



A Down-Easter writes home as follows: "The first day I went to the Exposition grounds I was landed on the wooden trestlework of the Illinois Central Railway across the Midway Plaisance by one of the World's Fair express trains. This is the Sixtieth Street station. I fell in with a crowd of five hundred or more people that came on the same train, bent on the same errand that I was, that of seeing the Exposition. It is only about a block from this station to the entrance to the grounds, but there are fakirs enough along this block to satisfy half a million people. Their wares and curious cries swept all unpleasant things of life out of my mind and prepared me to be philosophical and not to be astonished at anything I saw.

"I passed through the gates and almost fell against a sedan chair carried by a couple of baggy-trousered Turks, but they did not mind me, and shambled along, swinging their chair between them. Whether to turn to the right or the left or to go straight ahead was a matter that I could hardly decide, for at the right were the Horticulture and Children's buildings, ahead was the Woman's building, while at the left was the Bureau of Public Comfort and the California buildings. But the two Turks helped me out of my dilemma. I followed them into what looked like a dark hole at the left, but which proved to be a passageway under a viaduct, and it leads into the Midway Plaisance. Up this broad avenue as far as I could see were thousands of people, turrets, minarets, flags of Oriental and other styles, while through the air floated the dulcet strains of bagpipes and grand conglomerations of all sorts of musical instruments, from heathen tomtoms to civilized bass drums.

"I cannot begin to tell all that I saw, but when a gnawing hunger finally asserted itself I realized that it was two o'clock in the afternoon, and that I had spent five hours of my first day and had not been inside of a building in the Exposition grounds. But I had seen sights never to be forgotten. Having dropped the Turks and followed a wheeled chair, which the people here call 'gospel chariots,' because most of the young men who push them are said to be divinity students, I followed the chair to the gateway on the Street of Cairo, and, as I had never been in Cairo, I followed the chair, paid ten cents, and went in. As we entered and went around a corner of the Street in Cairo we came upon a group of camels and donkeys sitting in meek submission around a placard containing the startling announcement: 'Camel ride, 50 cents; donkey ride, 25 cents.'

"Among the many people standing about was a man and his wife, who evidently had a strong hankering to enjoy the experience of camel riding. They made a bargain with the driver of an animal that was resting on a mattress, with his long bony legs doubled up under him. The two took their seats upon the creature with a confident air. The driver jerked at the reins and prodded the camel to induce him to rise. With a sepulchral groan, the poor thing began to obey by putting the different sections of his legs in place, at the same time tossing the passengers and nearly throwing them off. Once on its feet, the camel strode off with a swaying gait that would do credit to the surface of the Atlantic Ocean just outside of Cape Cod. Whoever undertook to ride on the back of a camel furnished amusement for the whole street full of people.

"I was next cognizant of a roar and commotion down the Plaisance whence I had come, and following up the trail of the roar, I found it proceeded from Hazenbeck's animal show, where five live lions in a cage were displayed immediately over the entrance to the building. A trainer was in the cage, showing to the public without cost the influence of mind over beast. It was a temptation to look further into this subject, so I deposited 75 cents in the ticket office, and found myself with many others in an arena filled with cages of most remarkable animals in great variety, and many birds. To me the most attractive animal was the little elephant, Miss Lilly, who stands 36 inches high.

"The animal performances are very wonderful and the entertainment given in this building shows what remarkable results can be accomplished in training wild animals. Here are full grown lions apparently as tame and as docile as the little donkeys in the Street of Cairo. They performed a variety of tricks and the trainer was as familiar with them as though they were the most harmless creatures. Were it not for an occasional roar, and a lion now and then showing the audience his full set of teeth, there would be nothing terrifying or startling about the exhibit.

"After having spent so much of my day in Cairo, Constantinople and the African jungle among the lions, I thought it only patriotic to return to America at least for a time; so I strolled across the street into the factory of the Libbey Glass Works. Here the whole operation of glass making is presented to the view. I saw vases, bottles and other things shaped in imitation of cut glass. I then watched some men who were cutting and polishing glass. But what interested me most in this building was the spinning and weaving of glass. A man would take a piece of glass, hold it in a flame until intensely hot, draw a point out through the flame, attach it to a revolving wheel about six feet in diameter and wind upon the wheel a continuous fine thread of glass. This glass thread seemed to be almost as pliable as though it were made of flax. Adjoining were two young women at a loom weaving fabric of this thread. When completed this glass cloth has a beautiful luster like satin and the attendants assured me that it would stand a good deal of hard usage before breaking. The Princess Eulalia, so I was told, is to have a dress made of glass that was spun and woven in this factory. I could have spent the day here with pleasure, but hunger began to gnaw me.

"I had noticed a little sign over the entrance way to a structure of primitive architecture which assured the public that a farmer's dinner could be had within. I bought a check at the door for fifty cents and took a seat at a plain table, and the waitress gladdened my weary heart when she placed before me an abundant supply of baked beans, brown bread, doughnuts, cheese and coffee, such as had formed part of my diet twice a week for many years just beyond the shadow of Faneuil Hall. Having thus refreshed my inner man, I walked out toward the other end of the Plaisance, where I was lured into a building by what in the Chinese language is called music. I looked over a variety of Chinese wares, had a good view of a paper dragon that had a length of about 125 feet, went up to the second story, where I was led into the mysterious presence of the beings that inhabit the Chinese Joss house.

"Next I watched the Chinese play for nearly two hours, and saw practically the same thing acted over and over again. The scene was evidently a conflict between different claimants for the throne. One claimant after another would come on to the stage, sit on the throne, give a few imperious commands, then retire around the corner, when the next claimant would make his appearance. Three coy Chinese maidens added a little variety to the scene. On two or three occasions, and at frequent intervals, a most diabolical-looking being with immense horns took part in the play.

"Such was my first day. I had not seen a thing directly connected with the Exposition, yet probably in no day of my life shall I again see so many people from all parts of the world and so many interesting and instructive objects as I saw on this one day.

"But this was only my beginning at the great Fair. To-morrow I will tell you a heap more."

In the section of horology the genius and ability of the French for original work and delicacy of execution is finely shown. Several watches are exhibited which have a face half an inch in diameter. One of these watches, which is claimed to be the smallest one in the world, is set in a rosebud studded with stones. A clasp at the point of the bud keeps it closed, and when pressed, springs open, revealing this miniature watch. This watch is wound up by turning the entire watch. A gold enamel ring has a similar watch set in it in a nest of about one hundred small diamonds. We here



Sci. Am. N.Y.

give an engraving showing the exact size of this remarkable specimen of fine mechanism. Several novelties in watches for ordinary use are also exhibited. One watch is so constructed that every time the case is opened to see what time it is, then closed again, the spring is wound up. This watch is a repeater, striking the hour and the minutes. Another watch has two faces, one on each side. One face gives the second, the minute, and the hour of the day, notes with a pointer how nearly the watch is wound up, and has two small faces, so that the time of different cities in the world can be shown. Turning the watch over and opening the rear case, there is found a perpetual calendar, which gives the day of the week, the day of the month, the month of the year, the phases of the moon, and it also contains a thermometer. The watches in this one case are estimated to be valued at about \$400,000.

Watches are shown in the Swiss department which display equal cunning in this line of manufacture. The ring illustrated herewith, showing a watch set in the crown, is reproduced in actual measurement, and represents the full size of the ring. The watch itself is set in a circle of twenty-four diamonds, and, like the watches referred to in the French department, it is wound up by turning the entire watch upon its setting. Other miniature watches are shown in this exhibit, which are mounted as butterflies, beetles, and ducks.

There is also a daisy made of gold and enamel, the center being one of these miniature watches.

The fine exhibit of the Oil Well Supply Company, of Pittsburg, is situated back of the Machinery Hall Annex. A huge derrick and all the machinery necessary for drilling a 3,000 foot well are in place.

The illuminated fountains are now in running order. The central jet rises 95 feet, the largest nozzle is 1½ inches in diameter. The current for the lamps is 90 amperes.

The total number of paid admissions to the Columbian Exposition from May first to July fifteenth is 5,158,523.

In the Swedish section of the Fine Arts building there is a wood carving, No. 188, entitled "Columbus' Arrival in America." It is by A. E. Norman, a Swede by birth, who had learned the trade of carpenter, but received no special instruction in wood carving. The specimen of his artistic skill in exhibition is highly creditable. It was cut from a solid block of Turkish boxwood a foot square and eight inches thick. The central figure is of course Columbus, and he is shown just as he is in the act of stepping ashore from the Santa Maria's cutter, one foot being on the gunwale and the other on the soil of the New World. He holds aloft the standard of Castile and Aragon and a drawn sword. The accessories are all appropriate and are very skillfully treated. Above and around the discoverer is the typical vegetation of the West Indies. In the remote distance the Santa Maria rides at anchor. Near by a native chief and a maiden regard the pale stranger with awe and wonder. The execution is careful throughout.

The custodian of the Presbyterian exhibit sits daily on the unopened cases in the Liberal Arts department like Marius amid the ruins of Carthage, and there he will sit until the Exposition closes. The Presbyterians will not allow a nail to be drawn from the cover of one of the boxes while the Fair is open Sundays, and the Exposition authorities refuse to allow the cases to be removed until the Fair closes for good and all. The public do not miss much.

The exhibit of the Century Company in the north gallery of the Manufactures building is very complete. The various processes of wood engraving, electrotyping, and photo-engraving are exhibited in detail. For example, a sheet of copy is shown, then the type locked up in a form, followed by the proofs with the reader's marks upon them, then the electrotype and finally the printed page. "How a dictionary is made" is also shown, the great "Century Dictionary," of course, being chosen. The original drawings from which many of the cuts were produced, one of the wood engraver Cole's exquisite blocks, the engraving being done directly from one of the paintings by an old master in Florence, are also on exhibition. Parts of the original manuscript of "Little Lord Fauntleroy," "Abraham Lincoln," etc., are shown, as well as some of George Kennan's *Century* articles which have been rendered illegible by the Russian police authorities. Many valuable autograph letters are on exhibition. The booth is built in excellent taste, is beautifully decorated, and the whole exhibit is very creditable to the great magazine.

On July 7 the Spanish caravels, being the reproduced fleet with which Columbus sailed on his voyage of discovery, reached Chicago from New York and Cadiz, and anchored in the open roadstead, immediately in front of the Palace of Manufactures and Liberal Arts, at the World's Columbian Exposition. These vessels were illustrated in the *SCIENTIFIC AMERICAN* of April 23. It was a beautiful day on which they reached Chicago. The fleet left Milwaukee the previous day and was joined early Friday morning, many miles north of Chicago, by the United States war vessel Michigan and the revenue cutter Andrew Johnson. As they approached Chicago many other vessels joined in the escort, and a grand procession was formed which proceeded slowly up to the Exposition grounds, where joyous salutes of cannon were fired. The rich-toned chimes in the German building pealed forth their notes of welcome, while thousands of people who lined the shores joined in with cheers and waving of handkerchiefs.

Lieutenant Commander Berry, of the Michigan, then came ashore, followed by Captain Victor Concas, who commanded the caravels and brought them through their long journey of 147 days from Cadiz to Chicago.

The reception of the guests was as appropriate in its way as was that of Columbus himself when he first stepped on land in the New World. The guests were escorted to a temporary platform adjoining the Administration building, where they were greeted by prominent United States officials and representatives of almost every nation in the world.

Addresses were made by President Palmer of the Exposition, Senator Sherman, Captain Concas, Secretary Herbert, Mayor Harrison and Frederick Douglass. Spanish airs and other music were interspersed, and rousing cheers were given for the little King of Spain, Alfonso XIII., and his mother, the Queen Regent.

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WORLD'S FAIR NOTES.

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also for Spain, the Spanish navy and the Spanish people.

The French exhibit in the Manufactures and Liberal Arts building occupies one of the most desirable spaces in the building, as it is situated near the center by the clock tower and extends from Columbia avenue through to the east side of the building. The exhibit of manufactures is on the ground floor and that of liberal arts in the gallery, with private stairways in the department leading to the gallery floor. This exhibit was organized and arranged under the immediate supervision of the French government, and exhibits of certain classes are arranged in groups. The largest and most noticeable of these exhibits come under the following heads: *Furniture and interior decoration*.—This includes a large variety of interior furnishings, especially the gracefully designed and richly ornamented pieces of furniture for which French manufacturers are so famous; also a very large display of tapestries and other wall hangings. Several rooms are reproduced in all their furnishings, perhaps the most richly furnished being that of a drawing room. *Ceramics and mosaics*.—There are five exhibits of manufacturers of Limoges ware, which are extensive and which cover full sets of dishes as well as a few representative dishes of sets. Each display is artistically arranged, and although a comparatively small amount of space is occupied, in each exhibit there is shown perhaps \$25,000 worth of this famous ware. The exhibit of artistic glassware is considerably smaller than that of china, but much ornamental work in porcelain and glass is shown, and also of Sevres ware. One large room, richly decorated, is filled with beautiful specimens of this ware. Many small vases and half a dozen or more richly decorated and artistically shaped vases of large size are shown in this room. *Art metal work*.—The display of bronzes is one of the largest and finest in this department. Many of these bronzes are groups and statuettes, while others are electroliers of equal artistic merit. Many of these electroliers are designed for lamps of small candle power and are a revelation in artistic skill and taste in designing illuminating fixtures. In this department as in all others duplicates are sold of all pieces, and as the card of each purchaser is attached to the article purchased, the taste of the public can be readily gauged. Many popular figures have from fifteen to twenty-five or more cards attached to them, and these usually are by no means the ones of most artistic merits. By far the richest bronze exhibited is the Doré vase, a piece of much size and so artistically and elaborately ornamented as to require the closest study to appreciate the work that has been done on it. Besides the regular bronzes there are several exhibits of cheaper forms of bronzes as well as of imitation bronzes of plaster or other materials bronzed over.

Threads and Fabrics.—This is a department in which French manufacturers are so well known to excel in many lines of goods, and the rooms in which these exhibits are shown are usually crowded with women, especially in the sections devoted to clothing, costumes and accessories of the toilet. These exhibits include fabrics of all kinds, more especially those made of silk, and they are fabrics more in the line of personal decoration rather than other uses. Many large cases are filled with gowns, displaying the latest Paris fashions. Hats, bonnets, and kid gloves are also shown. The display of laces is very complete and includes many beautiful and costly specimens of work.

Jewelry and Ornaments.—This department includes a line of work in which the French so excel that it vies with the costumes section in popularity. Several exhibits of imitation jewelry are at all times surrounded by groups of visitors who have better use of superlative adjectives than judgment of precious stones, for adjoining the cases in which these imitations are shown, and which represent only a few thousands of dollars in value, is an exhibit of genuine stones that is estimated to represent about \$2,000,000 worth of goods. In the center of this case is shown a necklace and pair of earrings valued at \$106,000. The necklace is made up of eleven diamonds of as many different colors, each diamond joined to the necklace proper by a diamond setting. Just above this necklace is a pin composed of six blue diamonds on a background of yellow diamonds, which is valued at \$160,000. The largest stone in this pin weighs forty-one carats and in itself is valued at \$100,000. Just at the left of this is another pin composed of five whitestones which has a price of \$140,000. The largest stone, weighing forty-three carats, is valued at \$53,000. There is also shown in this case a prayer book printed in the fifteenth century, and before Columbus discovered America, in a binding of gold and silver enamel inlaid with rubies. At the right in the case is a tiara of diamonds from the crown jewels that was worn by the Empress Eugénie.

Printing.—Printers and everybody interested in the printer's art will find the department in which this art is exemplified from a mechanical standpoint very complete. This department is located in the Palace of Mechanic Arts. Two very old printing presses are

shown in this department, one of which was made in Boston in 1742. The other old press is of similar type, and is almost identical with the old Benjamin Franklin press shown in the Smithsonian Institution, at Washington. This press uses an iron impression screw instead of a lever, such as is used on some old presses. This latter press is believed to be 150 years old. It was in use at the time of the Revolution, and was also used during the late Rebellion for printing Confederate money. General Lee's farewell address to his army was printed on this press. Outside of these two ancient models, the other presses exhibited illustrate every variety of press that is in successful operation to-day. These include presses for every purpose and of various speeds, from the small press for printing cards or circulars to the monster quadruple inserting perfecting presses that print newspapers of eight, ten, twelve or more pages at the rate of about 40,000 an hour. Many of these presses are shown in operation. One large lithographic press that prints pictures in colors of the Exposition buildings and grounds is the center of much interest. The Chicago evening papers print editions each afternoon in this department. In the stereotyping department no new processes for stereotyping are shown, but complete outfits of different type and manufacture of the generally used process are exhibited. Type-setting machines of four different styles are also shown in this department in operation. These include both the machines that set ordinary type as well as those that cast the entire line from matrices. The *Daily Columbian*, the official organ of the Exposition, is printed in this department, and the composition is done on one of these type-setting machines. Printing several colors at the same time is also illustrated by several exhibits of presses for this purpose.

The art of making type is illustrated in a historical manner that makes it one of the most complete exhibits in this building, as the process of type making is fully shown by exhibiting machines illustrating the development of this art. This interesting exhibit begins with the old hand moulds, such as were used one hundred years ago, each letter or type being cast in a slow and uncertain manner. The next step in advancement is in the rotary type-casting machine invented in 1840, and which was operated by hand. Thirty years later steam power was applied for this purpose, making a machine which would seem remarkable even in these days, were it not for the type-perfecting machine of 1893, which is shown alongside the machine of 1870. This latest invention casts type at the rate of 160 to 180 a minute, each type being perfect in every respect and ready for use. It is a machine of marvelous ingenuity. Wooden type, presses, book binders' machinery, thread and wire stitching machines, cutters, perforating machines, and all other devices used in printing establishments are likewise shown.

Two of the British royal commissioners, James Dredge and Walter T. Harris, who have just returned to England, sent a letter to President Higinbotham, of the Exposition Company, in which they express themselves, regarding the Fair, in a manner that reflects the sentiments of every visitor. In this letter they say: "We wish once more to express to you our admiration and amazement at the marvelous Exposition which the unparalleled energy of your citizens has reared in Jackson Park. To say that it surpasses in size, beauty, and grandeur any previous international exposition is merely to repeat a threadbare platitude. Your World's Fair does this, but its mission in the work of progress and civilization constitutes its real splendor and its chief value. That it thus gloriously closes the commercial history of the nineteenth century, and thus ushers in the unknown progress of the twentieth, must bring to the city of Chicago and to those great men who have sacrificed themselves to attain this unlooked-for success, a position among the cities of the world that no amount of commercial prosperity and rapid growth could secure. This is the truth it will be our privilege to spread on our return to Europe, and we hope and believe that our testimony may help somewhat to spread the fame of the Exposition abroad and stimulate the interest of foreign visitors."

A new feature of the Fair is an exhibition of the method of saving lives as practiced by the life saving crews. The life saving station has been very popular with visitors, but large crowds now gather when an exhibition is to take place. A mock wreck has been provided; on this four or five sailors will lodge and act as perishing mariners, several times daily. To them the crew on the land shoot the ropes with which the hawser, breeches buoys, and tackle are to be drawn to the wreck and made fast. The crew has already had one real call, and they responded promptly.

SCIENTISTS are now telling us that the dangerous microbe is lurking in the greenback. Those in arrears for subscription, says a contemporary, can send the amount, as he has facilities to disinfect small amounts, and is willing to take the risk.

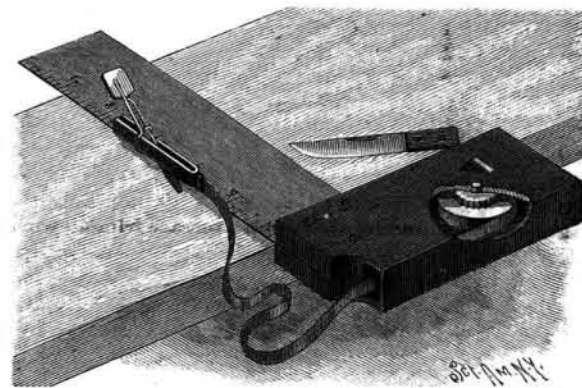
A New Comet.

The new naked eye comet was discovered, in constellation Lynx, at Salt Lake City, July 8, at 10 o'clock by Alfred Rordame. The position of the comet July 10 was about right ascension 8 h. 30 m., declination north 47 degrees. Prof. Swift, of Rochester, who is well known as a comet finder, says the new visitant is a rapid traveler and its motion is west with a daily rate of about three degrees. Prof. Swift says, July 9: "The comet was large and bright with strong central condensation, though no star-like nucleus could be discerned with my four and one-half inch comet seeker. Its tail was straight, exactly opposite the sun, but in consequence of the sky illumination by electric lights, appeared not to exceed three degrees in length." The next night (July 10) he continues: "The tail had considerably broadened, and I fancied had shortened in the interval. As the edges were several times brighter than its inner portion, I concluded it to be a hollow cylinder, as all comets' tails probably are. At 9 h. 50 m. it passed over a pretty bright star, but contrary to a former experience the star was entirely obliterated, showing the comet to be rather a dense one."

As far as can be determined, the comet is a new one and will probably go down into astronomical history under the name of Rordame's comet. According to the orbit determined at the Dudley Observatory, the Rordame comet is receding from the earth at a very rapid rate. It is not likely, Prof. Boss says, to be of much popular interest, though it will be dimly visible for a week yet. It is now about forty millions of miles from the earth and reaches perihelion on July 23.

AN IMPROVED CARPENTER'S SQUARE.

This square, which has been patented by Mr. Frank D. Dunnington, of Buckhannon, West Va., may, in general respects, be of the ordinary construction; but it has an attached marker connected by a line or tape with the square, so that the marker may be drawn along the edge of the blade in marking work, the tape and marker, when not in use, being drawn within the



DUNNINGTON'S CARPENTER'S SQUARE.

handle by a retracting device. The latter preferably consists of a spring-actuated drum journaled in a cavity of the handle, a detent and spring pawl, with projecting knob to be engaged by the thumb or finger, affording means to stop the recoil of the spring when the marker is being used. A light casing is provided for the marker, which consists of a pivoted blade whose point may project beyond either side of the case to mark the work, the other end of the blade forming a handle, shaped to be normally spring-held within the case. An independent additional blade may be arranged as shown, if desired, for convenient movement into and out of the square. This attachment in no way interferes with the ordinary use of the square, as the line and marker, when not in use, are drawn into the mortise or recess of the square handle, with only the handle of the marker blade projecting, so that it can be conveniently grasped.

Steam and Electric Railroads.

A writer in the *New York Sun* notes the fact that notwithstanding all the assistance given to corporations by legislatures, cities, counties, and private individuals, railroad construction in this country was very slow at first. In 1830 there were but 23 miles in operation; in 1832, 229 miles; in 1835, 1,098; in 1840, 2,818; in 1845, 4,633; and in 1848, 5,997. In no single year was the increase in mileage, which now averages 5,000 miles a year, as high as 1,000. But from 1849 to the beginning of the civil war, in 1861, the extension was rapid, the total mileage in 1861 reaching 31,000. Then construction languished until 1870, when 7,000 miles were added, and now the total length is 215,000 miles. On the other hand, the electric railroads have increased with marvelous rapidity throughout every section of the country. At the beginning of 1890, when electric railroad building first began to be popular, there were 200 companies in operation, covering 1,641 miles of track and using 2,346 cars. To-day, so great has been the multiplication of lines that there are more than 7,000 miles of electric street railroads. Three years ago, the mileage of horse roads was 5,713, of electric roads 1,641, of steam roads 554, and of cable roads 527. Now the electric roads lead all others.