



The Electrical Congress was held during the week ending August 26, and proved to be one of the most interesting as well as one of the most valuable congresses that has been held. The work was divided into three sections, "Pure Theory," "Theory and Practice," and "Pure Practice." The third section was by all odds the most attractive so far as attendance was concerned. In addition there was a Chamber of Delegates composed of representatives appointed by the leading governments of the world. All the sessions of this chamber were held in secret and important results were accomplished, which were embodied in a report, especially in the direction of adopting units for electrical measurements. These included the ohm, ampere, volt, coulomb, farad, joule, watt and henry. This last unit derives its name from the eminent American electrician and is the unit of induction. Many valuable papers were read at the meetings of each section, but the discussions brought out even more instruction than did the papers. Long distance transmission received a great deal of attention. The members of the congress received much attention and visited the Exposition to inspect the Intramural Railway and its plant, the movable sidewalk, the Exposition electrical plant, and special features in the Electricity building. An important feature of the programme was a lecture by Nikola Tesla on "Mechanical and Electrical Oscillators," which touched upon new principles in the electrical field.

The live stock exhibit, which opened to the public on August 22, to continue for about three weeks, was a very popular attraction. It included some twelve hundred head of cattle—Short Horn, Hereford, Aberdeen-Angus, Galloway, Devon, Jersey, Holstein-Friesian, Ayrshire, Guernsey, Red Polled, Polled Durham, Dutch Belted, and Brown Swiss; over eight hundred horses, including French Coach, German Coach, Cleveland Bay, Percheron, Clydesdale, Shire, French Draught, Belgian, Suffolk Punch, Hackney, Morgan, Arab, Americo-Arab, French Trotter, and Russian; besides Shetland and other ponies; jacks and jennets, and mules; eighteen hundred sheep and fifteen hundred hogs. The animals were shown in the live stock pavilion, which is in the shape of a large Roman amphitheater, and has seating accommodations for ten thousand people. Forty stables were built by the Exposition in which to house the animals, each stable being 200 by 42 feet in size and provided with modern conveniences. One of the most attractive features of this exhibit was the display of twenty-one horses sent by the Czar of Russia. Some of these horses are almost priceless in value and special attendants were sent from Russia to care for them. Emperor William, of Germany, also sent many fine horses from his stables. The awards in this department aggregated over \$150,000. Fine animals were contributed from Canada as well as from many sections of the United States.

The week ending August 26 was the banner week up to that time, so far as attendance at the Exposition was concerned, as it exceeded 1,000,000. The average attendance for the six days was over 163,000. Illinois day, which was August 24, there were 240,909 paid admissions. Special exercises were held at the State building and there was a large parade. Other special days of the week were West Virginia day, Delaware day and Colored People's day. A feature of Delaware day was the distribution of a carload of luscious peaches.

A prince of the royal family of Japan reached Chicago the last week in August to attend the Exposition. He was in time to be informed of the many awards that the juries are making to exhibitors from his country. No country has, proportionally, made so fine an exhibit as Japan, and it is reaping the benefit now by receiving more awards than any other country.

The great telescope which Charles T. Yerkes has presented to the Chicago University is set up complete, so far as outward appearance is concerned, in the center of the main aisle at the north end of the Manufactures and Liberal Arts building. The part of the instrument exhibited was manufactured by Warner & Swasey, Cleveland, Ohio. It is mounted on a heavy iron column 43 feet high and weighing 50 tons. The polar axis is of steel and 15 inches in diameter, while the declination axis is of steel and 12 inches in diameter. The tube, as now seen without the lenses, weighs 6 tons, is 64 feet long, 52 inches in diameter at the center and tapers toward the ends. Three electric motors of one horse power each control all the motions of the

instrument, and one of these motors automatically winds the driving clock, keeping the tube in exact sidereal time. This instrument was opened to the public with formal ceremonies, many eminent scientists being present.

Foreign commissioners, correspondents and jurors to the number of fifty or more have been given an excursion into the Northwest over the Great Northern and other railways through the wheat fields of Minnesota and South Dakota. The main purpose of this excursion was that these foreign visitors might see the extensive manner in which farming, and especially wheat raising, is carried on in the Northwest. One of the special events of the excursion was witnessing the cutting of an eleven thousand acre wheat field. The trip was carried out with great success and was a revelation to many of the visitors.

In one portion of the Manufactures building the publishers of the principal magazines have taken pains to show what the magazines are made of. Here may be seen the originals of illustrations that have secured fame for their designers all the world over. Nor are the manuscripts less interesting. Some dainty pieces of literature, which one might think had been put on paper with the finest of crow quills, are actually found as though the manuscript was the product of a very blunt stick. On the other hand, there are original manuscripts of important and popular works, like the original copy of "Ben Hur," for instance, so fine as to task the sharpest eyes. When looked at through a magnifying glass, however, the small handwriting is found to be very distinct, each letter being carefully formed and accurately united. Readers of magazines, after trying to decipher the copy of some favorite authors, will ever after gratefully appreciate the services rendered by typesetters and pressmen.

Saturday, August 26, was special day in the Palace of Mechanic Arts, and every machine in the building that could be put into operation observed the day. People crowded the building from early in the morning until late at night, watching the various exhibits; riding on the electric traveling cranes, which had been fitted up with balconies for the purpose; collecting many unique souvenirs of the day, and going about from one special feature to another. The special event of the day was printing a souvenir newspaper. This event began at the paper-making machine, where wood pulp was made into paper. In the meantime compositors were busily at work at the opposite side of the building, setting type with the linotype machine. By the time the paper was made the type was set, and in sixty-three minutes from the time the pulp was put into the machine, souvenir papers were printed. The celebration had many ridiculous features connected with it. One large pump supplied a constant stream of lemonade, and on the lagoon in front of the building sports were carried on, such as climbing a greased pole, hanging over the water, and boat crews battling with each other with streams of water.

Such a profusion of electric lights as one sees in the buildings and on the grounds of the World's Fair has probably never been viewed by mortal man before, so says the *Electrical Review*. Arc and incandescent lamps are everywhere. The white buildings reflect the lights and make the scene as bright as day. On those nights when every lamp is burning, the electric fountains playing, and fireworks are shooting up from the lake, the scene is almost beyond description. No picture can do it justice—it must be seen. The Grand Basin is outlined in living fire, the surrounding buildings glow with light, the massive dome of the Administration building, crowned with electric lamps, rises heavenward in graceful curves, while the electric fountains shoot forth ever-changing sprays of colored water. Involuntary applause breaks forth among the spectators ever and anon, as they sit and stand about in open-eyed astonishment at the grandeur of an artistic accumulation of electric lights.

A very interesting novelty is the Columbus egg, as it is called, shown in the Westinghouse lighting exhibit. On a table on the west side of the space are placed a pair of large induction coils for exhibiting the effects of the two-phase rotary current. A wooden table is placed over these on which metal objects commenced to spin around as soon as placed upon it. Two copper eggs, one small, the other about eight inches long, when placed over these coils commence whirling and soon turn up on the end and continue to whirl. In the room provided for the exhibition of high tension currents a series of transformers and Leyden jars are so arranged as to give heavy discharges over glass and rubber plates.

In the Electrical Palace the electric stoves and cooking utensils are objects of attraction and interest. As they have no pipes, and give rise to no smoke or dust, they readily lend themselves to ornamentation. They can also be placed in any convenient place or position. Some of the stoves are very elegant and would adorn a parlor.

Probably the largest photograph at the World's Fair is to be seen in the gallery of the Mining building. It belongs to the exhibit of the Standard Oil Company.

Among other things are transparencies illustrative of oil works and distilleries, storage tanks, etc., in various parts of the country.

Recently the company had a large relief map made, and the work of securing a good photograph of this on glass was given to J. K. Hillers, of the United States Geological Survey, who is an expert in large photographs. A good sized negative was made of the relief map, and upon a paper print from the negative were drawn the States, lakes, and names. From the print a negative 20 inches square was taken, and from this an enlarged transparency on glass, 7 feet long by 4 feet 2 inches wide, was made.

No ordinary camera could do the work, so the photographer made a camera of a room 12 by 15 feet in size. The room was blackened inside and made light and even air tight. The shutter was placed in the window and the lens in the shutter. Mr. Hillers had three expert photographers assisting him in the work, and they built a silvering vat which used \$250 worth of nitrate of silver, and a developing vat, both in the gigantic camera, so that probably for the first time the camera itself was used as the developing room.

The work was focused on a ground-glass plate, the same size as the photograph. This was done by three men holding the plate and moving it back and forth until the proper focus was secured. Then the sensitive plate was made ready. This was a piece of American plate glass, three-eighths of an inch thick, made and polished for this particular picture. A work of this nature had never before been attempted on such a large scale. Mr. Hillers was obliged to feel his way, for he did not know just how long the plate should be exposed. A test was first made with a small plate, and this gave him an approximate measure of time.

With rare good fortune, the first exposure of the new plate was a success, and a beautiful photograph was secured. Then a specially arranged hose was turned against the big plate to wash away the chemicals. It took an hour to do this. After the toning process came the matter of varnish. This was the critical phase of the operation. The plate was laid on four rubber balls, one at each corner, and Photographer Hillers tilted it while an assistant poured on half a gallon of varnish. Success still remained with him, and the transparency was ready for its colors.

The oil-bearing districts are shown in yellow, and each particular region where oil is actually brought to the surface is shown in the color of the oil itself. It took four months from the beginning, when the first negative of the map was taken, to finish the transparency. It is valued at \$5,000.

A New Yorker's Impressions of the World's Fair.

Taking the fastest express from New York for Chicago, going in twenty hours, as comfortably almost as if in one's drawing room, the World's Fair city is reached without any appreciable fatigue or discomfort.

In entering the city of Chicago, much time is lost because the tracks run through a traveled street at grade, requiring a very slow speed. To a New Yorker, accustomed to the rapid speed on the Park Avenue viaduct and tunnel, this was especially noticeable.

In approaching the city, as most of the roads do, from the foot of Lake Michigan, the first glimpse of the roofs and domes of the Fair buildings is obtained, and an idea of their magnitude is realized. Landing in the city, one is struck with the peculiar smokiness of the atmosphere and the dinginess of all the buildings, the sunlight having a sort of yellowish cast. There is a special league in Chicago organized to stop the smoke nuisance, which by constant agitation is expected to bring about an improvement. By the general use of electricity as a motive power, great changes may some day be accomplished. But the smoke is now tolerated, as a Chicagoan says, because the fuel is cheap, and is thereby one of the means of enabling the factories to prosper.

The court or finest general view of the World's Exposition is acknowledged to be from the lake. It is really the front view of the aggregation of buildings, and is very impressive. Starting from the foot of Van Buren Street in the large whaleback steamer Christopher Columbus, a delightful sail out on the lake and parallel with the shore for about eight or nine miles supplies a continual panorama of interest.

One observes the swift and frequent so-called "cattle trains" traversing the Illinois Central tracks close to the lake shore; then the large substantial hotels surrounding the north end of the grounds are seen, and beyond, close to the domes and turrets of the foreign buildings, is a big, tall, unsightly blotch of a building inclosed in black scaffolding, called the "Spectatorium," located close to the water's edge. But when this is passed the long facade of the Palace of Liberal Arts facing the lake, the pier, the Peristyle, and through it the gilded dome of the Administration Palace, the Agricultural Palace, and glimpses of the Court of Honor are observed, with an ensemble and symmetry of architecture that is grand and imposing.

At the pier the first novelty to be seen (after passing

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A New Yorker's Impressions of the World's Fair.

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the admission gates) is the endless sidewalk railroad operated by electricity, which extends over the entire length of the pier. For five cents a person may ride upon it all day if desired. In approaching the buildings from the pier, the splendid group of statuary surmounting the Peristyle appears in strong relief against a blue sky, while the other single statues on either side and underneath form an appropriate setting or surrounding. Once the Peristyle is reached, the massiveness of its three rows of columns becomes apparent and the solid pavement underneath brings one to a realizing sense of Venice. A paved arched bridge is provided in the center of the Peristyle over a narrow waterway which connects the basin of the Court of Honor with the lake. Steam launches pass through this and under the bridge in going from the Court of Honor to the lake. The Peristyle fronts directly on the lake, making a pleasant place to sit on a hot afternoon, as the cool breezes from the lake draw through between the columns.

After crossing the floor of the Peristyle inward, the first unobstructed view of the various buildings in their majestic proportions is had. Close to the spectator at the lake end of the Court of Honor, isolated on a pedestal rising out of the water, is the mammoth gilded statue of the Republic, facing westward toward the Administration building, which causes the statue to be seen first from the back. The statue is 60 feet high and cost \$25,000. The two arms are raised upward parallel with each other, one hand holding a flag and the other a staff with a liberty cap on it. It is very imposing and can be seen from nearly every point of view. To the right of the Peristyle as one enters from the lake is the Palace of Music, decorated with statues of heroic size to correspond with those on the Peristyle. This palace is 130x250 feet in size and its interior construction is so perfect that it is said to possess the finest acoustic properties for orchestral purposes of any hall in the United States; 2,500 persons can be seated in it. It is here that Theodore Thomas held his daily concerts, which were so little appreciated by the general public. At the other end of the Peristyle, opposite and symmetrical with the Palace of Music, is the Casino, in which a restaurant is located equal in every respect to those of New York. On the south side of the Casino, secured to the wharf, is the famous Santa Maria, a complete copy of the Columbus ship, and it is usually crowded with visitors.

There is another direct connection here with the lake. The huge Palace of Agriculture stands west of the Casino, and the waterway between the two is bridged over. Right near the Santa Maria, secured to the dock adjoining the Agricultural Palace, are the other caravels of Columbus, the Nina and Pinta, admittance to which is refused. On the other side of the water, opposite these vessels, standing apparently on an island, is the reproduction of the La Rabida monastery, containing many interesting relics of Columbus. This building contrasts strongly in its simplicity with the grand architecture of the adjacent buildings. Passing westward along the south side of the basin, directly in front of the long facade of the Agricultural Palace, an excellent view of the Palace of Liberal Arts, bounding the opposite side, is obtained, and also glimpses of the Palaces of Electricity and Mining, while at the extreme western end the stately gilded dome of the Administration building looms up as a fitting background and center for so many buildings. The bright greenward between the walk in front of the buildings and the pier line, relieved at boat landings by massive white statues, forms a pleasing contrast with the white of the buildings.

Walking still westward until the west end of the Agricultural Palace is reached, another waterway is seen at right angles to the length of the basin, and parallel with the lake front. Looking south, the Columbus monument and colonnade, imitating somewhat the Peristyle, is seen, and north is observed in the distance the Wooded Island and the dome of the Illinois State building, while the long western facade of the Palace of Liberal Arts shows its size to advantage.

Standing in the open plaza directly in front of the Administration building, at the western end of the basin, the expensive and grand MacMonnies fountain (called the Columbian fountain) is the most conspicuous object; its odd shape and curious combination of picturesque statuary mark it truly as one of the chief works of art in the Exposition. The color is white like the buildings. On each side of this fountain are two large electric fountains whose basins are sixty feet in diameter.

In the daytime these fountains do not present any attractiveness, but at night the multi-colored illumined fountain is particularly beautiful. On the eastern porch of the Administration building, facing the basin and lake, is St. Gaudens' beautiful statue of Columbus in heroic size. The view from the balcony of the eastern porch of this building is particularly pleasing, bringing in, as it does, the fountains, the basin, lined on each side with beautiful green lawns, and the artistic facade of the Agricultural Palace,

while in the distance can be seen the statue of the Republic and the lake through the columns of the Peristyle. South of the Administration building stands the immense Palace of Machinery, with its long row of Corinthian columns, and on the north are the Mining and Electrical Palaces, simple but harmonious in shape and idea with the other larger buildings. In the porch of the Electrical Palace is a beautiful statue of Franklin drawing electricity from the clouds. West of the Administration building is a large open space, bounded by the Central Railroad depot, an imposing building and very large. In the gallery of this building is a spacious writing room, equipped with every facility for correspondence. The building seemed to be too large for the purpose, and there was much waste room. Just west of this are the train sheds for thirty-five tracks, having accommodations for thousands of visitors. Not more than one-third of the tracks were in active use. Coming to the Fair in this way, *via* the Illinois Railroad, the visitor is landed close to the Administration building, and has for a first view the delightful vista of the basin and lake from the eastern porch of that building.

The aluminum bronze dome of this building, shining like gold, looming up 275 feet above the ground, can be seen from a great distance, and is particularly conspicuous at night when covered with rows of hundreds of incandescent lights. The designers have allowed ample space between the buildings properly to show them off, and while apparently near together, as observed by the eye, they are in reality separated some distance apart, as can be proved by attempting to walk from one to the other.

One noticeable difference from the Centennial Exposition in 1876 is the absence of cheap and rapid communication between these large buildings.

Electricity is used so successfully in propelling boats about the lagoons and canals that it is surprising electric carriages were not introduced to take visitors about the grounds for a small sum. The need of such simple, direct transportation should have been thought of. The only method adopted is the use of rolling chairs, to be hired at 50 cents per hour, or electric launches at 50 cents a round trip. The rolling chair privilege has proved to be somewhat of a failure, thousands preferring to walk rather than pay the high figures. At Philadelphia one could reach any building for five cents by frequent trains. In my next some of the notable exhibits will be described.

MEETING OF THE AMERICAN ASSOCIATION AT MADISON.*

The concluding portion of Dr. Hovey's report is as follows:

BILOXI INDIANS, OF LOUISIANA.

Prof. J. O. Dorsey, chairman of the Anthropological Section, described a peculiar tribe of aborigines that he visited in 1892 and 1893 for ethnological study. He said that the name "Biloxi" was a corruption of the name they gave themselves, and which simply meant the First People. They were known to have lived in 1669 at Biloxi Bay, Mississippi; but in 1763 they removed to Louisiana, and of the entire tribe only seventeen individuals remain alive. They formerly existed in three divisions, named for the deer, the grizzly bear, and the alligator, and each of these branches refused to eat the meat of the animal whose name they bore.

Among social peculiarities may be mentioned the fact that a Biloxi cannot marry his wife's aunt or niece, but might marry her sister, differing in this from the Sioux and other tribes. They hold to a form of transmigration. For instance, the spirit of a deer revived and took the body of another deer. Thunder stories should only be told on a fair day. Hummingbirds always tell the truth, and signs from them are regarded as sacred. Various superstitions were described. The Biloxi language appears to be the oldest of the Siouan family. There are linguistic proofs that the Biloxi, Hidasta, Tutelo, and Winnebago dialects were offshoots from a parent stock, or at least that those speaking them dwelt near each other. But by careful investigation it appears that 1,500 years must have elapsed since their separation, and that it took place in Virginia. In this connection, the fact may be mentioned that Dr. Washington Matthews entertained the section by rendering speeches, war songs, and sacred songs of different Indian tribes, by the aid of the phonograph. He had his own cylinders. His account of the difficulties of inducing the Indians to speak or sing into the instrument were amusing.

BEAR AND WOLF STORIES.

For forty years Prof. W. H. Brewer, of Yale College, has been a steady attendant on the meetings of the A. A. S., and always has something bright and original to say. This time his theme was the instinctive interest children take in stories about bears and wolves. Nothing can be told them about lions, tigers, leopards, or cats that so fascinates them as the class of stories named above. He has repeatedly experimented on this matter with very young children, even as young

as five years, and has never found their interest to flag as long as he was willing to talk about bears. He told a child five years old a story about a grizzly bear that fed on the carcass of a whale near his camp on the Pacific coast, and when he saw that boy a year later he climbed on his knee and demanded the same story over again. Bear stories never grow old. Children may forget about Samson and the lion, but never about the she bears that revenged the bald-headed Elisha. To some extent the same interest is manifested in wolf stories, *e. g.*, the fascinating tale of "Little Red Riding Hood." Now, why is so much interest taken in these animals? Two explanations may be offered. One is that it is entirely a matter of education, due to the consecutive traditions of the nursery, and the place they have in juvenile literature. The other is that this interest is instinctive. The latter is the true explanation. The origin of instinct is a mooted question among naturalists. Most evolutionists have held it to be due to the inheritance of acquired experience, memory, habits, and ~~instincts~~. This is now denied by naturalists of certain schools, but held to by others. Our own belief is that the matter now considered belongs to inherited memory. Bears and wolves have been the most destructive of all wild beasts known in our latitude and climate. The destruction of children by these animals in parts of Europe is still more remarkable. Formerly it must have been very great, and must have made a permanent impression on the mind. We know that several of our finest breeds of dogs were originally evolved as wolf dogs. The fear inspired by bears and wolves in the childhood of our civilization, and the education of successive generations in this fear, descends to us as an inherited memory, or instinct, of sufficient force to impart a fascination to all stories about them.

Among papers read in other sections the following may be named as attracting special attention: "Natural Gas from New Lisbon, O.," by W. A. Noyes. "A Tempered Steel Meteorite," by E. Goldsmith. "Negative Lightning," by W. LeConte Stevens. "The Rotating Disk in Photometry," by E. S. Ferry. "The Latitude Variation Tide," by A. S. Christie. "Automatic Fire Sprinklers," by D. S. Jacobus. "Use of the Name 'Catskill' in Geology," by Prof. J. J. Stevenson. "The Fossil Sharks of Ohio," by E. W. Claypole. "Photography as Applied to Recording Micro-organisms in Artificial Cultures," by G. F. Atkinson. "Lichens of the Black Hills," by T. A. Williams. "The Roots of Orchids," by Prof. M. B. Thomas. "Relations of Production and Price of Silver and Gold," by Henry Farquhar.

The total number of lectures, addresses and papers read this year was 179, many of which were doubtless as interesting as those that happened to arrest the writer's attention. All the more important ones will appear in the published proceedings of the society. Nothing more is now attempted than to give a kind of bird's eye view of the great annual gathering of men of science, and some idea of what they talked about. The entire number in attendance as registered was 290, a less number than has usually been enrolled. It had been hoped that the proximity to Chicago and the World's Fair would attract a larger number; but the reverse has proved to be the case. So many congresses of one kind or other, and such diversified objects of interest at the Fair as may there be seen, served to draw away from the meeting at Madison.

Grateful mention should be made of the charming hospitality shown by the citizens, the faculty of the University, and the State officials. Never on any previous occasion has the Association had such ample facilities of every kind at its disposal, and such quiet yet spacious quarters for its sessions. The illumination of the lake shore on Monday evening was as grand as could well be imagined. The various excursions to localities of interest were well planned and admirably managed. Among the points thus visited were the Effigy Mounds, along the shores of Lake Mendota; the Driftless Area of Wisconsin; the singular walled lake known as "The Devil's Lake;" the various kames, eskers, and drumlins telling of the ice age and its results; and most wonderful of all, the picturesque and instructive Dalles of the Wisconsin.

The principal officers chosen for the next meeting are: As president, Prof. Daniel G. Brinton, of Media, Pa.; vice presidents, Section A, G. C. Comstock; Section B, W. A. Rogers; Section C, T. H. Norton; Section D, Mansfield Merriman; Section E, Samuel Calvin; Section F, S. H. Scudder; Section G, L. M. Underwood; Section H, Franz Boas; Section I, Harry Farquhar. The office of permanent secretary is held by Prof. F. W. Putnam; Prof. H. L. Fairchild, of Rochester, N. Y., is general secretary; and Prof. J. L. Howe, of Louisville, Ky., is secretary of the council. The treasurer of the association is Prof. William Lilly, of Mauch Chunk, Pa. The next meeting will be held in some Eastern city, probably in Brooklyn, N. Y., although it is not yet determined.

The total cost of the Suez Canal exceeded £20,000,000.

* Continued from the SCIENTIFIC AMERICAN of September 2, page 147.