported to England. What the colonies possessed by way of raw materials, of course, that the home country lacked, was not sand for silica but fuel for the furnaces.

GLASS WINDOWS

Hans Lippershey (1570-1619), a German-born lens maker in the Netherlands, applied for a patent for an optical refracting telescope, made from two lenses, a converging objective lens and a diverging eye lens, intending his invention for warfare. Galileo would soon be redirecting this war device toward the heavens.[2] It would become apparent that a major problem limiting the usefulness of this device: chromatic aberration caused the images to be fuzzy as light of different colors was brought to a focus at different focal lengths. It would not be until 1668, fully sixty years later, that Isaac Newton would be able to develop a device using one lens and a mirror, the optical reflecting telescope, and for the 1st time correct for this most salient design flaw.

HISTORY OF OPTICS

1620

Blown plate was produced in London by grinding and polishing broad sheet, and was used for mirrors and coach plates.

GLASS WINDOWS

1. The techniques of mathematics, of the measurement of time, of the production of permanent photographic images, and of the manufacture of glass are equivalently vital in Astronomy, as limiting items in the pace of its discoveries. Therefore, in considering the History of Astronomy, we need always to bear in mind the pace of the development of glass manufacturing skills and capabilities.

MATHEMATICS
CHRONOMETRY
PHOTOGRAPHY
GLASSMAKING

2. It wouldn't take long for scientists to figure out that if you turned a telescope, intended for gazing at very distant and large objects, around, it became a device by which they could gaze at very close and small objects, a microscope.

1678

Crown glass was first produced, in London (because of its finer quality, this process would predominate until the middle of the 19th Century).

GLASS WINDOWS

Christiaan Huygens of the Netherlands, in a communication to the Academie des Science in Paris, presented the wave theory of light which he would propound in 1690 in his *TRAITE DE LUMIERE*, to wit, that light is transmitted through an all-pervading aether made up of small elastic particles, each of which can act as a secondary source of wavelets. On this basis Huygens was able to explain many of the known propagation characteristics of light, such as the double refraction in calcite that had been discovered in 1669 by Erasmus Bartholinus of Denmark.

1688

Two kinds of flat glass sheets had been being made. The more common kind, “crown” glass, was made by spinning a lump of molten glass until it spread out into a flattish plate. Even as late as 1800, most domestic glass windows would still display at their centers the characteristic umbilical imperfection, the “crown.” A higher quality had been achieved, however, by blowing a large bubble while pressing it against a metal plate until it approximated a cylinder, and then cutting this bubble open and flattening it out while the glass was hot and plastic. In about this year, in France, workers began to create mirror glass plates by a casting process created by Abraham Thevart. The cast glass needed to be hand polished. This new process would result in the founding of the St. Gobain glassworks. Distortion of image, due to imperfect mixing of the raw materials, would be characteristic of these early cast glass plates even after they had been rendered perfectly flat by polishing.

1687 The palace of Versailles, near Paris, finished by Louis XIV.
1688 The Revolution in Great Britain begins; November 5, King James abdicates; and retires to France, December 3.
1689 King William and Queen Mary, daughter and son-in-law to James, are proclaimed, February 16.
Viscount Dundee stands out for James in Scotland, but is killed by general Mackey, at the battle of Killycrankie; upon which the Highlanders, wearied with repeated misfortunes, disperse.
The land-tax passed in England.
The toleration act passed in ditto.
Several bishops are deprived for not taking the oath to king William.
William Fuller, who pretended to prove the prince of Wales spurious, was voted by the commons to be a notorious cheat, impostor, and false accuser.
1690 The battle of the Boyne gained by William against James in Ireland.
1691 The war in Ireland finished by the surrender of Limerick to William.
1692 The English and Dutch fleets, commanded by admiral Russel, defeat the French fleet off La Hogue.
1693 Bayonets at the end of loaded muskets first used by the French against the Confederates in the battle of Turin.
The duchy of Hanover made the ninth electorate.
Bank of England established by king William.
The first public lottery was drawn this year.
Massacre of Highlanders at Glenco, by king William's troops.
1694 Queen Mary dies at the age of 33, and William reigns alone.
Stamp duties instituted in England.
1696 The peace of Ryswick.
1699 The Scots settled a colony at the isthmus of Darien, in America, and called it Caledonia.
1700 Charles XII. of Sweden begins his reign.

1691

Plates of glass of unprecedented size were at this point being produced by pouring molten glass onto a metal table, spreading it evenly with rollers, annealing, grinding, and polishing. Distortion of the image due to imperfect mixing of the raw materials is often seen in such early plate glass even when perfectly flat.

GLASS WINDOWS

1739

Glass had for a long time been being manufactured in America and shipped to the Old World, because of the greater availability of fuel in the New World. However, at this point the 1st large-scale glasshouse in America, that would be successful and enduring, was being set up in New Jersey by the German-born manufacturer Caspar Wistar.

GLASS WINDOWS

1773

Polished plate glass was being produced by the French process at the Ravenshead Works at St. Helens in England. Glass-making would most noticeably establish itself in England around Dudley and Stourbridge in the Westmidlands, and in the northeast around Newcastle. Distortion of image, due to imperfect mixing of the raw materials, would be characteristic of these early cast glass plates even after they had been rendered perfectly flat by polishing.

GLASS WINDOWS

1798

Distortion of image, due to imperfect mixing of the raw materials, had been a characteristic of cast plates of flat glass even after they had been fully polished. At this point the introduction of a process of mechanical stirring of the molten glass, by Guinand, greatly improved glass windows and mirrors.

GLASS WINDOWS

1800

For the 1st time a steam engine was used in the grinding and polishing of glass for windows and mirrors.

GLASS WINDOWS

1805

By this point the mechanical stirring of molten glass for the casting of glass plates for mirrors and windows had been perfected, and problems of distortion were pretty much a thing of the past.

GLASS WINDOWS

1827

The invention of a glass-pressing machine, used by the American manufacturer Deming Jarves in his Boston and Sandwich Glass Company (1825-1888), permitted the manufacturing of inexpensive and mass-produced glass articles.

GLASS WINDOWS

1832

On the Isle of Jersey in the English Channel, there was an outbreak of the Asian cholera.

James Fenimore Cooper, in Paris with his family when the scourge hit that metropolis, commented upon how the gardens of the Tuileries suddenly became deserted.

In America, white settlements were not enjoying good health but the Mandan and Hidatsa were being utterly destroyed. Take a look at the discussion by Richard Batman beginning on page 320 of James Pattie's WEST: THE DREAM AND THE REALITY (in hardcover, titled AMERICAN ECCLESIASTES: THE STORIES OF JAMES PATTIE. Norman: U of Oklahoma P, 1986) having to do with the new and terrifying plague of cholera sweeping the settled east about the same time. Physicians would reject the contagion theory (with the exception of smallpox), until in the latter part of the 19th Century work on cholera finally would show that it and other such diseases were indeed, like smallpox, contagious.

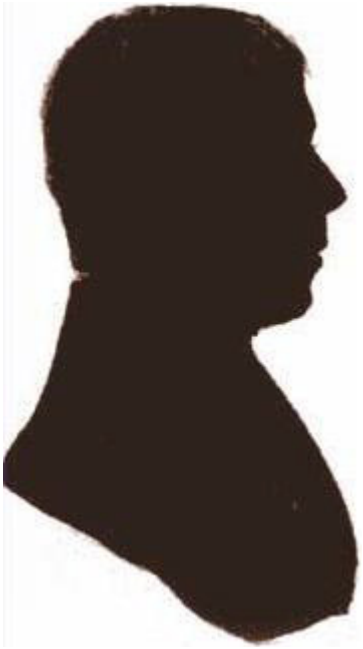
Dr. James Ellsworth De Kay returned from Turkey to New-York, where he began to prescribe port wine as a remedy for cholera and quickly earned for himself a nickname, "Dr. Port." Saloon customers would be able to ask the bartender to pour them "a Dr. DeKay." Soon he settled at Oyster Bay on Long Island, where he would study natural history, contribute to New-York newspapers, and cultivate literary friendships. Among the

romantic literary types whom he would seek to cultivate would be Washington Irving, Joseph Rodman Drake, James Fenimore Cooper, and Fitz-Greene Halleck.



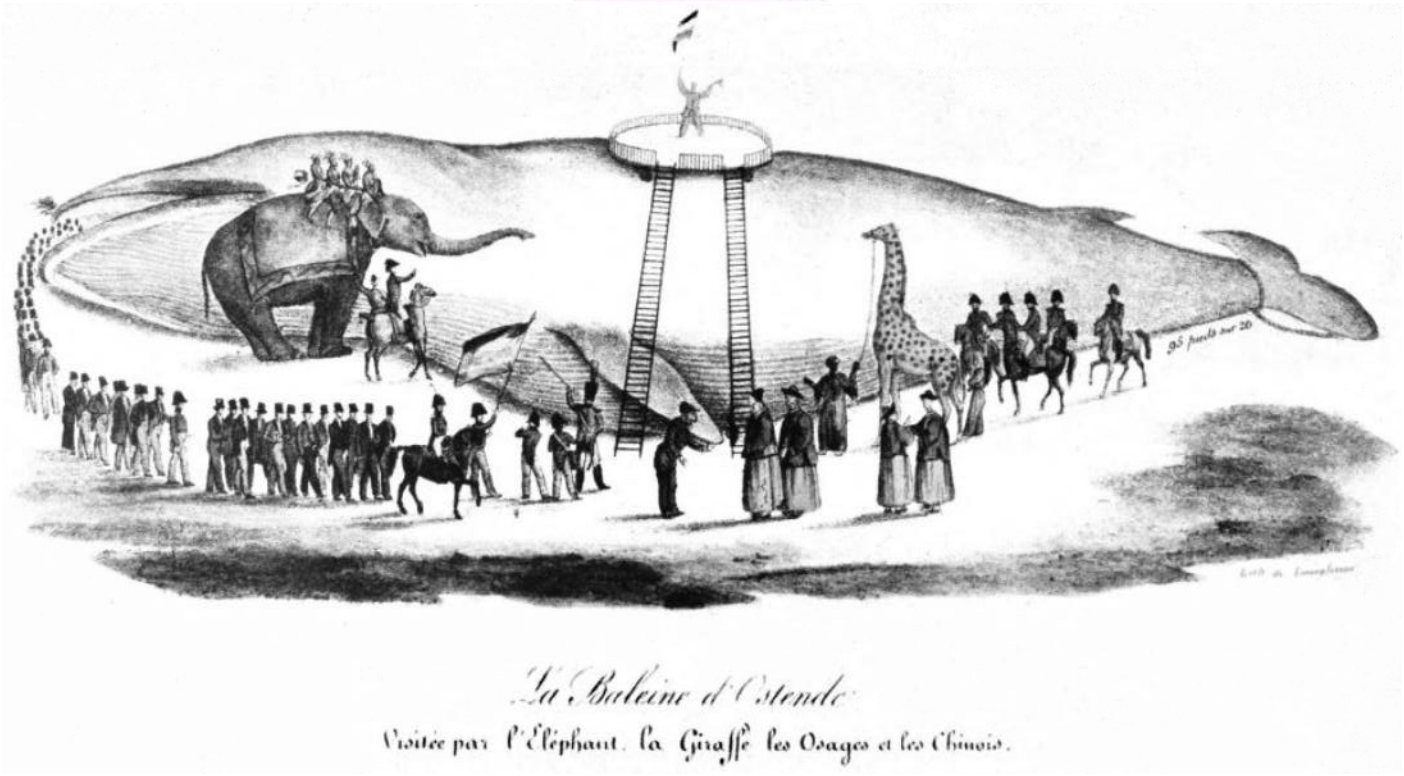
(You will notice instantly that the exigencies of class would make it quite impossible for him ever to cultivate the likes of Henry Thoreau as part of such a clique.)

When the 1st person died of the cholera in his town, Friend John Cadbury the chocolate maker insisted on following in his "broad-brimmed hat and flowing Quaker frock-coat" as the hired laborers carried the coffin to the graveyard. This was at a time when other people were shunning the victims of the infection. Such burial workers smoked tobacco constantly while on such details, as their effort to ward off the disease or at least somewhat relieve their anxieties.



Friend John had installed a window made of panes of plate glass in his shop (rather than using the conventional panes of crown glass), one of the 1st local businesses to do so, and was employing an authentic Chinaman attired in an authentic Chinese national costume, to sit on display in the window and weigh and pack his tea. Hoo-hah!

GLASS WINDOWS



George W. Warren would write of the activities of his father Josiah Warren (1798-1874) the anarchist, during the public crisis of this year:

> Then in 1832 the cholera first made its appearance, and I well remember how my father set up his type and printed hand-bills cautioning the people how to live during the prevalence of that disease. These bills described the symptoms and how to treat them. Then I was allowed to go with my father to scatter the bills of caution along the streets, and I remember how proud I was when those who saw what my father was doing, shook hands with him so warmly.
> What with his work of printing precautionary notices and attending a large number of funerals with masonic lodges,

> firemen and other organizations requiring bands, my father was kept busy for days and weeks and months; there was scarcely an hour that a funeral didn't take place. Time went on, so did deaths, but our family lived through it. Fortunately the writer, being only six years of age, could not realize the state of affairs, nor the horror of the situation — he trotting along, scattering [and] broadcasting the "caution" notices, proud of telling how many papers he had given to the people each day.
> If the city records of 1832-1834 were not destroyed during the destruction of the court house some years ago, the thanks of the city alderman to him will be found recorded to Josiah Warren if I mistake not.

A New York City peddler brought cholera up the canal to Rochester, New York, population 11,000, and 400 to 500 of them died, filling many of the city's small cemeteries such as the 3 1/2 acre graveyard on Buffalo Street. One local resident, Ashbel Riley, buried 80 of the victims unaided. The Rochester Board of Health was established. The Monroe County Jail, called the "Blue Eagle Jail," was built off Court St. between the west bank of the river and the Carroll-Fitzhugh raceway. It had a walled courtyard not only for prisoner exercise but also for executions.

Professor Richard Harlan was a member of a commission of Philadelphia physicians to Montréal, to collect information on the effective treatment of cholera. He became surgeon to the Philadelphia hospital.

In this year Friend Charles Farquhar, Sr. graduated from the Medical School of the University of Pennsylvania and opened a practice in Alexandria, Virginia, where the city council immediately put this new physician in charge of their town's struggle to deal with the ongoing epidemic.

The cholera outbreak of this year would give rise to at least one monument. It is atop a hill in Sheffield, England and commemorates 402 victims buried in grounds between Park Hill and Norfolk Park adjoining Clay Wood. The monument was designed by M.E. Hadfield and sculpted by Earp and Hobbs and would be complete in 1835. Its plaque names John Blake, Master Cutler, one of the victims, and notes that the foundation stone was laid by a poet, James Montgomery:

1833

Glass production improved, making it possible to manufacture sheets of up to 6 feet in length. (Before this point the largest piece of sheet glass available would have been 4 feet (in broad glass) or 4-5 feet (in crown glass).

GLASS WINDOWS

1834

Robert Lucas Chance began to use a German process to produce finer quality and larger flat panes of glass. This was a cylinder sheet process. Such glass would be useful as an architectural material, as in the Crystal Palace. The process would be used extensively to make glass windows until early in the 20th Century. From this period onward industrial machines would be developed to automate the production first of obscured glass and then of clear window glass.

1838

Robert Lucas Chance took out a British patent for his version of the process of casting of mirror glass plates, involving stirring of the molten glass. It would take a decade for this version of the process to become the usual one.

GLASS WINDOWS

1845

Early November: Henry Thoreau built his chimney. Evidently, also by this time he had installed his two secondhand windows each made up of something like 24 oblongs of crown glass, which he had purchased somewhere for $2.[43].

WALDEN: At length, in the beginning of May, with the help of some of my acquaintances, rather to improve so good an occasion for neighborliness than from any necessity, I set up the frame of my house. No man was ever more honored in the character of his raisers than I. They are destined, I trust, to assist at the raising of loftier structures one day. I began to occupy my house on the 4th of July, as soon as it was boarded and roofed, for the boards were carefully feather-edged and lapped, so that it was perfectly impervious to rain; but before boarding I laid the foundation of a chimney at one end, bringing two cartloads of stones up the hill from the pond in my arms. I built the chimney after my hoeing in the fall, before a fire became necessary for warmth, doing my cooking in the mean while out of doors on the ground, early in the morning; which mode I still think is in some respects more convenient and agreeable than the usual one. When it stormed before my bread was baked, I fixed a few boards over the fire, and sat under them to watch my loaf, and passed some pleasant hours in that way. In those days, when my hands were much employed, I read but little, but the least scraps of paper which lay on the ground, my holder, or tablecloth, afforded me as much entertainment, in fact answered the same purpose as the Iliad.

PEOPLE OF WALDEN

BRONSON ALCOTT
WALDO EMERSON
ELLERY CHANNING
BURRILL CURTIS
GEORGE W. CURTIS

WALDEN: Before winter I built a chimney, and shingled the sides of my house, which were already impervious to rain, with imperfect and sappy shingles made of the first slice of the log, whose edges I was obliged to straighten with a plane. I have thus a tight shingled and plastered house, ten feet wide by fifteen long, and eight-feet posts, with a garret and a closet, a large window on each side, two trap doors, one door at the end, and a brick fireplace opposite.

TIMELINE OF WALDEN

1847

James Hartley produced sheets of rolled glass with an obscured ribbed finish which would often find use as an architectural material for the roofs of railroad terminals.

1848

By this point the process pioneered by Robert Lucas Chance for the production of mirror plate glass was the one that was routinely used.

According to Warren Scoville's REVOLUTION IN GLASS MAKING, only "[s]ome of the wealthiest people in Boston had begun to use polished plate glass instead of sheet glass in their front windows before 1850."[3]

GLASS WINDOWS

1851

The firm of Thomas Cook offered many British "tour-ists" the opportunity of economically visiting London to view the exhibits of progress at the Crystal Palace.

Cook has made travel easy and a pleasure.

The ancestry of our present-day picture windows is closely linked to the development of window glass itself. London's Crystal Palace –the quintessential glass structure of the Industrial Revolution– not only enclosed a world's fair in glass, but also exhibited the largest sheet of plate glass created to that point. Until the 1920s, plate glass used for oversized glass windows would be produced entirely by the casting method. Workers would pour molten glass onto cast-iron tables from large regenerative pots, then roll, anneal, grind, and polish the slab into a finished sheet. The process was slow and labor-intensive, so plate glass was expensive. Not surprisingly, it would see very limited residential use during the 19th Century. According to Warren Scoville's REVOLUTION IN GLASS MAKING, only "Some of the wealthiest people in Boston had begun to use polished plate glass instead of sheet glass in their front windows before 1850." By 1870, plate glass sheets as large as 84"x60" would become possible, but the domestic output would be less than one percent. The American production of plate glass would rise steadily to 82 percent by 1890. In 1897 the Marsh Plate Glass Company

3. However, in England, Friend John Cadbury of chocolate fame had installed in the front of his shop a window made of panes of plate glass rather than panes of crown glass, by about 1832:

of Floreffe, Pennsylvania would develop a continuous oven (lehr) for annealing plate glass, reducing the carefully controlled cooling time from three days to three hours. Stylistically, oversized windows known as "cottage" or "front" windows would grow in popularity during the 1890s. Such cottage or front windows invariably featured a transom above them, and including this transom were rarely larger than 48"x68". Cultural changes in the early 20th century, as well as innovations such as central heating, would lead to flowing, open floor plans and ever-larger home windows. The horizontal emphasis of Prairie School architecture, championed by Frank Lloyd Wright, would create a need for wide windows rather than tall ones. While Wright used decorative ribbon windows or art glass in most of his Prairie School houses, more vernacular and eclectic versions incorporated oversized windows of plate glass. To meet this market, sash-and-blind companies could simply place their cottage windows on their sides in the window frames. The transom became a casement or double-hung sash paired with a mate for natural ventilation. These new oversized windows, mimicking commercial "Chicago" windows, would for a period be known as "landscape" sash. The center sash would still rarely be larger than 48" square, but the overall window assembly would come to have a predominately horizontal axis, spanning 8' or more. Thanks to Henry Ford, by 1922 engineers had developed a semi-continuous method of rolling plate glass for automobile windshields that was soon adopted by Pittsburgh Plate Glass Co. and Libby-Owens-Ford Glass Co. As a result, the price of plate glass would plummet in comparison to the price of standard window glass, and though it remained the costlier material, more affordable plate class contributed to the growing popularity of picture windows. By the 1930s, plate glass 127"x286" could be produced up to 1 1/4" thick. American Window Glass Co. of Pittsburgh offered a plate glass alternative for oversized windows dubbed "Crystal Sheet," a special 39-ounce-per-square-foot) glass 3/16" in thickness. Nevertheless, picture windows were usually glazed with 1/4", 5/16", or 3/8" plate glass, while larger windows required thicker glass for stability. Chicago's Century of Progress International Exposition of 1933 would unveil George Fred Keck's ultra-modern House of Tomorrow and Crystal House emphasizing the use of glass throughout the home. The term "picture window" would be coined a few years later. A solar-home innovator, George Fred Keck would introduce thermal pane windows in 1935, but thermal pane picture windows would not be commonly found on all classes of residential work until the 1960s.

1857

November 27, Friday: Father Isaac Hecker wrote to Orestes Augustus Brownson from Rome.

Henry Thoreau visited beautiful downtown Concord:

> Standing before Stacy's large glass windows this morning, I saw that they were gloriously ground by the frost. I never saw such beautiful feather and fir-like frosting. His windows are filled with fancy articles and toys for Christmas and New Year's presents, but this delicate and graceful outside frosting surpassed them all infinitely. I saw countless feathers with very distinct midribs and fine pinnae. The half of a trunk seemed to rise in each case up along the sash, and these feathers branched off from it all the way, sometimes nearly horizontally. Other crystals looked like pine plumes the size of life. If glass could be ground to look like this, how glorious it would be!

We notice, in this journal entry from Concord in the Year of Our Lord 1857, Thoreau's above reference to glass grinding: "they were gloriously ground by the frost." At that point in time, the glass-grinding factories that were producing such large slabs of sheet glass for use in shop windows had been in production for about nine years. Not only patterned plate glass, but transparent plate glass, was for the first time available and reasonably priced in large slabs in commercial quantities. This windows through which Thoreau was staring at John Stacy's bookstore would have been some of the few such transparencies as yet installed in local shops.

GLASS WINDOWS

November 27, Friday: Mr. Wesson says that he has seen a striped squirrel eating a white-bellied mouse on a wall –had evidently caught [it]; also that the little dipper is not a coot, –but he appears not to know a coot, and did not recognize the lobed feet when I drew them. Says the little dipper has a bill like a hen, and will not dive at the flash so as to escape, as he has proved.[4] Says that a loon can run but little way and very awkwardly, falling on its belly, and cannot rise from the ground. Makes a great noise running on the water before it rises.
Standing before Stacy's large glass windows this morning, I saw that they were gloriously ground by the frost. I never saw such beautiful feather and fir-like frosting. His windows are filled with fancy articles and toys for Christmas and New-Year's presents, but this delicate and graceful outside frosting

surpassed them all infinitely. I saw countless feathers with very distinct midribs and fine pinnae. The half of a trunk seemed to rise in each case up along the sash, and these feathers branched off from it all the way, sometimes nearly horizontally. Other crystals looked like pine plumes the size of life. If glass could be ground to look like this, how glorious it would be!
You can tell which shopman has the hottest fire within by the frost being melted off. I was never so struck by the gracefulness of the curves in vegetation, and wonder that Ruskin does not refer to frostwork.
P.M. –Rode to the kiln and quarry by William Farrar's, Carlisle, and to gorge behind Melvin's.
The direction of the strata at this quarry is like that of Curly-pate and the Easterbrooks quarries, east-northeast by west-southwest, though the latter are very nearly two miles southeast.
Was struck by the appearance of a small hickory near the wall, in the rocky ravine just above the trough. Its trunk was covered with loose scales unlike the hickories near it and as much as the shagbark; but probably it is a shaggy or scaly-barked variety of Carya glabra. It may be well to observe it next fall. The husk is not thick, like that of the shagbark, but quite thin, and splits into four only part way down. The shell is not white nor sharply four-angled like the other, but it is rather like a pignut.
The stratification trends there as at Curly-pate, or perhaps more north and south.
That trough place on the side of the rocky valley to catch the trickling spring for the sake of the cattle, with a long slab cover to the trough that leads to it to fend off the feet of cattle that come to drink, is an agreeable object and in keeping with the circumstances, amid the hickories and perhaps ash trees. It reminds me of life sometimes in the pasture, –that other creatures than myself quench their thirst at this hillside.
I think that Ruskin is wrong about reflections in his "Elements of Drawing," page 181. He says the reflection is merely the substance "reversed" or "topsy-turvy," and adds, "Whatever you can see from the place in which you stand, of the solid objects so reversed under the water, you will see in the reflection, always in the true perspective of the solid objects so reversed."

4.Vide December 26, 1857.

Here, in a photograph made sometime between 1865 and 1868, courtesy of Leslie Perrin Wilson of the Concord Free Public Library, is the closest approximation we have to the sort of "plate glass" window through which Thoreau was peering on this day. The shop on the left is 23-25 Main Street, which was John Stacy's business which his son Albert Stacy had by 1850 taken over. The shop on the right is one that he set up after the Civil War. We note immediately that this type of shop window might more appropriately be referred to as a glass plate window rather than a plate glass window, as it was clearly built up from multiple polished glass plates in a frame rather than, as today, of one solid slab of almost invisible glass entirely filling a window space:

1863

John Shepard Keyes purchased the Bullet Hole House on Monument Street in Concord.

Out for a walk on the Old Carlisle Road (now Estabrook Road), Ellery Channing was hiking past what remained of Emerson's shanty out standing in the field where the Clarks had neglected it after their son James had gone insane and then died — and noted that the windows of that structure were missing.

1870

Although plate glass sheets as large as 84"x60" had by this year become possible, little of this sort of thing was as yet being produced.

GLASS WINDOWS

Most glass plate shop windows, in this period probably still consisted of the sort of windows that are evident in this photograph made sometime between 1865 and 1868, supplied to the Kouroo Contexture by Leslie Perrin Wilson of the Concord Free Public Library. The shop on the left is 23-25 Main Street in beautiful downtown Concord, which was John Stacy's business which his son Albert had by 1850 taken over. The shop on the right is one that Albert Stacy set up after the Civil War. This type of shop window might more appropriately be referred to as a glass plate window rather than a plate glass window because it was being built up from multiple polished glass plates set into a frame rather than, as today, of one solid slab of almost invisible glass entirely filling a window space:

1884

During this year and the following three years, Chance Brothers would be introducing the rolled plate process whereby glass is poured onto an inclined metal plane and then passed between machine rollers, followed by grinding and polishing (the glass they were producing was not clear but patterned).

SHEETS OF GLASS

1890

During this decade, oversized windows known as “cottage” or “front” windows would be becoming popular. Such windows needed, for reasons of ventilation, a transom above them, and were seldom larger than 48"x68” inclusive of the transom. Frank Lloyd Wright’s horizontal emphasis, known as Prairie School architecture, would mean the installation of wide windows rather than tall ones. Wright’s designs would employ decorative ribbon windows or art glass, but knockoffs of his style would incorporate oversized windows of plain plate glass. Sash-and-blind companies would be able to meet this market demand by merely re-orienting their existing product, to wit, hanging ordinary cottage windows sidewise in their frames. The transom would become a pair of ventilation casements or double-hung sashes. These new oversized windows, mimicking commercial “Chicago” windows, would for awhile be known as “landscape” sash. The center sash would still rarely be larger than 48" square, but the overall window assembly would come to have a predominately horizontal axis spanning 8' or more.

GLASS WINDOWS

1897

The Marsh Plate Glass Company of Floreffe, Pennsylvania developed a continuous oven (lehr) for annealing plate glass that would reduce the carefully controlled cooling time of the glass from three days to three hours.

GLASS WINDOWS

1898

Pilkington Glass introduced hexagonal rolled wired cast glass.

SHEETS OF GLASS

1903

In the US, the invention of machine-drawn cylinder glass (in the United Kingdom, Pilkington Glass would be manufacturing this sort of glass from 1910 to 1933).

GLASS WINDOWS

1913

In Belgium, the 1st flat sheet glass drawn by machine (this sort of glass would be first drawn, in the United Kingdom, in Kent in 1919).

GLASS WINDOWS

1920

Ezra Pound's HUGH SELWYN MAUBERLEY.

During this decade, in Paris, Pound would be editing T.S. Eliot's THE WASTE LAND for publication.

Until this decade, plate glass used for oversized glass windows had been being produced entirely by the casting method. Workers would pour molten glass onto cast-iron tables from large regenerative pots, then roll, anneal, grind, and polish the resultant slab into a finished sheet. The process had been slow and labor-intensive, therefore plate glass had been expensive. Not surprisingly, it had seen very limited residential use during the 19th Century. In this year, however, continuous ribbon production of sheet plate was begun by the Ford Motor Company.

(One has cause to wonder whether Pound's preparation of Eliot's poetry during this decade was more similar to the old, labor-intensive rolling, grinding, and polishing of plate, or more similar to the new, continuous ribbon production of plate.)

1922

Ford Motor Company engineers had developed a semi-continuous method of rolling plate glass for automobile windshields that would soon be adopted by the Pittsburgh Plate Glass Company and by the Libby-Owens-Ford Glass Company. In result, the price of plate glass would drop to closer to the price of standard window glass, though it would remain somewhat more costly. This more affordable plate glass would contribute to a trend to put picture windows in new homes.

GLASS WINDOWS

1923

The 1st United Kingdom production of continuous polished plate glass, using a single-grinding process.

GLASS WINDOWS

1925

The Pilkington Brothers developed a continuous grinding and polishing process for ribbons of sheet glass.

GLASS WINDOWS

1926

The Pilkington Brothers achieved continuous production of ribbons of sheet glass by flowing glass from a tank furnace over a weir, and then onto rollers.

GLASS WINDOWS

1930s

At about this point, factories for the continuous rolling, grinding and polishing of sheet glass were in operation. By this decade, plate glass 127"x286" could be produced up to 1 1/4" thick. The American Window Glass Company of Pittsburgh offered an alternative to plate glass in oversize windows they were terming "Crystal Sheet," a special 39-ounce-per-square-foot glass 3/16" in thickness. However, picture windows usually used 1/4", 5/16", or 3/8" plate glass, with for stability larger windows requiring thicker glass.

GLASS WINDOWS

1933

May 27: The “Century of Progress” International Exposition opened in Chicago. The theme of the exposition was the progress of civilization during the century of that metropolis’s corporate existence — this would be the 1st time in American history that an international fair would pay for itself. That it would pay for itself, however, seems to have been due rather largely to one person, Sally Rand, who got star billing at the “Streets of Paris” concession for her slow fan gyration wearing only ostrich plumes, performed to the strains of Debussy’s “Clair de Lune.”

Ohiyesa, or Doctor “Charles Alexander Eastman,” universally accepted as a credit to his race, would be awarded a medallion of recognition at this exposition. Indicative of the racism of the times, this medal celebrated “what an Indian could achieve.”

We do not have a record of the physician’s thoughts while this signal honor was being bestowed upon him by the white people who constituted one quartering of his pedigree and by the dominant white culture which constituted some proportion of his heritage. We do hope he had a chance, while he was on the grounds, to stop by the “Streets of Paris” concession and enjoy Sally Rand’s class act.

At this exposition George Fred Keck’s ultra-modern House of Tomorrow and Crystal House emphasized the use of glass throughout the home — the term “picture window” was right around the corner.

GLASS WINDOWS

1935

A solar-home innovator, George Fred Keck, introduced thermal pane windows (thermal pane picture windows would not be commonly found on all classes of residential construction until the 1960s).

GLASS WINDOWS

1937

In factories for the production of sheet glass, both sides of the glass ribbon came to be ground and polished simultaneously.

GLASS WINDOWS

1938

Pilkington Glass developed the twin ground polished plate system.

GLASS WINDOWS

1959

90% of the world's flat glass was being produced by the float glass process invented earlier in the decade of the 1950s by Sir Alastair Pilkington of Pilkington Brothers. In this process molten glass was poured onto one end of a molten tin bath. The glass would float atop the tin, leveling out as it spread along the bath until it achieved a smooth face on both top and bottom. The glass would cool and slowly solidify as it traveled over the molten tin and then be lifted off the surface of molten tin as a continuous ribbon. The glass was then fire-polished, the finished product having near-parallel surfaces. Glass was being produced in standard metric thicknesses of 2, 3, 4, 5, 6, 8, 10, 12, 15, 19 and 22 mm. In this year this float glass was launched on the United Kingdom market.

GLASS WINDOWS

"It's all now you see. Yesterday won't be over until tomorrow and tomorrow began ten thousand years ago."

– Remark by character "Garin Stevens" in William Faulkner's INTRUDER IN THE DUST

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ARRGH AUTOMATED RESEARCH REPORT

GENERATION HOTLINE

This stuff presumably looks to you as if it were generated by a human. Such is not the case. Instead, upon someone's request we have pulled it out of the hat of a pirate that has grown out of the shoulder of our pet parrot "Laura" (depicted above). What these chronological lists are: they are research reports compiled by ARRGH algorithms out of a database of data modules which we term the Kouroo Contexture. This is data mining. To respond to such a request for information, we merely push a button.

Commonly, the first output of the program has obvious deficiencies and so we need to go back into the data modules stored in the contexture and do a minor amount of tweaking, and then we need to punch that button again and do a recompile of the chronology — but there is nothing here that remotely resembles the ordinary "writerly" process which you know and love. As the contents of this originating contexture improve, and as the programming improves, and as funding becomes available (to date no funding whatever has been needed in the creation of this facility, the entire operation being run out of pocket change) we expect a diminished need to do such tweaking and recompiling, and we fully expect to achieve a simulation of a generous and untiring robotic research librarian. Onward and upward in this brave new world.

First come first serve. There is no charge.
Place your requests with <Kouroo@kouroo.info>.
Arrgh.