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SCIENTIFIC AMERICAN SUPPLEMENT

No. 907.

For the Week Ending May 20, 1893.

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PRICES AT THE WORLD'S COLUMBIAN EXPOSITION.

The specter of extortion is in danger of keeping many people from attending the World's Columbian Exposition, not, however, so much because of its actual presence, as because of the fear of its existence. During the first week or two that the Exposition was open there was without doubt excuse for these fears, but this is a thing of the past now. A typical case was that of three dollars a day for a room in a shack of a building, the entire furnishing of the room costing just forty-five dollars. Inside the grounds some of the restaurants charged most unreasonable prices, particularly in the cases of two foreign restaurants, which seemed to be run on the plan that Americans were gullible and would pay any price without complaint.

Investigations by representatives of the SCIENTIFIC AMERICAN lead to the conclusion that visitors at the Exposition need have no fear of excessive charges if they use judgment and discretion in securing accommodations and making other arrangements. The Exposition management has no jurisdiction whatever over the hotels, and cannot therefore regulate their prices, but fortunately there is no need of such jurisdiction, because of the intervention of the law of supply and demand. Within walking distance of the Exposition grounds are comfortable accommodations for over one hundred thousand people, while throughout other parts of the city are accommodations for two or three times as many more people, and in all parts of Chicago are plenty of honest landlords whose prices are reasonable and who can be relied upon not to resort to extortion. Intending visitors who wish accommodations secured in advance, and who have no other means of securing them, should apply to the Bureau of Public Comfort connected with the Exposition management, which was organized for the special purpose of protecting visitors from extortionists. There is no reason why visitors should fall into the hands of sharks, except their own carelessness. As with rooms, so it is with restaurants. Throughout the city are innumerable restaurants which furnish meals at reasonable rates, so that strangers with limited means can secure as comfortable living in Chicago this summer as in any other large city in the country at but little if any more cost.

As to the charges at the restaurants in the Exposition grounds, the Exposition management has required that all bills of fare and accompanying prices be submitted to a committee appointed for the purpose, and these prices are regulated in accordance with prices at restaurants of corresponding degree in the center of the city. There may be a slight increase, but this little increase visitors will willingly pay, when they appreciate the fact that one-quarter of the gross receipts of the restaurants go into the Exposition treasury toward making the great undertaking a financial success.

The cry of extortion is a false one so far as present conditions and future prospects are concerned, and should not deter one person from visiting the Exposition, which is the greatest industrial achievement in the history of the United States.

ONE HUNDRED AND TWELVE AND ONE HALF MILES PER HOUR.

Sixty years ago, when the steam engine began its competition with the stage coach as a means of passenger transit, its velocity was naturally a matter of wonder and comment. We read in the books of that period of the great speed of fifteen or even twenty miles an hour being attained by the locomotive. Under the conditions of the day such a speed was no trifle. The loosely coupled cars, with inefficient springs, rattled along over the imperfect rails and roadbed. The engine filled the air with sparks and cinders, which drifted into the cars and made life miserable for the passengers. The rails on which the cars moved were made of wooden beams, along which strips of iron were spiked. Sometimes the end of one of these strips became loosened, and bending upward over the wheel into "snake heads," would be driven through the floor of the car into the body of some unfortunate passenger, with fatal result.

The contrast between the old and the new was vividly brought out in the exhibit prepared by the New York Central Railroad for the World's Columbian Exposition. In our issue of last week we showed the two extremes of railroad engineering in the State of New York. The De Witt Clinton of 1831 stands alongside of the New York Central engine No. 999 of 1893—the pygmy beside the giant. The great dimensions of engine 999 were not all that entitled it to respect.

The engine drawing a regular train of cars on the track of the New York Central road has surpassed the speed of any object propelled by man short of a projectile. The speed of the wind in the most powerful gales has been equaled, and the flight of the swiftest bird through the air has been surpassed. The mile record for a locomotive engine on Tuesday, May 9, was reduced by it to 35 seconds. With grim humor the engineer said of the machine, she was not feeling her best, although she gave a new world's record. On May 10, between the cities of Batavia and Buffalo, a new speed test was made. Batavia was passed at a speed of sixty miles an hour. This was increased until a mile was run in thirty-five seconds, and soon after a mile was made in thirty-two seconds. For some distance a rate almost as great was maintained.

This speed, subjected to analysis, reveals the greatness of the achievement. In every second of its progress the engine covered a distance of 165 feet. This is the velocity which a body falling in a vacuum would acquire in a fall of 425 feet. In other words, if the engine could have had its course deflected to a vertical one, without loss of velocity, it would have been thrown to this height. A man at his best can run at a speed of 30 feet per second for a few seconds at a time. His best long jump is about 23 feet. With a train running at the velocity of 165 feet, it seems as if the old stories of trains jumping chasms or running over bridges too weak to support them might be realized.

There are certain landmarks set for speed achievements by our imaginations. The "even time" of ten seconds for one hundred yards has been surpassed by a running man. The bicyclist it is claimed has surpassed his "even time" of a mile in two minutes, and aided by ball bearings and pneumatic tires the trotting horse drawing a sulky is approaching the same figures. The carrier pigeon with only aerial friction to contend against approaches a speed of a mile in one minute. The running horse may yet reach the record of a mile in a minute and a half. Engine 999 has already established her goal. It is a mile in thirty seconds, and it is believed that she will soon reach it.

The achievement means a great deal. The advocates of flying machines speak of a possible speed of sixty or perhaps a hundred miles an hour. Recent experiments with direct-geared electric motors have indicated the possibility of a speed of one hundred and twenty miles an hour. Atmospheric resistance at this rate begins to be taken into account as an important factor.

Geo. Westinghouse, Jr., a recognized authority on the subject, has shown the difficulties in bringing fast trains to a stop and in reducing their speed on emergencies. His communication was reprinted in our issue of October 8, 1892. He depicts the many troubles to be encountered in running trains at the rate of ninety miles an hour. In the face of all this the great engine of the Columbian Exposition, while still new, while drawing a regular passenger train, and without any special preparation, runs at the rate of 112½ miles an hour. It is a striking instance of theory and practice brought face to face.

THE ELECTRIC RAILWAY TROLLEY.

Another broad patent for a gigantic monopoly has recently been issued by the Patent Office. This is a patent for the invention of the late Chas. J. Van Depoele, who was a well known electrician. The patent was applied for in 1887, but other inventors claimed substantially the same thing at the same time, which led to the taking of evidence from the several claimants to determine who was the original and first inventor. These proceedings, termed interference proceedings, have recently been brought to a close, and the Patent Office awards the patent to the administrator of Dr. Van Depoele, the inventor himself having passed away. The patent has been purchased by the Thomson-Houston Electric Co., and if its validity is sustained, of which there is at present no reason to doubt, the above company will enjoy a far-reaching monopoly, covering substantially all the electric railways in the country and the plants therewith connected. Over six thousand miles of these railways are now in operation and they are being extended rapidly in all directions. This monopoly has seventeen years to run. It is probably of greater importance to the public and of more value to its owners than the telephone invention.

The claims of the Van Depoele patent are very broad and comprehensive. The principal claims are as follows:

The combination of a car, an overhead conductor above the car, an upwardly extending and laterally movable arm carried by the car and having its upper end free, and a contact device carried by the arm at its free end, and making underneath contact with the conductor.

The combination of a car, an overhead conductor above the car, a contact device making underneath contact with the conductor, and an arm on the car movable on both a vertical and a transverse axis and carring the contact device.

In an electric railway the combination of a car, a conductor suspended above the line of travel of the car, a rearwardly extending arm pivotally supported on top of the car so as to swing laterally and provided at its outer end with a contact device engaging the under side of the suspended conductor, and a tension spring for maintaining an upward pressure contact with the conductor, substantially as described.

OVER one thousand steamships are traversing the four great ocean routes.

There was a great drop in the number of visitors at the World's Columbian Exposition grounds immediately following the opening day. The attendance during the week did not average over 35,000 paid visitors daily. In many respects this small attendance was a fortunate thing for the Exposition, as it granted exhibitors opportunity to complete the work of installing their exhibits without being interfered with by crowds of sightseers. The result was that an immense amount of work was accomplished both inside the buildings and in completing the work of laying out the grounds.

Much to the surprise of everybody who had not witnessed the progress of installing exhibits, the Government building was the first one completed. The machines shown by the War Department in this building which manufacture cartridges, and other machines shown by the government mint which manufacture souvenir coins, to demonstrate the manner in which silver and gold coins are made, attracted especial attention, not alone from the interest of the general public in these things, but from the fact that they were about the only machines which were prompt in starting with the opening of the Exposition.

Another exhibit in the Government building which has proved particularly attractive to visitors is that of the models shown by the Patent Office. This exhibit is very complete, comprising something like 3,000 models representing as nearly as possible every important line of invention. A large number of the models shown were made by the Patent Office for this exhibit, and they include many interesting historical inventions. In connection with the more important inventions many models are shown to illustrate the progress made in this particular line of invention. The exhibits are especially complete in firearms, steam engines of all kinds, agricultural implements and especially in all kinds of labor-saving devices.

The appearance of the official catalogue on the opening day of the Exposition was a surprise, especially because of its complete condition. This catalogue is of different form than such catalogues usually are, a different volume being issued for each department. This is a great convenience, because a bound volume of all the catalogues would be very bulky and approach in size a book half as large as the Chicago City Directory. Each catalogue contains considerable condensed information regarding the Exposition, its officials and other subjects, besides general information regarding the building and exhibits it directly refers to. A different scheme of installation was followed in nearly every building because of the differences in design of the buildings. In each catalogue are diagrams showing the scheme of installation of the special building to which the catalogue refers. By using this diagram a visitor can readily find just the location of any particular exhibit, as all of the exhibits have references to the particular section in which they are installed. In general it can be said of each building that the sections are arranged alphabetically one way and numerically another. If the reference following a certain exhibit should be D—4, an examination of the diagram would show exactly the relation this space bears to the building. The catalogue of the English exhibit was issued promptly and is an excellent specimen of printing. It contains a map of the grounds and buildings upon which the position of the Victoria House and the British exhibits in each building are indicated by red marks.

An unfortunate misunderstanding arose in the Department of Mechanic Arts immediately following the opening of the Exposition regarding the matter of power. The exhibitors seemed to infer that whatever power they wished was to be furnished by the Exposition without cost, while the Exposition proposed to charge $60 per horse power during the Exposition. The difficulty seemed to be chiefly because the exhibitors likened this Exposition to a county fair, which is obliged to offer all sorts of inducements to attract exhibits. The Exposition management does not consider that it is holding the Exposition for charitable purposes, but for the public benefit, and it believes that every exhibitor who makes a creditable showing will reap inestimable benefits from the display of his machines or wares. Some of the exhibitors, in their excitement, threatened to cover up their exhibits with canvas, while others proposed to withdraw their exhibits. The Exposition does not propose to permit either of these things to be done.

As has been said before in these columns, the color effects at the Exposition have been designed to be made by flags and bunting. For this purpose there are over 700 flagstaffs on the buildings and throughout the grounds that have been set up by the Exposition management. One of the most effective sights on the opening day was to see a flag thrown to the breeze from nearly every one of these staffs at the instant the Exposition was declared open. Most of the flags shown are the American colors, but the Exposition also shows its own colors, and in addition there are the special banners and emblems of forty-seven different nations. All the American flags were made in this country, while most of the foreign flags were manufactured in France. The special bunting for exterior and interior decoration was manufactured on the grounds by the Exposition management, and over 5,000 such flags have been made in stock. The flags for exterior decoration are made of material that is not only strong, but with fast colors, while the bunting for interior use is considerably cheaper material. In the larger buildings a large amount of this bunting is used; in the Manufactures and Liberal Arts building there are at least 400 sets of flags representing all the nations exhibiting. Hanging from the top of each immense truss is an American flag of immense size, which is very conspicuous among the other flags. On the exterior of this building there are 200 flagstaffs. It has been found quite impossible to make an elaborate display of the flags of each nation at all times, and they have therefore been divided into relays, as it were, by which the flags of sixteen different nations are exhibited in daily rotation.

Strict rules regarding the use of vehicles in the Exposition grounds are now in force. No wagon or vehicle of any kind is permitted on the promenades except the police and hospital patrol wagons in the employ of the Exposition. Bicycles and all other vehicles are excluded, excepting of course the wheel chairs, which are a special concession. All supplies for use in the restaurants or for other purposes are delivered during the night time, and in special cases where deliveries are to be made during the day time, they must be made in push carts wherever possible.

Advertising matter may be distributed within reasonable limits, and the Exposition has not yet drawn any close lines within which exhibitors must keep themselves. Circulars, catalogues and other literature pertaining to any specific exhibit may be freely distributed. There will be no general advertising allowed that shall in any way interfere with the best interests of both exhibitors as a class and of the visitors.

The French fine arts display in the Gallery of Fine Arts was completed and thrown open to the public on May 5. This is believed to be the finest display by all odds that the French people have ever made, though perhaps not quite so extensive as the one at their own Exposition.

There was much complaint during the first week that the Exposition was opened of extortionate prices in the restaurants. In most cases there was ground for these complaints, and so much was said about the extortion by the local press and the public in general that the Exposition management took the matter in hand and made a careful investigation, comparing the prices in all of the restaurants with prices in restaurants of corresponding degree in the heart of the city. The result is that prices in all cases have been modified when necessary, so that a visitor can now get as good a meal at the Exposition grounds as in any restaurant in Chicago, for little, if any, advance. The fact that one-quarter of the gross receipts of all the restaurants go toward defraying the expenses of the Exposition accounts for any slight increase in price.

The Intramural Railway was not ready for operation the first week and scarcely ran a train for passengers, owing to delay in completing some of the motor cars and in making connections in the steam plant. On May 8, however, everything was completed so that the trains were running regularly and many passengers were carried.

The first evening the Exposition was opened for the purpose of fully testing the electric display, which has received so much attention from the engineering department, and which has been anticipated with so much expectation by the general public, was on May 8. The attendance in the evening was large, and the results were much finer than had been anticipated, even by the engineering department. The scenes about the basin were grand beyond description. Two of the immense search lights were used. The Administration building was illuminated in the most elaborate way, both exterior and interior, while the faces of the buildings adjoining the basin were ablaze with electric lights. The display was not so elaborate as it will be a little later, because the electric fountains did not play.

The Sunday question, which has been so seriously agitated for many months past, was given a practical test on May 7, the first Sunday after the Exposition was formally opened. The Sunday-closing rule was rigidly enforced, the foreign commissioners, as well as many government and Exposition officials, were excluded from the grounds. Fully seventy-five thousand people gathered outside the gates, expecting to be admitted, as this was the first Sunday that the grounds have been closed since work was begun on the Exposition. In addition to these people there were believed to be one hundred thousand people in the city who also expected to spend the day at the grounds, but who did not go out because of the fact that the papers announced that the Exposition was closed. The results of the day were not particularly satisfactory to either side in the Sunday-closing discussion, because of the behavior of the crowds outside the gates and of t general drunkenness and lawlessness that resulted. T movement favoring an open Sunday received consi erable strength as the result of this one day's exp ment, and everything points to an open Sunday least by June first, if not before.

Phillips Flying Machine.

In the many attempts which have been made t solve the problem of aerial navigation, the princo most in favor of late years has been that of la plane surfaces. Upon this principle for oi- s eight years past Mr. Horatio Phillips has dl.ne. at length he has succeeded in demonstrat.e Pc principle is fundamentally correct. But, ph l duced the dimensions of his planes from s.ssin five feet broad to those of Venetian blind le R to his advantage. His method of proceedi.e o entirely different from that hitherto pursue.ica. working in the same field, as neither large p faces nor balloon arrangements are employed, stored-up energy used. Advantage is taken vacuum and a plenum formed by induced the upper and under surfaces respectively o.vere slats or laths fixed horizontally in a verti.The These slats are curved on their upper and .ge f faces and are thicker at their leading edg. w their trailing edge. The curves are such that .ess vex upper surface near the front edge deflects .th upward, thus creating a partial vacuum on th. surface of the slat or sustainer. The under surf.. the slat is formed to a parabolic curve which gradu puts the particles of air into motion downward, th producing an excess of pressure on the under surf of the slats. The principle has been put into prac by Mr. Phillips in a machine which broadly resem a canoe with a sail like a Venetian blind with the s fixed wide open, the machine being driven forward an air propeller to which motion is given by a stea engine.

The carriage is 25 feet long and 18 inches wide, t ing to a point at the front end. It is borne on wheels a foot in diameter, one in front and two at rear. There are 50 sustainers or slats, each 1½ i wide and 22 feet long, fitted 2 inches apart in a 22 feet wide and 9 feet 6 inches in height. The su ers have a combined area of lifting surface of 136 s feet. The boiler is a cylindrical phosphor bronze sel 12 inches in diameter and 16 inches in length. heating surface is 12 square feet, and is made t Field tubes ¾ inch outside diameter and 14 in long. The firegrate area is 70 square inches, an t fuel used is Welsh coal. The engine is compound, w ing cylinders 1¾ inch by 3⅝ inch by 6 inch sta fitted with ordinary slide valves. The working p sure of steam is 180 lb. per square inch. The propel is 6 feet in diameter and 8 feet pitch, and has a p jected area of blade surface of 4 square feet. Th speed is about 400 revolutions per minute, and the est mated speed of the machine about 35 miles an hour The weights of the various parts of the machine ar approximately as follows: Carriage and wheels, 60 lb. machinery complete in working order, with water i boiler and fire on grate, 200 lb.; sustainers, 70 lb.; tot weight of machine, 330 lb.; total weight, lifted an carried, including 72 lb. of added weight, 402 lb.

In order to test the machine a wooden track 628 fe in circumference and about 6 feet wide has been l in the gun-proving grounds of Messrs. Cogswell & I rison, at Harrow, the machine being tethered to a tral post. In some trials which we recently witne a number of runs were made, with the result t speed of 28 miles an hour was attained. As reg the ascensional powers of the machine, it was sho that it had a lift of about 3 feet from the ground at rear. The rise reached its maximum when the chine ran in the face of the wind, and was continu over about two-thirds of the track. The machine w also moored by a stern rope in which a dynamome was inserted, and on the engine being run at speed, the dead pull was 75 lb. On the whole the chine is one of promise, and is certainly a step in vance in aerial navigation.—*Iron.*

Fast Time of the Campania.

The new Cunarder, the Campania, arrived out Queenstown from New York on the morning of 12, having made the voyage in 5 days, 17 hours, an minutes, thus beating by more than two hours best previous eastward record, namely, that of New York, in 5 days, 19 hours, and 57 minutes. t best day's runs of the Campania were 481, 490, 47?1 and 492 miles, and the total distance traversed 2,868 miles. An illustrated description of the Cam.a was published in SCIENTIFIC AMERICAN of Mara