

# BUILDING A SKYSCRAPER "WHILE YOU WAIT"

**Mechanical Miracles and Their Application in the Work of Rushing a Modern Structure from a Hole in the Ground to an Imposing Edifice.**

BY WILLIAM ALLEN JOHNSTON.

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PEED—speed—more speed!

This is an express age and we are living in it. Express trains are striking the country from coast to coast, contracting distances so marvelously that now a business man may spend alternate days in cities one thousand miles apart; express steamships are tearing over the Atlantic so fast that today one may visit the Old and New Worlds each other week; express highways under rock and river are making a small town out of Greater New York; express elevators take an officeholder to his skyscraper home while he is getting his key from his pocket.

And now we have "express" buildings—structures reared so rapidly that, like the fabled Blarney Castle, they seem to spring up over night. On the site of the new Gimbel department store building, in Herald square, a building race—a race against time—is in progress, the magical speed of which is without parallel in the history of construction.

It is literally a Marathon of the skies.

October 20 the site was a huge pit quarried out of solid rock to a depth of two and a half stories and covering nearly an entire block in area. By afternoon of that day the bases of concrete and iron grillage were completed and ready for their stupendous burden, and by night of that day the race of iron began.

Big white arc lights and yellow incandescents gleamed all along the four deep walls, and a small army of men slipped down into the pit and made anchorages for the derricks.

At midnight the derricks came with a groaning and creaking of enormous trucks and a snapping of whips over the four and six ton beams. Such derricks were never seen before, even in skyscraper New York. They are selected giants of the Oregon pine forests, rounded by the skilled sparsers' adzes so perfectly that it seems they might have been turned by some monster lathe.

The masts are ninety feet long and weigh more than eight tons each; the booms measure eighty-five feet. Three flat cars, to each gigantic steel mast, are piled for the steel twelve—and a deal of skilful railroading was required to bring them here over their transcontinental journey. They could only be hauled through the streets when traffic was suspended at night.

One by one they were lowered into the pit, and one by one they arose and poked their slender heights into the murky glare of the electric lights. Hastily the power connections were made and the derrick, steered by electricity, came so slowly—and by daylight at least one of the big fellows was lifting iron out of the street as fast as it was piled in.

Now more iron began to arrive. All day long the narrow side streets were filled with an almost continuous succession of four horse trucks, each truck almost as long as the street is wide. The drivers are, in the main, former ironworkers, and know how to grapple a load and where to place it. The heavy rattling work goes on swiftly; each load disappears like magic into the capacious maw of the pit.

**The Flag on High.**

Now, already, a column stands up and is marked with a flag in tribute to the "pusher" and his gang of seven who got it up first. Fifteen minutes later another pushed up its bracketed head, and now another—and more in swift succession.

They weigh fifteen tons each, these big points, and are bolted fast to the concrete bases—each one a solid piece of cast steel—and so their sturdy heads are half a story above the street level.

Headers, beams, girders are added as fast as the derricks can lift. The men do them. They do delicate work—these monster cranes. As the beams—two men riding them and scrambling back and forth to make contact and lower it. The heavy, rattling places the final fit is a question of only a fraction of an inch, and these mighty wooden arms move by these fractions.

Only the best iron men are employed upon this record breaking race of iron, men who won their spurs on the Manhattan Bridge, the Singer and Metropolitan towers and other big constructions. There are many applicants. They stand waiting on the sunny side of the cross street, their little newspaper bundles—containing their overalls and often their all—slung carelessly over their shoulders. But only the best are chosen—the steady, tactful workers who neither waste energy nor lives.

Still, they work in a little world of ever present peril. One man who had broken his two legs and collarbone in previous jobs laid his hand nipped off at the knuckles thirty minutes after he started work; another had the muscles of his leg stripped off by a falling pile of iron; a third was whirled over the drum of a derrick. They get good pay—often as much as \$50 a week when they work overtime. But one would rather be a plumber, it would seem, and draw the same wages.

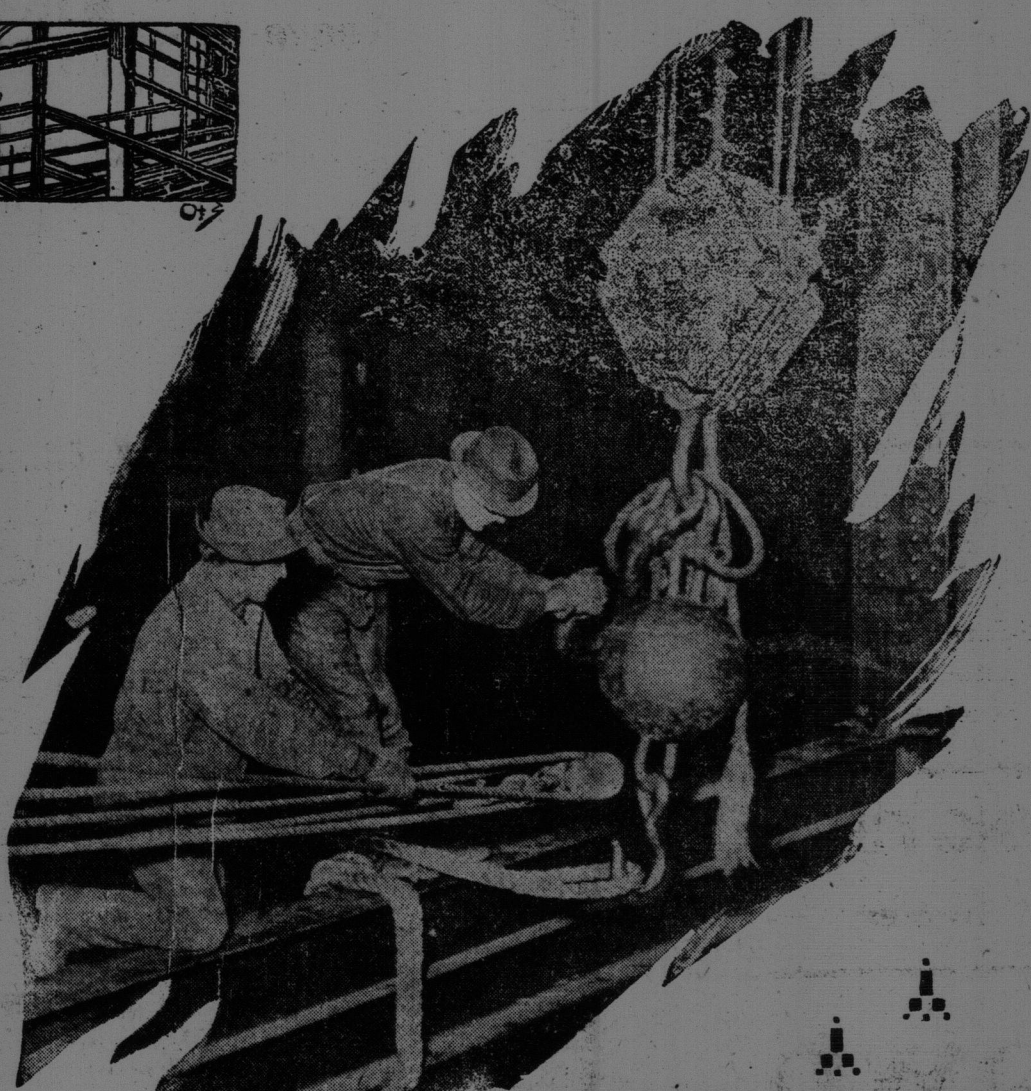
The hardest struggle of the iron construction takes place in the basement. After the derricks are raised out of the pit, the iron skeleton goes skyward by leaps and bounds, the huge derricks along with it.

**"Express" Building.**

And now comes the marvel of it all! Within thirty days after the pit was bare and ready—thirty days of two shifts each—the roof of this giant iron structure will be laid. Only thirty days to erect and rivet more than thirty million pounds of iron. Only thirty days to build the twelve stories of framework of a monster building which is to house one of the greatest department stores in the world.

These are the orders—"Thirty days to top the framework!" "Will you do it?" I asked the superintendent. "We—hope so," was all he said, but his manner said—"We will!"

It is the American way. Just recently the residents of Johannesburg returned after the hot season to find that their city boasted the completed framework of a new skyscraper. They rather doubted their eyes at first. A building much smaller and erected just previously had taken two and a half years for its erection. An American firm built a larger structure in six months.



The "Cowboys of the Sky" Working at Night Under Arc Light.

But six months is too long to-day—in America.

Over in the heart of the antique shops of Fourth avenue, at Twenty-eighth street, a million dollar structure is growing solidly toward the sky at the rate of a story a week. October 1 the site was a rock floor excavation covering nearly the area of a block. January 1 a great structure of granite, limestone and brick, a building which twenty years ago would have attracted thousands of sightseers, will have each of its twelve stories steam heated, electric lighted, all ready for occupancy.

It seems unbelievable, but there the big building stands—and grows before your very eyes! It is a structure put up at express speed.

From a distance the conglomerate clatter of the various building operations resolves itself into the steady roar of a blast furnace. Near at hand all seems deafening confusion at first.

Drays and heavy trucks rumble and crowd in continuous procession all around the base of the structure. As soon as one pulls out another takes its place. They are dumping iron, lumber, cement, pipe, brick, coal, cinders, tackle, derricks, wire reinforcement, terra cotta, masons' tables—what not? In each of the two narrow streets a mounted policeman is galloping ceaselessly back and forth in an effort to get some order out of the seeming chaos.

Derricks are creaking, cables whiplapping; strident bells, and hoarse, impatient orders rise above the deafening "rat-a-tap-tap" of the pneumatic riveting hammers. Overhead white hot rivets are hurtling and hissing through the air.

Overpowering confusion! So it seems to a layman. In reality the whole operation is a masterpiece of order—order backed by speed! Don't forget the speed.

**He's a Young Man.**

"Organization does it," said the superintendent. He's a young man, under thirty, and a small man, but he knows building, and his eyes, brain, body are never in repose.

"Now," he went on in his rapid, nervous way, "there are nearly a thousand men on the job this minute. They represent a good many trades—ironworkers, masons, electricians, standfitters, plumbers, carpenters, plasterers, derrickmen, stone setters, concrete mixers, general laborers. Each trade has its foreman, each gang its 'pusher.' The men are responsible to the foreman, the foreman to me. Every problem, and they come up every minute, filters right down to me—quickly, too. Sometimes we use megaphones.

"It's up to me to make these trades dovetail. That's the most difficult problem, hard enough on a slow job, but a good deal worse when the work is geared up so tightly that not a minute can be lost. The moment one trade puts in the last lick your next trade should be standing ready for its work."

"So much for saving time that way. There's another way. Whenever it's possible we start two different operations at once."

He pointed up to where a regiment of masons were making an outside brick wall literally grow as you watched it. "We started those men on the fifth story, building up, while the limestone was being laid on the second story. Two days ago there was open crew work between the two gangs."

"In other words," I began, "while you were waiting for the limestone?"

"No, no," he interrupted. "Cut out the word waiting. There's no waiting on the job. That's just the point. We don't wait; we double up and dovetail."

Inside the little office a man was scratching his head over a blue print. The superintendent gave a short chuckle. "That's the plasterer foreman," he said. "I just told him that we'd begin plastering tomorrow with a hundred and thirty men. He's a hustler, but he looked flabbergasted."

"You can't blame him. It is only three weeks ago to-day that the last foundation was finished. In three weeks more the roof will be laid. That's the time he has in which to plaster this building."

"What did he say?"

"Oh, he simply said, 'That's going some.' Now he's figuring how he can do it. And he will. Tomorrow he'll be enthusiastic about it."

**Men of Iron Nerve.**

They are the daredevils of the construction world, these iron men. Before the era of skyscrapers they were bridgemen, building their freeways at dizzy heights over rushing rivers; but in this new field their work has lost nothing of its ever present danger. From the time the iron structure leaves the ground their footboards are narrow iron beams, their elevators the ends of derrick chains, their whole environment a madhouse of swinging iron and white-hot rivets. A misstep means death—at any time almost; a dull eye means a maimed hand or limb.

"Cowboys of the sky" they are called, and they have many points in common with their dashing, daring brethren of the plains. They love a race and a risk for one thing.

As a big derrick was lowered to the street and lifted upon a four horse truck I saw two men lead up the derrick hooks with coils of rope and cable and then go riding up with the load—scrambling recklessly for footholds of any kind as they went sailing upward on a flying journey several hundred feet above the streets! Such adventures are strictly against the rules—against the law even; but the foreman wasn't

in the lead, towering gaunt and specterlike toward the sky.

The top of the skeleton is bristling with a battery of derricks, dipping, swinging, raising ceaselessly in a tune of changing signal bells, picking up the heavy beams and columns as though they were jackstraws and placing them with the nice precision of a human hand building a house of cards.

**Reaching to the Skies.**

Now a column stands up, a straight black line against the sky; now another and then two more and then four horizontal "headers" make a panel for the "intermediate beams."

Each heavy piece of iron is marked to be put in a certain place, and its bracketed ends are punched and ready for the riveting bolts. The moment the ends meet, a man sitting calmly upon the dizzy level—like a tall wrench through one of the meeting holes and makes a hum!—comes down. Then he reaches up, with a bolt and nut and next the riveters come and seal the ends solid with their white-hot bolts.

There, as you watched, the whole career framework of a new story grew and will endure for ages. Before the close of the short day an entire new story of iron will be added to the building. Think of this speed!

"A story of iron a day—that's my job," said the iron foreman. He is the same "Jimmy" Savage who was foreman on the Brooklyn end of the new Manhattan Bridge and was the first man to cross the structure. He is somewhat lame—that came from a one hundred foot fall off a railroad bridge—and he was one of those who just missed death on the Tenth Avenue car when the "traveller" fell and killed twelve of his fellow workers.

The strain of this iron work makes a man either exceedingly reckless or very serious. Savage is of the latter kind. He is only twenty-six years old, but he has all the gravity and steadiness and the heavily lined face of a man twice that age.

"A story a day," he repeated. "That's fast work. A few years ago we took a week. To-day the job is over before we get our second wind. Seems like I came from Philadelphia over here just yesterday and now we're taking the derricks down."

"Every morning the lighter docks with a load of iron—twelve hundred beams, or one hundred and eighty columns, anyway four hundred and fifty tons of iron in all. By three o'clock in the afternoon the whole load has been trucked here; and by five o'clock the derricks have picked it out of the street and laid it where we want it. Then I start raising the derricks so that we can begin laying iron the first

But how can a derrick, or any dead weight for that matter, shoot up into the air with nothing above to pull it up? The proposition is mystifying to a layman.

**The Miracle Part of It.**

"Easy enough," said Ward with a quick gesture. "Just fold your derrick up and tie it together. Then detach your main 'fall' or hoisting cable, from the boom and give it a clutch—and your mast about a third of the way from its top. Now start your winding drums in the basement—and what's going to happen? Why, the derrick must go up—that's all. Yes, it seems like raising a thing by pulling down on it, but it does so up."

As fast as each iron story is added the flooring is laid. This also takes little more than a day. For nearly a week at least was thought necessary. First the iron columns are blanketed with envelops of baked clay; then the flooring follows—at last of hollow tile with "montal" surfaces above for the reception of floors and similar surfaces below for the ceilings.

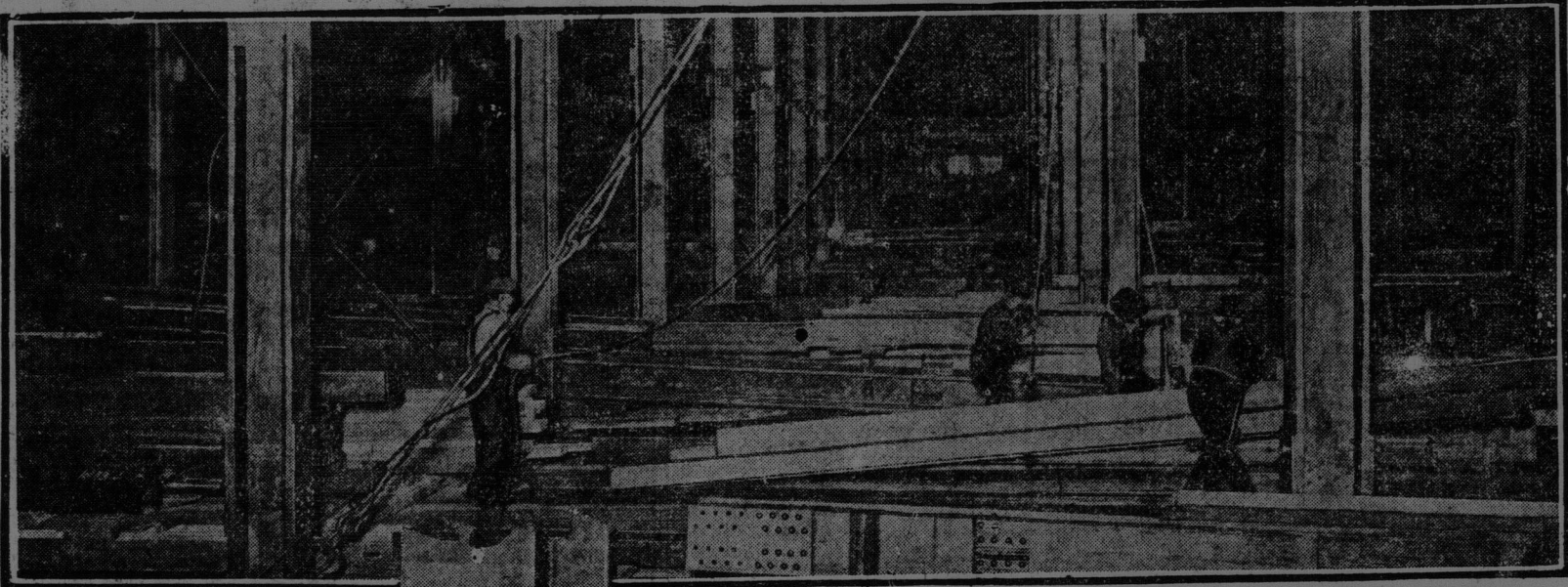
The finished structure then—the modern skyscraper—is really a great steel cage clothed with stone, cement and brick. Its walls and partitions are very thin as compared with the old-fashioned brick processes which took up room and gave less strength, which were slow and costly, moreover, less exact.

Speed, strength, economy—these are the cries of the building world to-day, and the progress made thus far is a decided tribute to American inventiveness and enterprise. The present day "express" building is exclusively an American institution.

And now what of the future?

The skyscraper is very young. Only twenty years ago a nine story building of the new type of iron and concrete was erected in Chicago. Its unusual height created such wonderment and attracted so much attention that pedestrians blocked the sidewalks and had to be dispersed by the police. The structure came to be called the "Rubberneck Building."

That was merely a score of years ago, and to-day we have the "Singer" tower, of fifty-two stories, and they have already ceased to be marvels! Again, and as the latest note in the construction world, there is the express building, a million dollar structure, erected in less time than a farmer takes to build a barn.



Interior of the New Gimbel Department Store Building, in Herald Square.

Daily the commercial sky line here grows higher and faster. A marvelous building race is on. Just where and when will it end?

I put the question to a leading architect, whose name and works are known from coast to coast, and his answer came promptly.

"It must end now so far as height is concerned," said he. "Greater height is not impracticable. A hundred story building is feasible—even a hundred and fifty. The buildings of our sky line from an artistic sense? What of our streets, if they are to be turned into gloomy caverns? This from a practical viewpoint."

"The skyscraper of the future may attain still greater height, but it will end in a tower which will not be greater in bulk than one-quarter that of the lower building, and come no nearer the foot of the building than the main building comes to the curb of the street. That will give a broken sky line and yield light to the street. The new American metropolis then will be a towered city—in reality a city built upon a city. Perhaps then, in this skyscraper era to be, we shall have lead beetles built from tower to another, to obtain quicker means of access from one tower office to another. Why not?"

As for speed—yes, more speed is possible. Every one is working to that end now. From the architect to the way to the designer of the rolling processes that make the iron. It is a matter of speeding these processes, and also of perfecting a building system. Your "express" building, as you call it, is the building of the future."



They Are the Daredevils of the Construction World—These Iron Men.

looking, and it takes so long to go up the ladders story by story.

Now the derrick—away up above—was flush with the building, so to keep the load from hanging from the sides on its way up a man must stand below and hold it taut with a stout rope. To accomplish this against the heavy weight and tension he wound his rope twice around the big mast of the derrick and, bracing his feet solidly, let it slowly out. Everything went well till suddenly his feet slipped. Then, as the rope burned through his hands, the heavy ball and hook with its cargo of men and cables went dangling through the air and snapping into the midst of a gang of outside bricklayers.

None of them was hit, but it seemed inevitable that the two men on the swinging cable would fare less luckily. The cable was twisting and whirling then around and around. If their bodies were caught between the heavy wall and an iron girder of the building—! But they were iron men. Such exigencies are common, and hence trivial.

The taller of the two—"Slim" Bass is his name and he has but one eye—slipped up the wire cable like an animated monkey; and as the ball crashed against the girder reached out swiftly, caught a column, clutched it and slid safely down to the same dangerous crosspiece. His companion executed a similar maneuver by sliding down and swinging on the hooks. In a moment the two were standing safely side by side upon the girder of the building and grinning down at the man who had lost control of the rope. It all happened within a second, and half a minute afterward the two men had disappeared within the iron skeleton overhead and the incident was swallowed up in the rush of the work.

Marble and brick walls and concrete floors are racing in pursuit, but the inside skeleton of iron is away

thing on the following morning. And so this magic work goes on. Before three o'clock each day a whole new story is laid.

The derrick must be raised every two stories, by which time the iron structure has risen so high about the big wooden skeleton that they cannot swing freely.

Obviously, it is no easy task to raise these derricks, with their awkward lengths and weight of several tons each. Formerly—just twenty years ago, in fact—a jib-derrick or stiff-leg derrick was used and this supplied the raising power. That took too long—a day almost to a derrick; and the scheme of making the derrick raise itself was hit upon.

By this plan the boom is hastily detached from the mast and the latter lifts it to its required place, just as a stiff-leg derrick would elevate a regular load. Then the boom is swung upward and gaped down; and taking the part of the mast it lets down its "falls" of cable and lifts up the mast.

That method reduced the raising time to about three hours, which was still too much. So when "Jimmy" Savage came on the job he did some figuring with "Jimmy" Ward, superintendent, and between them they hit upon a new scheme. "Why make two operations out of it?" they queried. "Why waste that time? Let's raise the whole derrick at once? And they did. Moreover, what once took a day is done now in forty minutes."

View of Hewitt and Bryce Building, Fourth Avenue, Twenty-Eighth to Twenty-Ninth Street, Forty Days from Start—Completed in Three Months.

considerations besides commercial ones. Thus far we have, in numerous instances, "dogged" our skyscraper privileges. I need to say that selfish motives have dominated that our buildings have been rushed skyward without regard to other interests.

What, for instance, of our sky line from an artistic sense? What of our streets, if they are to be turned into gloomy caverns? This from a practical viewpoint."

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