

Correspondence.

The Water Power of Augusta, Ga.—A Correction.
To the Editor of the Scientific American:

In the SCIENTIFIC AMERICAN dated February 3, 1894, on page 67, top of first column, subject "Niagara Hydraulic Works in Operation," kindly allow me to correct an error.

You refer to \$8 per H. P. per year, 24 hours to the day, as being the cheapest power ever obtained [said to be].

The city of Augusta, Ga., has been for years, and still is, furnishing thousands of H. P. to all who want it at the rate of \$5.50 per H. P. per year of 24 hours to the day, or 25 hours per day if necessary. A magnificent canal 7 miles long, with masonry dam across the Savannah River, furnishes at present about 12,000 H. P. to cotton, flour, yarn, and other kinds of mills, electric street railroad, electric power plants, electric lighting plants, and other uses, with a capital invested of about \$8,000,000 or \$9,000,000.

Augusta, Ga.

W. E. JACKSON, JR.

Winding a Motor for 110 Volts Potential.
To the Editor of the Scientific American:

Having seen on different occasions inquiries about speeds of motors as published by you in the SCIENTIFIC AMERICAN, I have built one as described in "Experimental Science," page 494, following all directions except the wiring. I wired the field with five pounds of number eighteen single-covered cotton wire, and the armature with fifty feet of number twenty-two silk-covered wire. As a motor it is quite a success. I attached it in a circuit of 110 volts in series with a fifty candle power thirty-five volt lamp, had it running over five hours at a speed of fifty-five hundred revolutions per minute. As a dynamo it will light an eight candle power lamp by putting in as a shunt between the two binding posts about twelve inches of number thirty iron wire. Hoping that this will be of some information to the young readers of the SCIENTIFIC.

PAUL J. CHASSAGUE.

Akron, O.

Copying from Nature.

That the designer who copies from nature is the one that attains success most readily cannot be doubted, says the *Commercial Bulletin*. The days of copying from old designs are fast going, and now the designer who would keep up with the times must be as original as possible. This has been said many times before by many writers. The most unique method of designing direct from nature, thus assuring originality, is a way which your correspondent has had explained to him recently by one of the designers in a Lawrence mill. This man has designed fancy figured effects for intricate shawl patterns for many years. Since the advent of the demand which calls for a closer imitation of nature in designing, this man has found it to be advantageous to copy from flowers. His ability to copy offhand from a flower model is deficient; so the man does like this: He gets a bunch of roses, or a twig of leaves and buds, and places these upon his design paper. A light pressure with his hands flattens the objects upon the paper sufficiently to permit a true outline to be made of each leaf or flower. This outline he makes by the use of a pencil. Then he is sure of getting the correct forms of the figures. After he has made the outline of each leaf and flower, the bunch is removed and he proceeds to fill in the shapes. Then he checks off the risers and sinkers according to the outlined forms, and thereby is sure of getting the correct shapes of the objects into his design. This appears to be quite a novel way of copying from nature. Any one can do this.

A Rooster in the Pulpit.

On a recent Sunday morning, so says the *New York Tribune*, "the Rev. Dr. Tyndall, of the Broome Street Tabernacle, in this city, decided to preach a sermon to his flock showing how the devil hypnotizes people. And it occurred to him that some striking illustration of this fact in demonology would be very impressive. Of course, the best possible illustration would be the devil himself shown in the act of hypnotizing; but for many reasons the doctor was unable to secure the services of that nether personage. He has, however, been illustrating his sermons for some months past and is, therefore, not easily daunted. So he procured a large, able-bodied rooster, and at the proper point in his sermon placed it on a horizontal blackboard. Then he held its bill down on the board, and from it drew a chalk line. The incident mightily puzzled the rooster, which stood in a trance, looking at the doctor, who then announced that sinners were hypnotized by the devil in just the same way. While this illustration doubtless impressed the preacher's point on the people, it is open to one criticism. It made it necessary for Dr. Tyndall, for the time being, to enact the part of the devil, a character which we are sure is abhorrent to that good man's nature."

Wild Camels in Arizona.

The camels now running wild in Arizona are the descendants of a small herd originally imported for use in the State of Nevada. In the early days of mining on the Comstock, long before there were any railroads in the Great Basin region, it was thought that camels might be profitably used about the mines, particularly in packing across the surrounding deserts, and twelve "ships of the desert" were accordingly purchased and brought to Virginia City. They were wanted for use in packing salt from the Salt Springs salt marsh to the Comstock reduction works. This salt deposit lies far out in a desert region, and to reach it many waterless stretches of sand and alkali had to be traversed.

The camels were able to cross all the deserts in perfect comfort, carrying heavy loads of salt and finding means of subsistence in the prickly and bitter plants and shrubs everywhere to be found in abundance. In short, the animals did as good work here in our deserts as they are able to do in any country in the world, but they were too slow. The camel may be fast enough for an Arab, but he is too slow for an American.

When the occupation of the camels as packers of salt was gone they were sold to some Mexicans, who used them for a time in packing wood down out of the mountains. The Mexicans took them up rocky trails into the rugged hills and used them the same as they used a mule—unmercifully. They soon killed three of the wretched beasts, and would have killed the remainder had not a Frenchman, who owned a big ranch on the Carson River, below Dayton, taken pity on the poor, abused creatures and bought the whole of them. This Frenchman had been in Algeria with the French colony, where he had developed an affection for the camel—probably owed the animal a debt of gratitude for having saved his life on some occasion. He had no use for the beasts, therefore turned them out to roam the desert plains at will.

The animals, left to shift for themselves, soon waxed fat, and increased and multiplied. In a few years from nine the herd had increased to thirty-six, old and young. The Frenchman then sold the whole lot to be taken down to Arizona to be used in packing ore down off a big mountain range. It was said there was a good smooth trail, but the animals found all the rocks and soon became footsore and useless, when all were turned adrift to shift for themselves. They have regained the instincts of the original wild state of their species and are very wary and swift. They fly into waterless wastes impenetrable to man when approached. Some of the old animals, however, occasionally appear in the vicinity of the settlements. Of late it is reported that the cattlemen have been shooting them for some reason, perhaps because they frighten and stampede their horses. No one knows how many camels are now running at large in the wilds of the Gila country, but there must be a great number. One is occasionally caught. Four years ago one was captured near to Gila Bend that measured over nine feet in height. It appeared to be a stray from one of the herds in that region.—*San Francisco Chronicle*.

An Easy Method of Keeping Warm.

I should like to call attention to an easy method of warming one's self when other and more common means are not available. It is a method that I suppose is well enough known to the profession, but probably not often used. I allude to warming the body by merely taking deep inspirations.

On one very cold afternoon of this winter, though walking briskly along, I was uncomfortably cold; feet and hands were very cold, and my ears so chilled as frequently to require the application of my heavily gloved hands. In addition, the whole surface of the skin was unpleasantly chilled; "creeps" ever and anon running up and down my spinal column and radiating thence over the body and extremities; in short, a condition that every reader of this little article has doubtless many a time experienced. I then began taking an exercise often employed before with benefit; deep forced inspirations, holding the air as long as possible before expulsion. After a few inhalations the surface of my body grew warmer, and a general sense of comfort pervaded me. Continuing, the next to feel the effects of the effort were my previously frigid ears; they grew agreeably warm, and within the time required to walk three blocks, at the previous pace, hands and feet partook of the general warmth and I felt as comfortable as if the same length of time had been passed by a glowing fire.

The happy results obtained from this simple method are probably owing to several causes:

The cold of course chills the surface of the body and contracts the superficial blood vessels, usually affecting first hands, feet and ears, and afterward the general body surface. Contraction of the blood vessels results both in less blood to the part and in stagnation of the current, thus rendering the tissues still less able to resist the cold. Deep forced inspirations not only stimulate the blood current by direct muscular exertion, but also by compressing and expanding the lungs the flow of blood is greatly hastened through

this organ, and on account of the increased amount of oxygen inhaled, this abundant supply of blood is thoroughly oxygenated, tissue metabolism is increased and more heat necessarily produced.

Many times unavoidable exposure, as in riding, driving, standing and the like, for a longer or shorter time in the cold, has been the cause of severe and even fatal congestive troubles, such as pleurisy and pneumonias, and a means of quickly stimulating the flagging peripheral circulation which a person has always with him, and which can be employed without moving a step, is one that ought not to be neglected or forgotten.—*E. B. Sangree, M.D., American Therapist*.

THE ANTWERP EXPOSITION.

The International Exposition of Industries, Arts, and Sciences, under the patronage of Leopold II., King of the Belgians, opens at Antwerp May 5, and continues until November 12. The exposition promises to be one of importance and interest. As may be seen from the birds eye view herewith given, the exhibition will be extensive. It will include industrial, scientific, and artistic productions, as well as all kinds of commercial produce, embracing, in fact, the whole range of human activity. It will comprise maritime, colonial and African sections, also an exhibition of military art. Simultaneously with the general exhibition, the Antwerp Royal Society of Fine Arts will hold a special exhibition of painting, sculpture, engraving, and architecture, to which artists of all countries are invited to contribute. It is also intended to hold a series of shows and exhibits of livestock, agricultural products, flowers, fruit, etc., under special regulations.

The exposition is located in the new quarter of the city, near the river Scheldt and the new maritime installations. It covers an area of about 200 acres, and is connected with the principal railways. The main buildings are extensive, covering some 1,100,000 square feet, and include halls for exhibiting industrial and commercial products, machinery, and electric appliances; also a festival hall, measuring some 54,000 square feet. The exhibition halls are built of iron and steel, and are roofed with zinc. Various other constructions will be erected in the gardens; in the grounds will be displayed trees, shrubs, and all kinds of products unsuitable for exhibition in the principal halls.

The American sections of the exposition are as follows: In the industry building, 60,000 square feet; electricity building, 30,000 square feet; machinery building, 30,000; American building, 12,000 square feet for exhibits in models or small articles; 14,500 square feet divided into rooms for States and government exhibits.

The United States has been recognized by the appointment of Stanislas H. Haine as vice-president of the exposition, and he is sent as a special commissioner to this country.

The American Propaganda has also been formed as official agent of the Antwerp Exposition. It will endeavor to secure a creditable representation of American industry, and collect and install exhibits as well as disseminate information.

The American building at the Antwerp Exposition is modern Renaissance in style. Its dimensions are 240x150 feet. The main facade on the south side will be one of the most beautiful in the exposition. The approach is by a broad marble stairway, which lead up to the grand vestibule, 110 feet wide. From the floor of the vestibule one can obtain a view of the entire exposition hall, which occupies the center of the building and covers 12,700 square feet. To the rear of this main exhibit hall will be a model shoe factory. On the east front, where there will be a separate entrance, the entire space has been divided between the rooms for the press and a commercial room, where catalogues and literature of exhibitors will be available for distribution.

The second floor is in reality a gallery surrounding the main Exposition Court, which is open to the dome. From this gallery a view may be had of the models on exhibition below, and access is given to the exhibit rooms of the various States which will be there represented. The largest of these exhibit rooms, which is 40x82 feet, is devoted to the United States government.

A triangular space near the building will be used as a fire station. The station will be fitted up with the latest electrical devices, fire alarms, and other devices for fighting fire. In this annex will also be an ambulance wagon.

In the center of the main hall will be an illuminated electric fountain. A band of twenty selected musical instruments will be stationed in the balcony. The entire building will be of iron, steel and glass.

For the foregoing and the illustrations we are indebted to the *Graphic*, Chicago, and for the following to *Engineering*, London: The buildings are continuous, and consist of a vast hall intended for the display of industrial arts; from this the visitor passes into a smaller building, devoted to electricity, and over a raised corridor into the Machinery Hall. None of these buildings are monumental in their proportions, or even

elaborate in their design. There is, indeed, a certain amount of decoration on the long low facade that forms the principal front facing upon the beautiful Avenue du Sud, one of the great boulevards of Antwerp. But no money has been spent upon ornamental effects. The roofs are all small in span and simple in construction, the result being a long series of well-lighted galleries, unobstructed by heavy columns or the springings of massive arches.

A concert hall forms a part of the main buildings.

This is an old and very spacious structure, having a seating capacity for about 5,000 persons, and in it, musical performances and temporary exhibitions will be held during the summer.

The main buildings cover an area of 25 acres, or about one-third of that occupied by the thirteen great structures at Chicago. A sufficient part of the 200 acres constituting the park will be set aside for the landscape gardener, but much of it will be absorbed by important buildings and many pavilions; the inevitable Rue de Caire shall, it is intended, eclipse that of the Midway Plaisance in Chicago; there will be a panorama, a Turkish village, a Chinese bazar, a captive balloon, an

its highest pitch in this quarter of the exhibition, for not only will the houses be perfect in every detail, but the most minute care will be exercised in the dresses of all the occupants of these houses, where the pursuits of the sixteenth century will be carried on. Here also will be held many of those gorgeous historical fetes and processions for which Belgium is famous.

Vibrations of Tall Buildings.

During the recent storm in Chicago, when the ve-

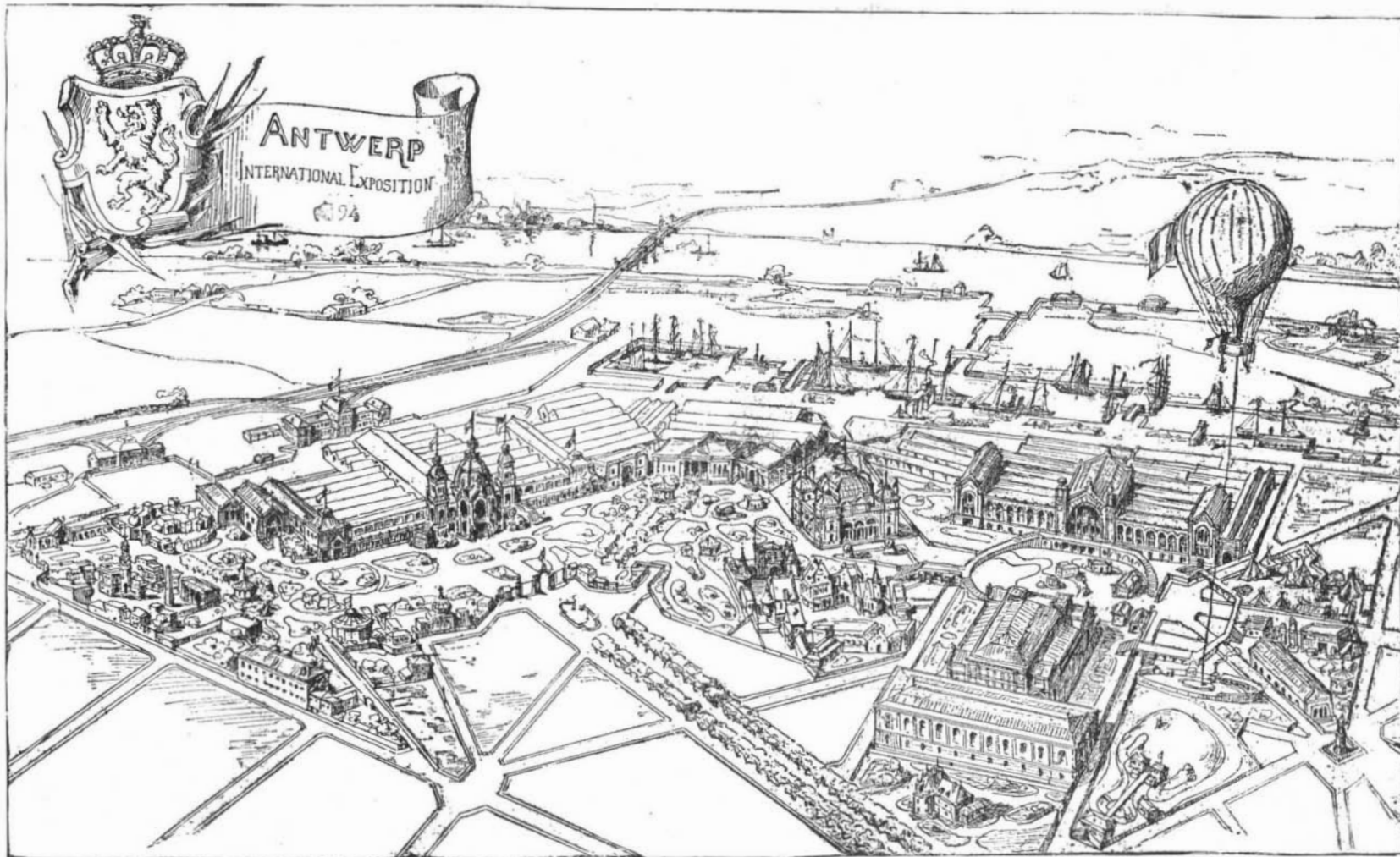
and the plumb-bob itself vibrating just above a drawing board placed on the second floor. The curve here traced was a circle one-half inch in diameter. The plumb-bob was then suspended in the south air well, extending from the seventeenth to the second floors, and the observed curve was elliptical, the major axis being north and south and seven-sixteenths inch in length and the minor east and west with a length of three-eighths inch. In the Pontiac building the same plumb-bob hung in the freight elevator shaft from the

fourteenth floor gave an elliptical curve with a major axis one-fourth inch long and extending east and west, the north and south axis being three-sixteenths inch. Observations were also taken in the Monadnock building with a transit sheltered so as to be unaffected by the wind. The one taken in the northwest corner showed a vibration of one-fourth inch and that in the southwest corner an average vibration of one-fourth inch with a maximum of one-half inch.

The Monadnock building is 400 feet by 67 feet and 182 feet high, the largest dimension being in the north and south line. The north half is built of heavy masonry, while the south half, being of more recent



THE AMERICAN BUILDING OF THE INTERNATIONAL EXPOSITION, ANTWERP.



BIRD'S EYE VIEW OF THE ANTWERP EXPOSITION.

Indian village, and so forth, but the chief of these outdoor attractions will be the Congo Settlement and the reproduction of old Antwerp. In the former will be brought together such a collection of realistic objects as shall give a clear idea of the great district in Africa in which the Belgians take so profound an interest. In the Antwerp of the sixteenth century will be presented reproductions, complete in every detail, of no less than ninety famous old buildings associated with the varied fortunes of Antwerp during the last 300 years. Realism will be carried to

locality of the wind as observed at the United States Signal Service station was as high as 84 miles an hour, observations were taken of the vibrations of the Monadnock and Pontiac buildings by Mr. W. L. Stebbins, civil engineer. An exceedingly sensitive level in which one division on the scale shows a variation of five seconds was set up on the eleventh floor of the Monadnock in Mr. Stebbins' office, and the time of the vibrations was observed to be about two seconds. A 14 ounce plumb-bob was then hung in the north air well, the point of suspension being on the sixteenth floor,

construction, is a steel framework, with light walls. It may be noticed that the greatest vibration of the south half was in the direction of the length. The Pontiac is of steel frame construction, and is 100 feet by 68 feet and 175 feet high, the length being in the same direction as that of the Monadnock. The wind during the storm was northeast.

ACCORDING to careful estimates, three hours of close study wear out the body more than a whole day of hard physical exertion.