tearing away this wreckage. A gun cotton torpedo, wires and an electric machine were then placed in the boat, and the boat proceeded to the wreck. A line was loosely placed around one of the masts, forming a sort of grommet. The torpedo was fastened to the grommet and lowered about thirty feet under water, the grommet keeping it near the mast. This was a very dangerous part of the operations, on account of the plunging of the masts and boat in the heavy sea, and it required all the strength and skill of the twelve hearty seamen to keep the boat from being swamped or crushed.

After the torpedo was lowered the boat pulled away to a distance of about five hundred feet, paying out on the electric wires. Arriving at this distance, the electric machine was put in action, the circuit tested, a button pressed, and an explosion followed which shattered the mast.

A second torpedo was in like manner taken out and secured to one of the remaining masts, but the wires becoming foul of the wreckage, the circuit was broken and the torpedo could not be exploded. It was then decided to try and pull one of the masts clear. The Kearsarge hove up her anchor and steamed over near the wreck.

A large hawser was taken out by the boat and made fast to one of the masts. When all was ready, the Kearsarge backed on her engines, tugging away at the hawser. The mast pulled under water, the hawser surged and strained. The mast had a good hold on the wreck and would not let go. Something had to come. So the hawser parted.

The hawser was again taken out by the boat, and this time it was made fast to the third mast. The Kearsarge backed as before, and after tugging for several minutes, till it seemed as though the hawser was again about to part, the mast broke adrift from the wreck. From an examination of this mast and the rigging, and parts of sails that still clung to it, it was evident that the schooner had been capsized in a sudden squall with all sail set. Probably all hands were lost.

The big mainmast remained to be got rid of. A third torpedo was put in the boat, the wires were carefully overhauled, all connections examined and the boat proceeded to the wreck. This torpedo was attached to the mainmast as the others had been, the boat pulled to a safe distance, and the torpedo was successfully exploded, so successfully in fact as to cause by its concussion the explosion of the second torpedo. There were two distinct explosions, following each other very closely, probably within a second. The pieces of the splintered spars floated off, the wire and rope rigging and sails sank to the bottom and the wreck was no longer dangerous to navigation.

The electric machine used was a Farmer dynamo-electric, series-wound machine, of eighteen volts and 3·6 amperes. Twelve hundred feet of number fourteen gauge, copper, rubber-insulated wire were used. The resistance of the wire was three ohms per mile, with 96 per cent conductivity. The insulation resistance is one hundred and fifty megohms.

The fuse bridge had a resistance of 0·69 ohm and required 0·89 ampere to fire the fuse. The torpedo consisted of an iron casing containing thirty-four pounds of wet gun cotton with a dry priming charge of 2·7 pounds.—*Brainard.*

Thirty Knot Steamers.

Mr. J. H. Biles, the designer of the Paris and New York, suggests the possibility of 30 knot steamers in the future. Ten knots must be added to the present speeds. Of this Mr. Biles proposes to gain two knots by the use of nickel steel instead of ordinary steel, then three and a half knots by the use of oil instead of coal as a fuel, and the remaining four and a half knots he believes can be secured by such changes in dimensions as will increase the length and draught and by improving the machinery. The length will be about 1,000 ft., and the beam 100 ft., with a draught of 30 ft.

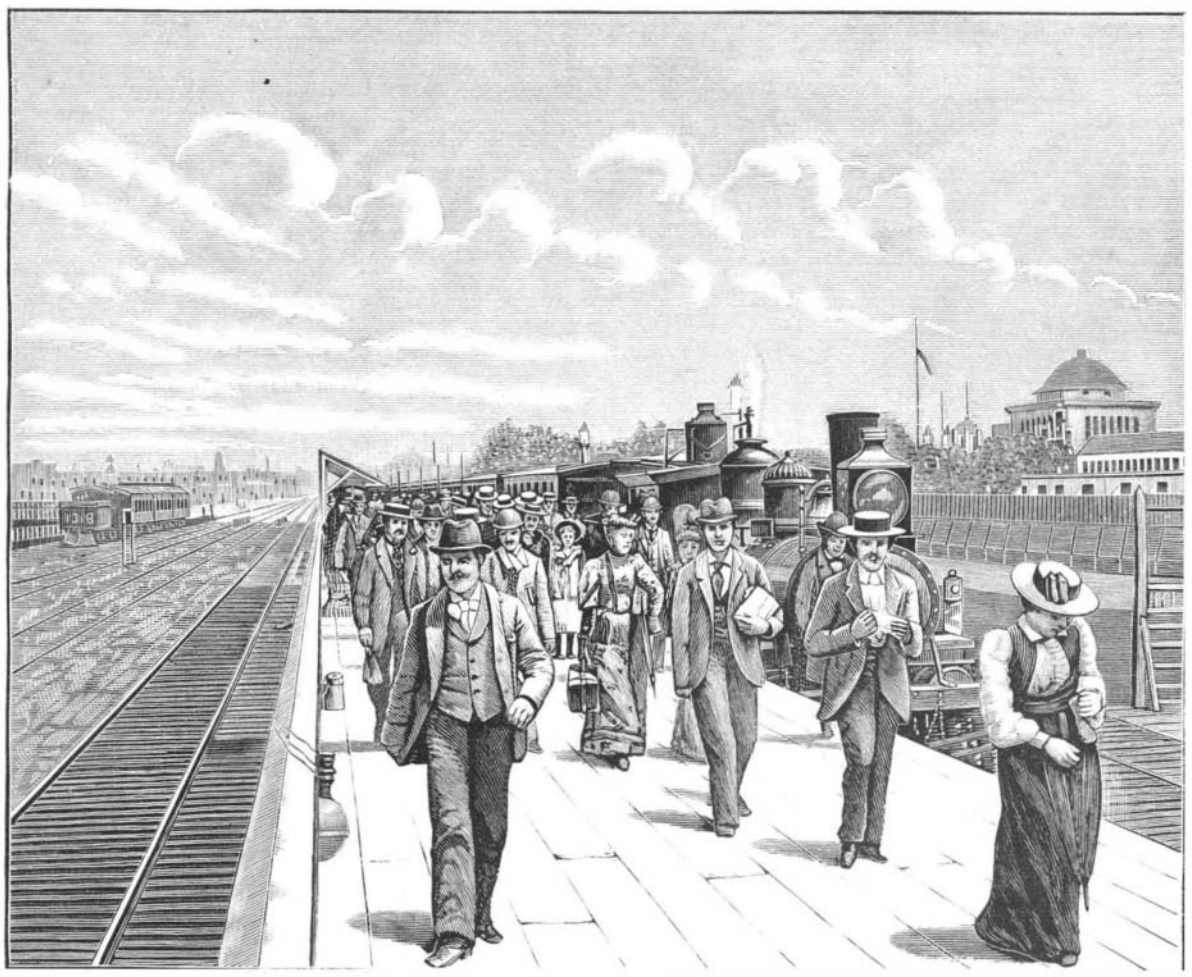
The National Wall Paper Company makes an exhibit at the World's Columbian Exposition based on the principle that such an Exposition as this is intended to show the latest achievements in the various arts and manufactures. This company comprises twenty-three of the leading wall paper manufacturers of the country. The designing of the structure and the work of decorating and placing the exhibits is due to Mr. Paul Groeber, one of the leading designers of wall paper. There are five separate rooms, one being a central or inner court, which Mr. Groeber has decorated in a manner to show the very latest achievements in wall paper manufactures. This room is two stories in height, open to the top, and is papered in the Empire style, in what is called aplique relief print, and is all hand work. The design stands out in bold relief. This is accomplished by the use of flexible pigments, instead of by embossing the paper, so that the paper can be rolled or wet without injury. Over two hundred hand printing blocks were required in printing the paper. The silk draperies and velvet carpeting were designed and manufactured to harmonize and correspond with the papering. Pilasters of this aplique relief paper form an important part of the decoration and they stand boldly out. The other four rooms are devoted to the display of various kinds of paper, which embraces the nicest of hand work. The best machine work is also displayed, so that grades of paper are to be seen here ranging in price from 50 cents to $24 a roll. One large case is full of paper that has the rich sheen of satin, but which is made entirely of pulp. That satin effect is given by the use of pulverized mica in making the paper.

In the house furnishing section, one of the most striking novelties is a large exhibit of rattan furniture, comprising three rooms. The face of the structure is covered with rattan and woven cane. There is a reception room, sleeping apartment and parlor, all the furniture of which is made of rattan, while the cornice, ornaments, decorating of the mantel, and the grilles are of the same material.

Stove manufacturers have vied with each other in making large and complete displays. One of the most noticeable exhibits is that of the Garland stoves. There is a superstructure 25 feet high, 30 feet long and 20 feet wide, arranged in the form of a huge kitchen stove. In this exhibit is shown what is believed to be the oldest stove in America. It was brought from France in 1693 and placed in the first convent established in Quebec. It is the ordinary type of box stove, and nearly square. The castings in it would be considered excellent work in stove making to-day. In another exhibit there is shown the first anthracite self-feeding base burner made. This stove was invented by the late Dr. Nott, who was president of Union College, New York. It is believed to date back to 1817.

Few people who have attended the Exposition have appreciated the importance of the Emergency Hospital; although probably they have been terror stricken by the apparently reckless manner in which the hospital ambulances dash around the promenades. There have been an average of over one hundred hospital patients a day since the opening of the Exposition. The largest percentage is the people who keep on going in their sightseeing until they fall exhausted, and in many cases the attending physicians say indigestion brought about by irregular eating has played an important part.

St. Thomas, one of the West Indies Islands, discovered by Columbus, is vividly represented by a model in the Transportation building, which is made on the scale of six inches to a mile horizontally. The outlines of the island are an exact reproduction of the sea beach in miniature, and palm groves, towns, harbors and shipping are shown in the naturalness of real life. Among the vessels represented in the harbor are United States cruisers and two of the Columbus caravels now to be seen at the Exposition.



ARRIVALS AT THE FAIR—ILLINOIS CENTRAL RAILROAD.

An exhibit made by the Horticultural Department in a section of the Midway Plaisance causes surprise, but is very practical in its way. It is a section of an old rail fence overgrown by a vigorous growth of ordinary garden weeds, which are described by a card as "Things to hit with a hoe." Nearly all of the more troublesome weeds are to be seen here.

Probably very few of the millions of people that have visited the Exposition have thought of the busy scenes that must be enacted after the gates to the grounds are closed to the public for the night. A glimpse late in the afternoon of the plaza around the Administration building and of the benches surrounding the basin and lagoons reveals an amount of rubbish in the shape of packages, papers, and boxes remaining from lunch parties that would fill a great many wagons. Every night, promptly at eleven o'clock, an army of men goes over the grounds gathering up all the rubbish, which is then burned. Another army follows with sweepers, cleaning up and repairing the promenades and repairing breaks in the lawns. Following these come the sprinkling carts. This work consumes the greater part of the night. As early as three o'clock A. M., provisions and supplies of all kinds begin to arrive at the various gates.

The Chicago, Milwaukee and St. Paul Railroad exhibits a light and heat tender in the Transportation building, which has been used on its vestibuled express trains. The car weighs 76,000 pounds. It is fitted with a boiler of the locomotive type, which carries steam at a pressure of 100 pounds. Five thousand pounds of coal and 300 gallons of water can be carried in the fuel and water tanks. These tanks and the boiler occupy about three-fifths of the car. In the remaining space is an electric plant, consisting of a Westinghouse automatic engine of eighteen horse power, belted by a link belt to an Edison fifteen kilowatt 110 volt dynamo. This tender has been used continually in winter on limited trains of ten cars each running between Chicago and Minneapolis, and has not only supplied necessary steam for heating the train, but has also maintained 200 incandescent lamps of sixteen candle power each.

The General Electric Company shows in one of its spaces in the Electricity building the first dynamo that Mr. Edison built, and it is an interesting fact that the Edison dynamo of to-day does not differ from this first one except in minor detail. This dynamo was one of fifteen used at Menlo Park, N. J., for the first public exhibition of incandescent lighting. It was built in 1880, and has been in constant operation until it was brought to the Exposition.

(*Continued on page 246.*)

Notes from the World's Columbian Exposition.

(*Continued from page 243.*)

Canada makes a splendid display in the Manufactures and Liberal Arts building, and it is evident from the variety of manufactured products that the Dominion has made great strides in fostering home industries. The great feature of this exhibit is the display made by the Indian schools of Manitoba and the Northwest. A number of Indian girls and boys from these schools are seen practicing different trades and kinds of work. One girl will be knitting, another crocheting, others doing fancy needle work and embroidery, while still others spin yarn on an old-fashioned spinning wheel, weave rag carpeting on a hand loom, and do other work. The boys are setting type, operating a hand printing press, and otherwise demonstrating their skill. A great many samples of work done by these young Indians are exhibited. Some excellent carpentry and iron products show the practical training that the boys receive. A wigwam, such as these Indians in their native condition inhabit, adds special interest and contrast to this exhibit. It is covered with buckskin, and in connection with it there are shown household utensils and native-made hunting and fishing apparatus. There is a fine display of robes, such as are used in the extreme Northwest, made of different materials, such as loon skins, lynx paws, deer skin. muskrat, and there are several robes made of Arctic rabbit skins. The skin of the rabbit is tender, and in order to give these robes strength, the skin is cut into strips and twisted, and the twists woven, leaving coarse meshes, yet making a very warm robe. This sort of a robe is used very extensively all through British America, from Manitoba even as far north as the mouth of the Mackenzie River, and is also found in use among the Esquimaux of Alaska. They are almost as light as down and have equal warmth.

Idaho's mining interests are extensive, as shown by the size of its exhibit in the Mining building, where several large piles of ores, mostly gold, silver, and silver-lead ores, are displayed, but also specimens of copper and lead and a few valuable stones such as opals and rubies. The Utah exhibit also consists chiefly of gold, silver, and silver-lead ores, together with considerable base bullion. There is also shown here coal, onyx, rock salt, rubies, opals, asbestos, potash, sulphur and concentrates, also iron ores. The feature of the Montana mining exhibit is the silver statue which occupies the most commanding position of the section. The rest of the section is given up almost wholly to large displays of silver ores. There are cases of beautiful specimens of native silver and silver crystals, also a case of gold crystals and nuggets of gold from the placer mines and fine displays of sapphires, tin and bismuth, copper ores and ingots and manufactures of copper. Colorado's space is large and is almost walled in by massive specimens of silver and silver-lead ores. Gold ores in various forms, petroleum, marble, building stones, and coal, both anthracite and bituminous, are also exhibited. In the center of the space are several cases containing specimens of placer gold, free gold and gold crystals. Surrounding this are shafts of building stone arranged in a circle, and on top of each shaft is a rich specimen of silver ore. The silver interests of this State are very completely represented, as are also the iron interests.

The railway terminal facilities at the Exposition were constructed on a far larger scale than has been necessary, but they have proved highly useful in handling the crowds.

The stub system of tracks is used, with facilities for locomotives to run around to the other end of the train. Four tracks enter the grounds at the south end and spread out, continually enlarging, until they aggregate thirty-three tracks in the station. The Terminal Station itself is a beautiful structure of staff and is a model railway station.

The switching of trains is done by means of an interlocking system, which is operated on the combined steam and hydraulic plan. One tower at the entrance to the grounds has control over the outer yard, while the switching immediately connected with the tracks in the inner yard and the Terminal Station proper is controlled from another tower located convenient to where the tracks spread out. The Illinois Central, the Baltimore and Ohio, the Northern Pacific and other railroads run trains at regular intervals into this station.

The location of this station is most fortunate, as visitors arriving in trains here pass through or around the building and are in the very heart of the grounds, the open plaza surrounding the Administration building, and are ushered at once into the center of the most inspiring part of the Exposition.

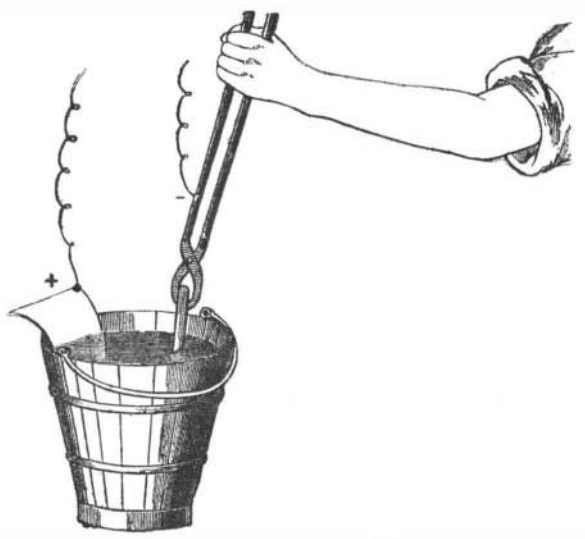
A writer in *Scribner's Magazine* says: "Night and electric light play a great part in the spectacular side of the Fair. Solomon in all his glory never saw such a sight as the plain people of this continent have had on illumination nights this summer. Innumerable incandescent lights sparkle along the cornices and pediments; the top of the wall inclosing the grand basin is outlined in fire; search lights from the top of the Liberal Arts building cut their wide swaths of light in gigantic circles, resting for a moment here and there to bring out now this detail or to throw into dazzling relief a sculptured figure or beast. It lingers longest on the MacMonnies fountain, the fitting jewel resting lightly on the bosom of this Venetian beauty whom but yesterday we called Chicago; and well it may, as in a degree the fountain is the *clou* of the Exposition."

The new heating process of Lagrange & Hoho, of Brussels, Belgium, is shown working at the Exposition. It is a very curious process, says the *Electrical Review*, and seems quite incomprehensible at first sight. In this process a rod of iron is raised to a white heat in a pail of water.

The experiment was made as shown below. An ordinary wooden pail is three-quarters filled with water slightly acidulated, a lead plate about 9 inches broad by 16 inches long dips to the bottom of the pail and is connected to the + pole of 110 volts incandescent dynamo machine capable of giving over 150 amperes. The iron rod, or article to be heated, is connected to the — pole of the dynamo, and simply dipped into the water; it immediately becomes heated and rapidly rises to a melting temperature, only that portion of the metal completely immersed becomes heated, and the heating is so rapid that neither the water nor that portion of the metal out of the water becomes very warm.

Wrought iron and steel actually melt if long enough held under the water. A carbon rod subjected to this process becomes amorphous carbon, proving that a temperature of at least 4,000° Centigrade has been reached, and it is stated that with 220 volts pressure a temperature of 8,000° Centigrade has been reached.

There are various theories to account for this phenomenon; but from close observation, it appears to be a case of arc heating. The moment the metal is



plunged into the water it is enveloped in hydrogen gas decomposed from the water. This envelope of gas parts the water and metal, forming an arc, which raises the surrounding gaseous envelope to an enormous temperature; the metal surrounded by this arc is almost immediately raised to the same temperature. A flame of burning hydrogen appears round the metal on the surface of the water.

The principle of the method is the same as that on which the burning of an arc light between two carbon points under water depends. An arc lamp will burn quite steadily under water if the connections are made waterproof; the arc itself requires no protection.

The Patent Congress at Chicago.

In addition to the interesting proceedings noticed in our article on page 242, a paper from the pen of Miss Helen Blackburn, of London, England, was read. This was a historical sketch of the inventions of English women and the patents issued to them by the British government. She said the first patent ever issued was granted in 1617, and twenty years later the first patent was granted to a woman, which was for a preparation of tincture of roses, saffron, etc. It was granted to Amy Everard, and a year later the second patent right was granted to Sara Gerome, who patented the engine for cutting wood into thin pieces for use in making band boxes and sword sheaths. The number of patents taken out by women is increasing rapidly year by year, marking the steps of education, civilization, wealth and luxury. She said that the rapid increase in woman's patents is clear evidence that in the past it had been opportunity rather than faculty that was lacking to place her among the inventors.

Ex-Secretary Noble delivered a very interesting address. He said the remarkable era of discovery and invention now unfolding its marvels and glories was due chiefly to the benign features of the United States government and the spirit of its patent laws. There had been at all times a remarkable union of scientific discovery with advance toward freedom. He spoke of the influence of inventions upon the forms of government and the advancement they made, claiming that they were largely the results of patriotic spirit. In this connection he referred to the large number of beneficial inventions and patents produced during the civil war, declaring that they were the means by which the government was enabled to successfully maintain its army and prosecute the war with the great producing fields of the West and Northwest depleted of men, but supplied with machinery to do the work of the farms.

"Imagine the war of secession," he said, "to have occurred with no railroads, no telegraphs, no improved arms, no Hoe printing presses, and without its most remarkable attachment — the reporters. It would doubtless be going on yet in swamp and mountain, with flint lock and solid shot and a wooden fleet. Where would have been the possibility of this Fair but for the inventions, not of the last 400 years, but of the last century, and even of the last half of the last century?"

General William F. Draper read an address on the "Influence of Inventions on the Cotton Industry," showing how the machinery for gathering and preparing the crop for market and the improvements for its manufacture have been instrumental in making this the greatest cotton-producing country in the world.

Remedy for Toadstool Poisoning.

Captain McIlvaine's recommendation when by mischance any of the poisonous toadstools have been eaten, published by him in the *Therapeutic Gazette*, is as follows: "The physician called upon to treat a case of toadstool poisoning need not wait to query after the variety eaten, he need not wish to see a sample. His first endeavor should be to ascertain the exact time elapsing between the eating of the toadstool and the first feeling of discomfort. If this time is within four or five hours, one of the minor poisons is at work, and rapid relief will be given by the administration of an emetic followed by one or two moderate doses of sweet oil and whisky in equal parts. Vinegar is effective as a substitute for oil. If from eight to twelve hours have elapsed, the physician may rest assured that amanitine is present, and should administer one-sixtieth of a grain of atropine at once."

The atropine should be subcutaneously injected, and the injection repeated every half hour until one-twentieth of a grain has been given or the patient's life has been saved.

Richard A. Proctor.

Richard Anthony Proctor, the astronomer and scientist, died of yellow fever in the Willard Parker Hospital, New York City, on the evening of September 12, 1888, having contracted the disease in Florida. The body was embalmed and sealed in a metallic casket and buried in the family lot of the Rev. Stephen Merritt at Greenwood Cemetery, Brooklyn. His grave remained neglected until a newspaper urged the erection of some fitting memorial. The paragraph came under the notice of George W. Childs, the Philadelphia philanthropist, of the *Public Ledger*. He at once responded to the call and provided an excellent lot in the beautiful Greenwood Cemetery and also ordered a fitting monument of Quincy granite as a proper tribute to the memory of the revered astronomer. The services connected with the re-interment took place on Wednesday, October 4, and were attended by Miss Mary Proctor, eldest daughter of the late R. A. Proctor; Prof. E. Ogden Doremus, Thomas A. Edison, Simon Newcomb, Prof. C. A. Young, Prof. Lewis Swift, and others, as well as the Rev. T. De Witt Talmage, who delivered the eulogy.

The monument is 8 feet high and 5 feet wide. The inscription on the front is as follows:

RICHARD A. PROCTOR,
Astronomer.
Born Chelsea, England,
March 23, 1837.
Died in New York City,
September 12, 1888.
Aged 51 years.
"How good! how kind! and he is gone!"
ERECTED BY GEORGE W. CHILDS.

Upon a polished panel on the reverse side appears the epitaph letter written by Herbert Spencer, the life-long friend of Proctor. The inscription reads as follows:

On public as on private grounds, Prof. Proctor's premature death was much to be lamented. He united great detailed knowledge with broad general views in an unusual degree, and, while admirably fitted for a popular expositor, was at the same time well equipped for original investigation, which, had he lived, would have added to our astronomical knowledge. Prof. Proctor was also to be admired for his endeavors to keep the pursuit of science free from the corrupting and paralyzing influence of State aid.

"HERBERT SPENCER."
1893.

Mr. Proctor did more, perhaps, to popularize the study of astronomy, both as an essayist and lecturer, than any other man. The present monument is a touching tribute to his memory.