

MODERN BUILDING METHODS

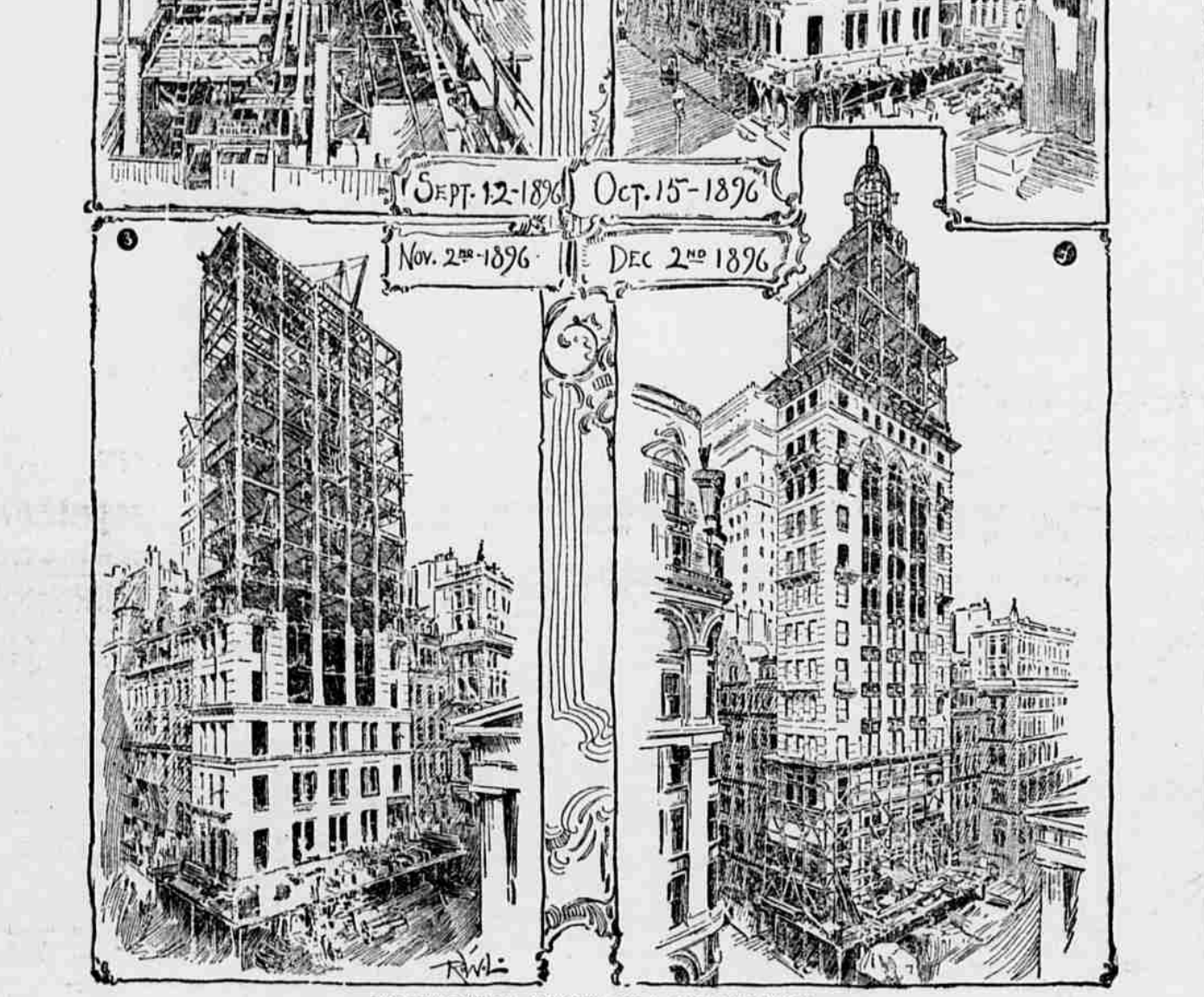
A Notable Achievement in Architectural Engineering.

MAGIC-LIKE WORK ON A SKYSCRAPER

Difficult Feat of Erecting a Structure 340 Feet High on a Lot 22 Feet in Width—Massive Foundations.

(Copyright, 1897, by S. S. McClure Co.) The building of the Gillender building, on the northeast corner of Wall and Nassau streets, New York, adds another conspicuous landmark to the marvelous construction that within half a dozen years has sprung up upon the lower end of Manhattan Island. Although it is not the tallest of the modern office buildings, its design, construction and equipment is of the same class, its extremely narrow width made it much more slender in proportion than the tallest of them, increased the difficulties of design and the boldness of construction, and makes it a notable example of its class, affording a fair illustration of some of the most difficult and successful work that has been executed.

First, some small steel pipes were sunk forty or fifty feet through the cellar floor into the ground. The difficulties of driving down such long and narrow tubes in such restricted quarters without disturbing the



CONSTRUCTION STAGES OF A SKYSCRAPER.

low ceiling were overcome by driving successive short sections of pipe and screwing them together to form a single continuous vertical pipe, whose joints were made by means of a special device. Large and deep excavations were therefore required and they could not be made in the wet and treacherous ground, even by the most careful and costly methods, without endangering the stability of the foundations and jeopardizing their stability and the safety of their occupants.

STEEL FOUNDATION. The responsibility rested upon the contractor who determined to avoid all risk by building, under the old foundations, columns extending down to the hard pan, and carrying the weight of the whole wall to that safe support. Narrow vertical shafts were cut close together partly through the foot of the wall in its outside face, thin and short sections of very heavy steel pipe set upright in them, and forced down into the ground by powerful jacks on top, and hydraulic jacks inside that cut away the core like chisel.

A GIGANTIC STEEL CAGE. This building is of what is known as a steel cage construction, that is, there is a steel framework or skeleton that is complete and independent of the walls, carries the weight of the floor loads, roof and all wind pressures, and other stories, the whole being supported entirely by the columns and their braces. The concrete was then filled in above the foundations. Instead of the floors and roof being partly carried by the walls, as formerly, the walls themselves are carried on special girders that are attached to columns at every story, each supporting a zone or belt of masonry that merely serves as an ornamental screen to exclude the air from the interior of the building.

SINKING THE CAISSON. A pneumatic caisson is essentially a great

pressure, was not sufficient to be injurious to the workmen, merely causing a considerable increase of temperature and producing a sensation of heat in the ears, but it had been necessary to sink the caissons twice or three times as far great precautions were taken to prevent the caisson from sinking. The caisson was entered through an air lock at the top of the shaft; this was a small steel chamber large enough to contain three or four men who entered it. They closed the airtight outer door and opened the pressure valve; when the required pressure was secured they opened the trap door in the bottom and descended the shaft into the excavating chamber of the caisson. To come out they entered the lock, closed the shaft door, opened the pressure valve and when the pressure was entirely relieved opened the outer door and emerged. It was necessary always to increase or diminish the pressure slowly and in steps, and when the pressure was never open at the same time; either one or the other was always closed and securely fastened by the force of the caisson pressure.

When the caisson reached the hard pan the excavation was carried a short distance into it and the bottom leveled and cleaned. Then concrete was rammed in bucket, and rammed down till the whole interior of the caisson and the holes left by the pipes and shafts in the brick work were packed full. The concrete was carried to the level inside the cofferdam from which the water was pumped out, and on its top steel beams and girders were set so as to overlap in both directions and carry the load down to the required positions at the extreme edges of the lot beyond where foundations could be conveniently placed. A solid mass of concrete was then filled in above the top of each pier, completely surrounding the girders and hermetically sealing them in the heart of a great block of artificial stone. The pier was completed on July 25, and the first column was set September 3, and after the steel work was fully under way it rose like magic at an average rate of two stories every ten days.

The most noticeable feature of construction was doubtless the skill and rapidity with which the trained erectors assembled the great steel girders and columns; although there were several thousand pieces and hundreds of them looked very much alike, each one was taken without hesitation, usually as soon as it arrived, rapidly and silently hoisted, perhaps 200 feet high, and set in its place, where half a dozen workmen were sitting to securely bolt it, and another party follow to drive the rivets, the men fearlessly walking and running on narrow, springy blocks, or slender, slippery beams or swinging heavy sledges from precarious platforms as much as 300 feet high. Sometimes a workman would ride up on the stone or iron that was being hoisted from the end of the derrick boom, staying back and forth over the crowded street, and sometimes he would slide down a rope or stand on a low pulley block and let it descend by "overhauling" the tackle rope, yet such was their confidence and steadiness that no serious accident of any kind occurred either to the workmen or to the thousands of people passing beneath them in the streets. Sometimes, however, the men grow too reckless, as in Buffalo, not long ago, when two men working on a narrow block, one of an upper story of a high building came to blow, and one fell off, and was miraculously caught in the loops of a rope many feet below, which saved his life.

THE EQUIPMENT. Steam for heating the building and operating its pumps is purchased from the New York Steam company, who develop it in great quantities in a boiler several thousand feet away, bring it in great underground mains, measure through special meters and thus

smokestack. Any deviation from the perpendicular or ill-fitted joints in such a framework might produce serious results and be magnified in proportion, so exceptional pains were taken to insure accuracy and perfect workmanship, and all the columns, cross beams and their braces were fitted together at the shops near Baltimore, where they were built, with the result that they were erected true and accurate when finally erected in place. While the erection was in progress the sidewalks were carried along the fronts of the buildings on narrow bridges raised above the street level over the unfinished vaults, heavy wooden posts were set up each side of this bridge and carried a flat roof of large timbers and plank that served both to protect pedestrians from any falling articles and for working platforms on which the stone cutters dressed the stone, and quantities of iron, cement and various materials were there unloaded from the wagons and stored. After the steel framework was well advanced the masons commenced building in the brick walls around and between the columns and upon the special beams; outside of this the front walls are faced with cut stone, anchored securely to the framework. Strong, light arches of hollow brick were built between the steel floor beams, concrete was filled in on top of them and wooden strips embedded therein to nail the wooden floors to the steel beams. The floor partitions were built on a framework of steel rods by fastening cross bars to them, covering both sides with metallic lath, a kind of steel cloth, and then coating the surface with a strong, hard cement plaster, and the columns and girders were encased everywhere with hollow brick or terra cotta covering that usually known as a fireproof coating, otherwise known as fireproofing; otherwise furniture and other inflammable contents of an iron building may often do, burn so fiercely that the heat softens, warps and

effects a valuable economy of space in dispensing with boilers, coal, etc. An electric current is taken from the street conduits, and operated about 1,500 feet, running the motors that drive the passenger elevators that travel six stories from pavement to roof in about thirty seconds. A powerful steam pump raises water from the cellar to the 4,000-gallon iron storage tanks 250 feet above the street mains, whence it is supplied to toilet rooms and to the offices, etc., at a maximum pressure of 100 pounds per square foot. A four-inch steel fire main extends from cellar to roof with branches in every corridor, having valves, fire hose and nozzles that will command every portion of the building and deluge it with water from the roof at the same time the moment the valve is opened the decrease in pressure automatically turns steam into a large fire pump and forces a powerful stream up from the bottom as well.

In Boston some of the tall buildings are provided with an outside fire system also, which consists of a vertical pipe extending to the level in a special nozzle from which a fan-shaped sheet of water can be thrown so as to fall in a thin curtain, and finally become a fine mist, while the whole front or side of a building from an adjacent fire.

On May 1, 1896, the tenants were removed from the building that formerly occupied this site and a few days before May 1, 1897, the new Gillender building received its tenants. The gross value of the building, including the cost of the building itself has been about \$500,000, including the cost of expensive machinery and equipment, rest of the cost being for the purchase of the lot, the cost of the building, including the cost of similar, though larger, buildings has been in the millions.

It is no wonder that it has been predicted that these gigantic towers will eventually transform broad and airy streets to the semblance of close, dark canyons that will finally become tunnels, when the enormously concentrated traffic is so congested that elevated platforms are required across the street above the level of the second story sidewalks for pedestrians. Such fears may, however, be reassured by the laws that have been passed in nearly all our large cities, regulating the maximum height of buildings. FRANK W. SKINNER.

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THE OLD TIMERS.

"Uncle" Austin Gollister, the only surviving playmate of Abraham Lincoln, is lying at the point of death at his home three miles east of Hodgenville, Ky. He is 71 years of age. Isaac McCallan, the aged post-sportsman of Greenport, Ia., who recently celebrated his 91st birthday by playing what all evening at his club, is troubled very little by his age and has his boat, fishing tackle and shooting implements always ready for use. Dr. Charles Frederick Wulligths, the oldest physician in Ohio, still keeps up his practice, despite his 93 years and his name. He says every member of his family for the past 200 years has lived over 100 years, and his grandfather at the age of 100 cradled wheat for three days in succession. England's oldest duke, the duke of Northumberland, has entered his eighty-seventh year. Though he calls himself Percy, the duke is really a Smithson, the last male Percy having died in 1675. He is extremely religious, and as his wife was an Irvingite, one seat is always kept vacant at his table for the oldest man in America, and of the centennarians the most vigorous and well preserved. Michael Shea of Indianapolis, in a few months he will have attained the astonishing age of 116 years, and what is more remarkable, he continues in full possession of his mental faculties, taking a keen interest in the events of the day. The Rev. Walter Bartlett of Greene is the oldest minister in Ohio, if not in the United States, and in charge of an institution he was one of the most prominent men in the state in the anti-slavery movement. He was instrumental in promoting the election of Benjamin Wade to the senate of the United States, and was a stockholder in the underground railway. Thomas Thompson, the millionaire philanthropist, who left his fortune to his wife, with the provision that on her death one-half the income should go to poor women of Stratford, Conn., was graduated from Harvard college in 1817 in the class with the eminent historian, George Bancroft. His widow, who is now over 80 years old, is one of the most liberal givers of the day to charity and benevolent enterprises.

The last remaining granddaughter of Alexander von Humboldt, Mathilde von Humboldt, died a few weeks ago in Rome. She was born in 1830 in Ottmachau, in Silesia, the ancient family seat. She lived in Cottbus and Ottmachau till her mother's death, when she returned to Rome, where she was the leading spirit of the German colony and well known as a friend of young artists of talent. Mr. and Mrs. Thomas W. Battles of Decatur, Ill., celebrated the sixtieth anniversary of their marriage last Tuesday. Thomas Battles is a native of Mount Vernon, N. H. He was born there on February 17, 1817. His wife was Miss Lucy Stevens, and she is just one year younger than her husband. Both came from good old Puritan stock and were lifelong members of the Congregational church.

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LABOR AND INDUSTRY.

Paterick, N. J., has a textile school. Maine will make silk from spruce trees. Machine-made diamonds are announced. The scouring mill at Pendleton, Ore., is running night and day.

Co-operation in France has spread more in agriculture than in manufacturing and trade. Ohio brickmakers are using a clay-digging machine that does the work of from seventeen to twenty men.

The value of the cattle in western Australia is estimated at \$2,000,000, or five times that of all the cattle in Australia.

Nearly 33,000 tons of southern pig iron have been shipped to foreign countries during the present month; 29,000 tons have been sent to the west, and 38,000 tons to the north and east.

Joseph Woods, a vice president of the Cigar-makers' International union, is making a tour of the country in the interest of the union label, delivering illustrated lectures in open-air meetings.

A few years since there was not a cannery west of the Alleghany mountains, but now they dot the prairies and plantations of the Mississippi basin, and are increasing year by year at a rapid rate.

The Utah Federation of Labor is making a strong fight for the eight-hour law of that state. The lower courts have declared the law constitutional, but interested parties have carried the matter into the supreme court.

The Bakers' International union at the recent Cleveland convention adopted a new financial system similar somewhat to that of the cigar-makers. All moneys collected from regular sources being covered into an international treasury.

The vote recently taken by the Brotherhood of Locomotive Firemen to decide the question of affiliation of that organization with the American Federation of Labor resulted in an overwhelming majority voting in favor of the proposition.

The commissioner of the public works department of Brooklyn and the chief engineer of the water supply department notified a pump company that hereafter it would have to pay the union rate on all city work. Machinists must be paid \$3.25 for eight hours.

In Connecticut there is hardly a farmer who does not raise tobacco. Tobacco is grown in at least a dozen states, Pennsylvania leading in the amount of production, while Ohio has 50,000 acres given up to the culture, and an average crop of 20,000,000 pounds.

The Board of Education of Wheeling, W. Va., has advertised for bids for the erection of an eight-room school building. An interesting feature of the advertisement is that portions are read in English, French and German, but that only union labor will be employed.

According to the Baltimore News, the farmers of Maryland are becoming interested in the movement for general cultivation of tobacco and for the introduction of the raising of rice. In earlier days tobacco grew throughout the state, but for the last half century it has been confined to the counties of southern Maryland.

Before any sickness comes a feeling of general debility and loss of vitality. Blood is vitality. When you feel weak ward off disease by strengthening your blood. Fill Anemic Blood is composed largely of concentrated beef blood, and is the great blood builder.

Interest.

The latest in the fancy dress bicycle party. Not on the boulevards or to some charming suburb, but indoors, preferably in a bicycle academy. In fact, the fancy dress ball that has so long held undisputed sway has found a rival. It used to be the way that what were known as "trick riders" were skillful with their wheels, but nowadays two-thirds of those who enjoy bicycle riding are sufficiently expert to make their wheels do almost anything but talk. The bicycle ride mentioned is no theory, but an established fact. Not a week passes but what an event of the sort is greatly enjoyed.

The persons who take part in these affairs do not, strange as it may seem, attire themselves in bicycle costumes. To be sure, their dresses and suits are not equal to those which were in vogue at the Bradley Martin ball, but they are often very unique and always interesting. It seems very strange to think of Mary, Queen of Scots, riding a bike, or of Charles II. begging for her hand in the next bicycle reel, while Oliver Cromwell pedals off broken-hearted because some one has gained precedence. Yet this is exactly what happens. Then Napoleon Bonaparte and Britannia ride away in a circle around the room, the fastest of friends.

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