

THE OPENING ON MAY 1.

(Continued from page 291.)

could comprehend or appreciate in several weeks of time.

Brief History.—A brief review of the history of the Exposition, its conception and consummation, will give some idea of the immense amount of work that has been accomplished. The act of Congress under which the Exposition was organized bears date of April 25, 1890. Several months following were consumed in discussing and arranging the organization of the World's Columbian Exposition Corporation, which was organized under the State laws of Illinois. Then came the question of selecting a site, and when Jackson Park was finally decided upon, it was necessary to do an immense amount of preliminary work before the foundation of a single building could be laid. Up to this time Jackson Park was a large tract of wild land with a few drives and walks in it, but mostly a swamp which at certain periods of the year was inundated by Lake Michigan. This tract comprises about 700 acres and was put into the hands of landscape engineers who, after an immense amount of dredging and leveling, evolved the present grounds. Ground was first broken July 2, 1891. Since then about 400 separate and distinct buildings have been erected, exclusive of booths, pavilions and other such buildings for concessionaires. All but about 50 of these are Exposition buildings, and it is estimated that the entire 400 buildings give 200 acres of floor space. It will thus be seen that in less than 21 months all these buildings have been designed and constructed, and many of them filled with exhibits. These buildings vary in size from small structures of one or two little rooms to the great Manufactures and Liberal Arts building, which is about a third of a mile long and a quarter of a mile wide. Throughout the buildings there are over 30,000 exhibits, representing 50 countries and 37 colonies. Seventeen foreign nations have constructed buildings, and there are nearly forty State buildings erected by the different States of the United States. The buildings, as a rule, are of a cream white tone, and with a few exceptions color effects are given by the use of bunting, of which over 100,000 yards have been used for furnishing flags and colors for the Exposition buildings alone.

The Attendance on the First Day.—The estimated attendance on the opening day shows that over a quarter of a million people were inside the Exposition grounds, of which 150,000 paid admission fees, and the fact that this vast multitude was handled on the opening day without excessive crowding or jamming proves that the transportation facilities are equal to almost any probable demands that may be made upon them.

Opening of the Woman's Building.—Next to the opening of the Exposition itself, the most interesting exercises were the dedication of the Woman's building, which took place two hours after President Cleveland had declared the Exposition open. The exercises were held in the Hall of Honor in the Woman's building, and a large number of distinguished women from various foreign countries and various parts of the United States were present. The exercises consisted of music, prayer, the reading of an ode written by Miss Flora Wilkinson. Mrs. Potter Palmer, President of the Board of Lady Managers, gave an address explaining what had been accomplished. A jubilate, written especially for the occasion by Mrs. H. H. A. Beach, of Boston, was sung, and several of the ladies on the platform, especially those representing foreign countries, made addresses. The event of the exercises was the driving of the golden nail by Mrs. Palmer. This was the last nail driven, and was the formal act of declaring the building complete.

The Michigan, Massachusetts, New York, Missouri, Swedish and many other buildings were formally opened for the entertainment of visitors.

Early in the evening, before the time for closing the grounds to visitors arrived, the electric lighting equipment of the Administration building was tested, and every lamp, both arc and incandescent, was used. The effect was in every way perfect.

In every way the opening of the Exposition was remarkably auspicious. The Exposition buildings themselves, with the exception of one or two of the minor buildings, were complete, and the work of installing exhibits was in a very forward state. Outside of the Palace of Mechanic Arts fully eighty per cent, if not more, of the exhibits were ready for the inspection of visitors Monday noon.

The Stage Coaches.—A new method of transportation to the Exposition grounds from the heart of Chicago was inaugurated only a few days before the Exposition opened. This is a line of coaches which will be in many respects a reproduction of the balmy days of stage coaching in the far West. The coaches will have a seating capacity for perhaps twenty-four people on top and sixteen inside, the coaches being modeled after a style of coaches used at the Paris Exposition. The horses are of American breed, having come from the West, and most of them being stage coach horses. The drivers are experts from the West

who are in the habit of driving something after the manner of Horace Greeley's stage coaching in Nevada, but whatever the speed may be the riding will be comfortable, as the coaches will start from the center of the city and go to the Exposition grounds over the boulevard system of the city. The ride will consume about an hour. There will probably be six horses attached to each coach.

Drilling the Ticket Takers.—The men having charge of handling tickets at the sixteen or more entrances to the Exposition grounds were put through a course of training for several days before the Exposition was formally opened, and it was rather an amusing sight to see the rows of dummy visitors going in and out of the several gates in order that the training should be a literal reproduction of the conditions soon to come. Nearly five hundred ticket sellers were engaged. These men were divided up into sections, as there will be three shifts of men to work during the hours which the Exposition is open, each shift working six hours at the gate and having an allowance of one hour for squaring accounts. Each ticket seller is under bond for the satisfactory performance of his duties. The gates are open to the public at eight o'clock in the morning, and visitors are supposed to be out of the grounds by half past six in the evening, and when there are evening sessions from eight until half past ten. The Exposition management has aimed to give ample facilities at the several gates for selling tickets as rapidly as visitors can be admitted to the grounds, but it is urged that visitors take advantage of the many ticket stations away from the grounds, at the railroad stations, hotels and elsewhere, so that there shall be as little delay as possible in securing admittance.

Several hundreds of aquatic birds of many varieties have been put into the lagoon. One wing of each bird is crippled, so that none of the birds can fly. Most of these birds are those that are native to the Chicago climate. Their presence adds much to the picturesqueness and life of the scene surrounding the lagoon. What adds still more naturalness to these banks is the fact that thousands of plants indigenous to the swamps and waterways of Illinois have been transplanted to these waters, and especially to the shores of the Wooded Island. The size and vigor of these plants gave every appearance to the island last fall of their having always been there, while the fact is nearly every individual one had been transplanted within twelve months. This fringe of green will give enough natural tangle to the shore of the island to obliterate every appearance of being artificial. Besides the Wooded Island there is the Hunter's Island, which immediately joins it on the south, and several other very small patches of green forming miniature islands, and these also have been transformed into a mass of green. The Wooded Island comprises about sixteen acres. Quite a little is cut off from the northern end, having been assigned to Japan for its floricultural exhibit, and also for the site of the Hooden, which is Japan's gift to the Park Commissioners of Chicago. But nearly ten acres of the area of the island are devoted to flowers. By far the most noticeable display will be the rose beds, which in themselves cover considerably over an acre. Most of the work on these beds was completed last fall. Thousands of full grown plants of the hardier types were set out, and these seem to have wintered with practically no loss by winter killing. Every variety of hardy roses is included in this display. Other roses in great variety, which could not live through the winter if exposed, were kept in the Horticultural building and were transplanted in time for the opening of the Exposition. At the southern end of the island is a splendid display of rhododendrons, and there are also scattered about the island, as well as throughout the grounds, clusters of the more well known shrubs, such as lilacs and azaleas. There are something like 25,000 or 30,000 hardy plants in the rose garden, and more than half as many of the tender kinds, which were wintered in the Horticultural building. In the center of the garden is a pavilion of considerable size, which will be a mass of green by June 1, because of the innumerable vines that climb over it. Many nurserymen throughout the country have contributed generously ornamental and flower shrubs. England has also made a fine display of typical English plants and the Germans have brought some of the favorite German plants. There have been planted on the Wooded Island and throughout the grounds over 12,000 trees, 5,000 shrubs, 15,000 miscellaneous plants, nearly as many aquatic and semi-aquatic plants, and several thousands each of fern roots, climbing vines, ornamental grasses, etc.

The idea of having two model American locomotives of the latest and most powerful type mounted on pedestals in front of the Railway Terminal Station was abandoned at the last minute. The effect was not quite so satisfactory as it was thought it would be, and one locomotive, which had already been put in place, was removed to the Transportation building.

The monster Krupp gun, which has been so fully illustrated and described in these columns, reached

the Exposition grounds without mishap, and was mounted in place a week before the Exposition was opened. Nothing in the grounds in the shape of an exhibit has attracted much more attention, and the German workmen and Columbian guards at the Krupp building had their hands full in keeping people from crowding inside the structure. This was specially true at the noon half hour, when large squads of workmen, from all corners of the grounds, made a line for the Krupp building. The monster is so surrounded by smaller guns, castings, and other exhibits, that a picture of it as it now stands is rather unsatisfactory. As it rests on its carriage, the gun is pointing directly out over the lake. Cartridges which are used in firing are near by, and the apparatus used in handling the gun is shown, thus making the exhibit very complete.

LOCOMOTIVES OF 1831 AND 1893.

Among the exhibits at the Chicago World's Fair, in which are shown contrasts between past and present, none will more strikingly illustrate the progress made in the last sixty years than the exhibit of the New York Central and Hudson River Railroad, consisting of a reproduction of the De Witt Clinton locomotive, which was the first engine to draw a train in the State of New York, and the sixty-two ton passenger locomotive 999, of the New York Central and Hudson River Railroad, just turned out of the New York Central shops at West Albany.

The De Witt Clinton was built in New York City in 1831, at the West Point foundry, located at the foot of Beach Street. The engine had four drive wheels, 4 feet 6 inches in diameter; the cylinders, two in number, were 5½ inches in diameter by 16 inch stroke. The boiler had 30 copper tubes, 2½ inches in diameter; the engine weighed about 6 tons, and was provided with a tender carrying fuel and water. On the tender there was a seat for the conductor. The engine had a boiler feed pump driven from the crosshead, and also a hand feed pump. This engine drew a train of three coaches, made in the style of the old-fashioned stage coaches. Trial trips were made on the Mohawk and Hudson Railroad at various times from July 2 to August 9, 1831, when the first regular excursion trip was made. The passengers on this occasion were Erastus Corning, Mr. Lansing, Ex-Governor Yates, J. J. Boyd, Esq., Thurlow Weed, Esq., Mr. Van Zant, Billy Winne, penny postman, John Townsend, Esq., Major Meigs, Old Hays, high constable of New York, Mr. Dudley, Joseph Alexander, of the Commercial Bank, Lewis Benedict, Esq., and J. J. De Graft. David Matthews was engineer and John T. Clark was conductor. The signal for starting was given by blowing a tin horn. The fuel used on this trip was dry pitch pine, coal having proved unsatisfactory, and as there was no spark arrester on the stack, the smoke and sparks were freely poured on the passengers in the coaches. They raised their umbrellas to protect themselves, but the covers were soon burned off, and the passengers busied themselves in putting out in each other's clothes the fires started by the hot cinders. When stop was made at a water station, the slack between the coaches, which produced disagreeable jerks, was partly remedied by wedging rails from a neighboring fence between the cars and tying them fast. On arriving at Schenectady refreshments were served, after which the party returned to Albany, and thus was completed the first regular trip of a locomotive and train in New York State. The coaches which made up the train were built by James Gould, of Albany. The upper view in our engraving is taken from an old sketch, supposed to have been made on the occasion of this excursion. It graphically represents the effect of the first view of a locomotive and train.

The lower view in the illustration represents the De Witt Clinton as it stood in the New York Central passenger station alongside of engine 999, which represents the accumulation of knowledge, skill, and experience of over sixty years in locomotive engineering and building. Engine 999 is the latest and probably the finest locomotive in this country. It was designed by Mr. William Buchanan, superintendent of motive power of the New York Central and Hudson River Railroad, and was built at the shops of the company, at West Albany. The cylinders are 19 inches in diameter by 24 inches stroke. The drivers, of which there are four, are 7 feet 2 inches in diameter, and the tires are 3½ inches thick and 5¼ inches wide, secured to the cast iron centers by Mansell retaining rings. The truck wheels, which are 40 inches in diameter, are also provided with steel tires and Mansell retaining rings. The total wheel base is 23 feet 11 inches. The weight on the four driving wheels, loaded, is 84,000 pounds, and on the engine truck 40,000 pounds, making a total of 124,000 pounds. The boiler is of the wagon-top style, and the firebox is of the Buchanan type, with a water arch. It is 108 inches long and 40½ inches wide. The total heating surface is 1,930 square feet, with a grate surface of 307 square feet. The height of the engine at the center of the boiler is 8 feet 11½ inches above the rail.

The boiler is designed to carry 190 pounds working pressure to the square inch. The tender has a coal

capacity of $6\frac{3}{4}$ tons, and carries 3,857 gallons of water, and is fitted with a water scoop. The weight of the tender loaded is 80,000 pounds. The engine is fitted with the Westinghouse air brake, and the engine and brake are fitted with the Westinghouse air signal. The locomotive was three months in building, and cost in the neighborhood of \$12,000.

This new engine differs in outward appearance from those previously built. No brasswork is visible. The ironwork is well finished and polished. The pipes are nickel-plated and the painted portions are striped with silver leaf. A round headlight is mounted over the smokestack.

The main dimensions of the engine are tabulated below:

Cylinders.....	19 in. \times 24 in.
Diameter of driving wheels outside of tires.....	86 in.
Diameter of engine truck wheels.....	40 in.
Springs, length of driver, center to center of hangers.....	44 in.
Total length of boiler.....	26 ft. 4 $\frac{1}{2}$ in.
Diameter of first ring outside.....	58 in.
Size of firebox.....	106 $\frac{3}{4}$ in. \times 40 $\frac{3}{8}$ in.
Tubes, 268.....	2 in. dia., 12 ft. long.
Heating surface in tubes.....	1,697.45 sq. ft.
Heating surface in firebox.....	232.92 sq. ft.
Total heating surface.....	1,930.37 sq. ft.
Grate surface.....	307 sq. ft.
Stack, inside diameter.....	15 $\frac{1}{4}$ in.
Weight, in working order.....	124,000 lb.
Weight, on drivers.....	84,000 lb.
Driving wheel base.....	8 ft. 6 in.
Weight of tender loaded.....	80,000 lb.
Total weight of engine and tender.....	204,000 lb.
Extreme length of engine.....	39 ft., 6 $\frac{3}{4}$ in.
Extreme height from top of rails to top of stack.....	14 ft., 10 in.

This engine is designed to draw the Empire State Express. On its way to the Chicago Exhibition it easily made a speed of 86 $\frac{3}{4}$ miles per hour, and the designers and builders believe that after it has worn enough to smooth up its bearings it will create a sensation in the matter of speed.

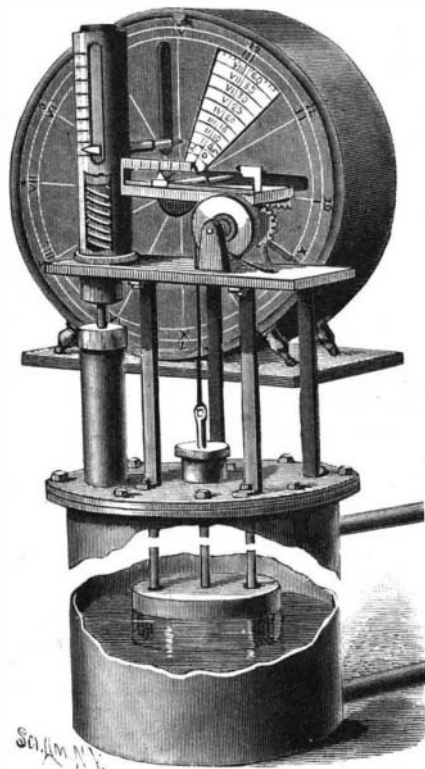
THE BROUGHTON QUICK DELIVERY MIXER.

A machine for thoroughly mixing hair and fiber with plaster, and one which can be easily taken care of and quickly set up and operated by any ordinary workman, is shown in the accompanying illustration. The machine is made by W. D. Dunning, of Syracuse, N. Y., and the design is the perfected result of a long experience and practical knowledge of what is required in a plaster mill. All the working parts and mixing chamber are of iron and steel, making the machine solid and durable. It has two shafts running horizontally side by side, geared to run in opposite directions; they are run through a cast iron case circling at the bottom, so that the paddles placed on the shaft in screw form lift the material from the bottom of the case and throw it in opposite directions from one end of the case to the other, thereby keeping it in constant motion and obtaining a perfect mixing. All bearings run in self-oiling boxes outside of the case, so that the material does not come in contact with them. The mixer is provided with two openings in front with slides or gates to let the material out of the machine, and to each of these openings is attached an automatic bag holder. The delivery is very rapid, the discharge from one opening being as fast as one man can take the bags away. The wooden hopper to receive charge passes through the floor above; attached is a cast iron slide arrangement to let material through the spout to mixing chamber, operated by means of a lever within reach of the operator on the ground floor. The machine is provided with two 24 \times 8 fast and loose pulleys and should run 175 revolutions per minute; it requires about 4 \times 6 feet floor space and has a capacity of 300 barrels per day of 10 hours.

The Conquests of Modern Science.

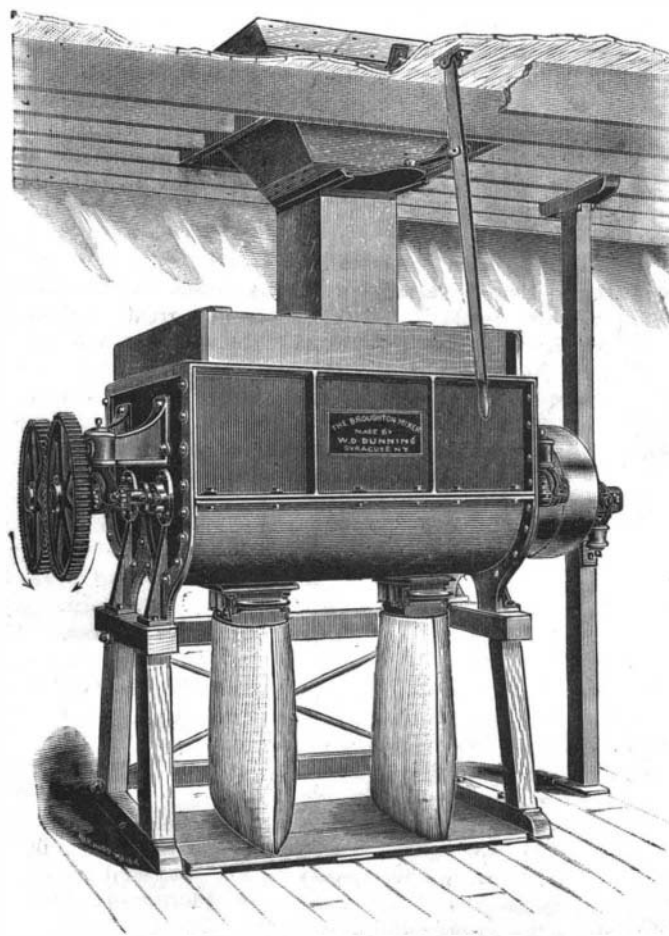
Surely I have established my thesis that dirt is only matter in a wrong place. Chemistry, like a thrifty housewife, economizes every scrap. The horse shoe nails dropped in the streets are carefully collected, and reappear as swords and guns. The main ingredient of the ink with which I now write was probably once the broken hoop of an old beer barrel. The chippings of the traveling tinker are mixed with the parings of horses' hoofs and the worst kinds of woolen rags, and these are worked up into an exquisite blue dye, which graces the dress of courtly dames. The dregs of port wine, carefully decanted by the toper, are taken in the morning as seidlitz powder to remove the effect of the debauch. The offal of the streets and the wastings of coal gas reappear carefully preserved in the lady's smelling bottle, or are used by her to flavor blanc-manges for her friends. All thrift of material is an imitation of the economy of nature, which allows no waste. Everything has its destined place in the process of the universe, in which there is not a blade of grass or even a microbe too much, if we possessed the knowledge to apply them to their fitting purposes.—*North American Review.*

A STEAM PRESSURE AND WATER LEVEL RECORDER.
With the device shown in the illustration a single steam gauge or water gauge for a boiler is not required, the steam pressure and the height of the water being indicated at sight, indicator diagrams being also furnished of both, by which the owner may see whether the boiler and the furnace fires have had proper attention.



LEWIS' STEAM PRESSURE AND WATER LEVEL RECORDER.

The improvement has been patented by Mr. William M. Lewis, of Thurber, Texas. At the front of the boiler is a closed vessel connected by pipes with the steam and water spaces, and having on its top a cylinder, in which is a piston with a rod extending upward in a casing on which graduations are marked. Around the upper end of the rod is a coiled spring, insuring a return movement of the piston with diminishing steam pressure, and the rod has in front a pointer indicating on the graduations, while from its rear a spring-pressed pencil extends through a slot in a clockwork casing. The dial, which is revolved by the clockwork, has near its outer edge a double graduation, one in Roman and the other in Arabic numerals, and a pointer fixed on the casing at the top indicates the time of day as the dial revolves. As the pointer indicates the steam pressure to the sight, the pencil marks a corresponding line on the moving dial. In the closed vessel at the



THE BROUGHTON QUICK DELIVERY MIXER.

front of the boiler is also a float, from which extends upwardly a rod connected with a belt passing over a wheel rotated by a spring, to correspond with the rise and fall of the float. On the shaft of this wheel is a gear meshing into a rack operating a horizontal slide, on the casing of which is a graduation, the rear por-

tion of the slide also carrying a spring-pressed pencil traveling in a horizontal line on the dial. An indicator made in the shape of a sector corresponding to one of the divisions of the dial is hung loosely on the shaft of the latter, the indicator having two sets of graduations corresponding to those of the horizontal and vertical scales, one indicating the height of water in the boiler and the other the steam pressure. By placing this indicator in proper position on the dial, it will indicate the steam pressure and height of water in the boiler at any particular time. The dial is preferably of slate, so that the markings may be easily wiped off, and, by using different colored pencils, as red and blue, a red line may represent the steam pressure and a blue line the water level, or vice versa.

Rock Emery Millstones.

Probably few of our readers have ever seen rock emery, and fewer still have heard of millstones made of this hardest of all stones except the diamond. But rock emery millstones are now made, and a long step has thus been taken toward pulverizing cheaply many hard substances that have heretofore only been reduced at much expense of wear and tear, and by slow and tedious processes. Rock emery is not a common mineral, being found only in a few countries. The best comes from Greece, but the larger importations are from Turkish mines. The consumption of emery is large, and its use has become of great importance in many industries, as it easily grinds away all substances with unexampled rapidity. A pure emery face never glazes, but is always sharp and cutting.

Rock emery mills reduce at once the hardest rocks or the softer substances, grinding all to any degree of fineness. Heat does emery no harm, and one of the remarkable properties of the emery stones is their ability to run cool. They form the most rapid grinder known, and are as much more durable than other millstones as they surpass them in hardness. The emery millstone face is never dressed, a little work on the furrows, and eye (made of softer material), is all the sharpening it requires. These stones are made to take the place of all other millstones, without any changes in the mill, and wherever other stones are used the rock emery millstones will do better work at less expense, and last much longer. They also grind hard materials that soon destroy all softer millstones. The hardest buhr, compared with emery, is like cheese.

Now that the manufacture of the patent rock emery millstones is understood they are turned out for all sorts of mills and for all purposes, at a moderate price, and wherever known are recognized as wonderful grinders, especially for fine work, from 60 to 150 mesh. These rock emery millstones are ample proof, if any is needed, of the progress of American milling.

A Colored Man's Career.

Frederick Douglass, ex-minister to Haiti, has been negotiating with the owner for the purchase of the Villa, one of the most valuable and beautiful estates in Talbot County, Maryland. Mr. Douglass is a native of Talbot County, where he was born a slave. In addressing an audience at the colored school at Easton, Md., recently, Mr. Douglass said: "I once knew a little colored boy whose mother and father died when he was but six years old. He was a slave and had no one to care for him. He slept on a dirt floor in a hovel, and in cold weather would crawl into a meal bag head foremost and leave his feet in the ashes to keep them warm.

"That boy did not wear pants like you do, but a tow linen shirt. Schools were unknown to him, and he learned to spell from an old Webster's spelling book and to read and write from posters on cellar and barn doors, while boys and men would help him. He would then preach and speak, and soon became well known. He became presidential elector, United States marshal, United States recorder, United States diplomat, and accumulated some wealth. He wore broadcloth and didn't have to divide crumbs with the dogs under the table. That boy was Frederick Douglass.

"What was possible for me is possible for you. Don't think because you are colored you can't accomplish anything. Strive earnestly to add to your knowledge. So long as you remain in ignorance, so long will you fail to command the respect of your fellow men."

LETTER boxes have been attached to the street cars in Huddersfield, England, and letters can be posted in these boxes as the cars are traversing the suburbs, the boxes being emptied by the post office employees on the arrival of the car at or near the central post office on each trip. If a person stops the car especially for the purpose of mailing a letter, a penny is collected by the conductor and deposited in the fare box. This doubles the cost of sending the letter, but the advantage of an immediate special delivery is secured, and letters are greatly expedited by the scheme. The scheme is yet an experiment, but it is largely approved.