WORLD'S COLUMBIAN EXPOSITION—ENTRANCE TO THE PALACE OF AGRICULTURE BUILDING.

The glory of the Exposition is the Court of Honor, and the glory of the Court of Honor is the Agricultural building. Situated on the south side of the great basin, it extends from the south canal nearly to the Casino, a distance of 800 feet. The building is 500 feet wide, and the cornice line is 65 feet above the grade of the walks. Architecturally the Agricultural building is one of the most successful in the inclosure. The architects were Messrs. McKim, Meade & White, of New York, who are so well known as the architects of the Madison Square Garden, in New York. The building is classical, and of an order designated as heroic by the architects. Pavilions are reared at each corner, and from the center of the building, the center one being 144 feet square. We illustrate one of the corner pavilions surmounted by a dome on which is a group of maidens of heroic size, called the Horoscope Group. These figures are represented as holding aloft a globe about which is a zone with the signs of the zodiac. The figures are made of staff, while the globes are of sheet copper. Each corner pavilion is surmounted by a group representing a distinct race, one the Caucasian, another the Mongolian, the third the Ethiopian, and the fourth the American Indian. Huge Corinthian columns 50 feet high and 5 feet in diameter support the pediment over the porticos. The dome over the main entrance, which is one hundred feet in diameter, is surmounted by St. Gaudens' statue of Diana, formerly in New York. On each corner pavilion are two reproductions of what are called the Four Seasons, making altogether eight of these groups. This group consists of four female figures representing the four seasons of the year, spring, summer, autumn, and winter. They are set back to back with their arms outstretched for sheaves of wheat extended above their heads.

We have already illustrated the large cattle group in our issue of April 29. From what has been said it will be seen that the decorative scheme of the Agricultural building takes its motive from agriculture, and primarily American agriculture; this is no less true when the minor decorative work is considered, maize, the potato, tobacco, etc., being freely used as decorative motives with excellent effect. The painted decoration in the entrance porticos is the work of Mr. George W. Maynard, of New York, who chose the Pompeian style of mural decoration as the best one adapted to the severely classic outlines of the Agricultural building. Mythological deities and figures representing "Abundance," "Fertility," etc., were chosen. The little bit of color adds greatly to the success of the general effect. We give some details of the other pieces of sculpture on this beautiful building, the description being taken from a former issue.

"On the exterior walls of the building, in strong relief, are fifty-four single figures of the Angel of Abundance holding a cornucopia which is overflowing with the fruits of the harvest. These figures are clothed in loose flowing robes and are classical like the others. Between the springs of the arches of the north, east, and west sides of the building are twenty-two more single figures in relief representing a female classically clothed, holding in her hands the signs of the zodiac. On the east front there are two spandrels, also two on the west and one on the north side. Four of these are the same. The two on the west side are immediately under the Horoscope Group and represent a pastoral scene of a shepherd with a crook in his hand, sitting on the right with two ewes and a lamb. The other spandrel represents the triumph of Ceres, and is on the north front. Ceres, the central figure, is represented as standing erect, holding a sheaf of wheat in her left hand and a shepherd's crook in her right. Further down on the pediment are other reliefs. On the left is a reproduction of Flora, Bacchus, and other mythological deities seated in a chariot drawn by two tigers. Over against this relief on the right hand is a figure of Mercury and pastoral deities in a car drawn by two dragons. The statuary is all the work of William Philip Martini, of New York, with the exception of Diana, which is the work of Mr. Augustus St. Gaudens."

The total cost of the building was $618,000, including the annex, which measures 312 by 550 feet.

In the interior thirty-seven States of the Union and thirty-five foreign nations exhibit agricultural products. Here may be found models of breweries with a capacity of one barrel of beer a day, exhibits of corn, maize, wheat and the complicated machinery used in their cultivation. Preserved meats, Apollinaris water, dairy products, sugar, bread, tea, coffee, spices, vegetable fibers follow one another in quick succession as the visitor hurriedly passes down the long avenues. Some of the oriental countries make choice exhibits, and here may be seen some of the possible uses of the bamboo.

In the galleries are attractive exhibits of well known food products, Quaker oats, Kingsford's starch and Maillard's chocolate and a thousand and one food preparations, with which we have been familiar from childhood, stare us in the face.

The exhibits are shown in a choice setting, and the marvelous beauty of the white building makes a lasting impression upon the memory.

Argentine or Silver Paper.

A substance known as argentine has been introduced in Germany for making the so-called silver paper, which is used instead of tinfoil as a packing material. It is a finely-divided form of metallic tin, also known as tin dust, of such a texture as to become an extremely fine powder, which must be perfectly uniform in grain, of a bright metallic gray tint, and entirely free from crystalline particles. The author was for some time in charge of a manufactory of this article, and introduced some modifications in the process, which are described. The raw materials of the manufacture are tin, hydrochloric acid, and zinc. The first may be used in the form of block or grain tin, but generally waste materials, such as bearing metal turnings, which are obtained from railway repairing shops in large quantity, are preferred. These are very variable in composition, including both white and red metal, with the proportion of tin varying from 27·6 to 74·5 per cent. The solution is effected by boiling the alloys with hydrochloric acid in large copper vessels, taking care to keep the stanniferous material in large excess, under which condition the copper is not attacked, while the greater part of the tin dissolves, lead, copper, and antimony remaining wholly or partially undissolved. The solution is filtered through a layer of sand in a hard-wood tub with a double bottom, where the lead chloride contained in the hot liquor crystallizes out on cooling. The residues are passed on to another establishment, to be used in making copper and antimony preparations. The purified solution, consisting essentially of stannous chloride, with traces of antimony, lead, and iron, having an average density of 40° B., corresponding to about 23·5 per cent of tin, is diluted from one to two hundred times its volume of water, and transferred to large vats in which plates of zinc are suspended, when, if all conditions are right, the tin precipitates as a uniform gray mass, rendered spongy by the simultaneous evolution of hydrogen, falling, when dried and rubbed through a sieve, to a fine dust.

The precipitate is removed every day, fresh liquor is added, and the process is renewed until the zinc chloride solution remaining has reached a strength of 20° to 25° B., when it is removed and concentrated to 50°, corresponding to a strength of 52 per cent of chloride of zinc. This is readily sold, as it is extensively used for preserving railway sleepers. The finished product should be as nearly as possible pure tin. An average sample analyzed by the author contained: Hygroscopic water, 0·83 per cent; lead, 0·6 per cent; zinc, 0·83 per cent; the remainder being tin, with small traces of iron, chlorine, and antimony.

As the silver paper is used in wrapping up provisions, the tin dust used in its preparation must not, according to the sanitary laws of the German empire, contain more than 1 per cent of lead.

In the year 1890 the price realized varied from 7*l.* to 7*l.* 10*s.* per cwt.

Formerly silver paper was made by covering ordinary white paper with a priming of white lead and size, upon which either silver leaf or tinfoil was cemented. At present this has been almost entirely replaced by argentine, which is made to adhere to the paper by the use of so-called wax solutions, prepared by methods which are kept secret. According to the author, the methods are as follows:

In the first, 4 kilos. of wax and ¾ kilo. of potash are boiled with 50 kilos. of water, and the melting fluid so produced is stiffened to a thick paste by stirring the tin precipitate into it.

In the second, 75 liters of freshly made 4 per cent starch solution are mixed with 750 grms. of a wax solution prepared from 5 lb. of wax and 1½ lb. of potash dissolved in hot water, and 25 kilos. of argentine are added.

The paste so obtained is printed by rolls on to paper, which dries to a dull gray tone, but becomes bright when burnished by passing through hot calender rollers, when it exactly resembles tin foil.

Soap Bubble Solution.

According to a communication recently made to the Academy of Sciences the following solution affords very thin and permanent bubbles:

Yellow resin	10 grammes.
Carbonate of potash	10 "
Water	100 c. c.

Boil until completely dissolved, and before use dilute the solution with four times its volume of water. It is somewhat difficult to float soap bubbles upon carbon dioxide, because, if you managed, after a score of trials, to free your bubble from the pipe on which you blew it, the bubble usually bursts the moment it touches your heavy gas. Mr. Newth lets us into the secret in his recent book. You must remove every trace of hydrochloric acid, which is carried over with the gas, by washing, the presence of this acid being fatal to the life of a soap bubble.

Correspondence.

Color Blindness at the Miller School.

To the Editor of the Scientific American:

A report on the color blindness found in this school may be of interest, from the fact that, in accordance with the will of the founder, Samuel Miller, none of our pupils are of wealthy families, while all are from one county, Albemarle.

About two months ago I examined the pupils, some two hundred and sixty, of this school for color blindness, using Dr. Oliver's method, a modification of that of Holmgreen. There were five test skeins of worsted—red, rose, yellow, blue, and green—each with two skeins of darker shade and two of lighter tint. Besides these there were a large number of confusion skeins of different colors, shades, and tints.

The test was made in the usual way, by matching colors. Those who matched the colors correctly, red with red, green with green, etc., as a matter of course, were considered all right, while those who matched such colors as red and green together were considered color blind.

Of the two hundred and sixty persons, students with but few exceptions, examined, one hundred were girls and one hundred and sixty were boys. Not one instance of color blindness was found among the girls, while eight cases of very decided color blindness were found among the boys. Seven of these were cases of red blindness, being unable to distinguish between the so-called rose and green of the same shade. One boy seemed unable to distinguish between any two colors of the same shade, even matching rose, green, and yellow together.

It is stated by high authority that only one of a thousand women will be found color blind, while one of every twenty men has this defect. The above report, therefore, while interesting, should not be a surprise. W. J. HUMPHREYS, *Professor of Physics.*

The Miller Manual Labor School of Albemarle,
Crozet, Va., August 2, 1893.

A Simple Optical Photometer.

A simple optical photometer, serving also to measure the degree of visual acuity, has been devised by Dr. Simonoff. A book of twenty-four pages is arranged; the first being of a clear gray tint, the second of double the intensity, and so on to the last, the color of which is nearly black—being twenty-four times the intensity of the first. On every page are printed a few phrases in black letters of different sizes. The amount of illumination available in a badly-lit apartment may be estimated by turning over the pages of this little book, held at a distance of about a foot from the eyes, until one can no longer read the line of letters of a selected size. With good illumination, the characters on the twentieth or even the twenty-fourth page may be read; but with poorer light legibility ceases at the tenth, or twelfth, or fifteenth page. The appliance is meant for indoor use exclusively, and must, of course, be employed with intelligent reference to the power of the eyes of persons making the test. But it is said to give fairly reliable comparative indications of the degree of lighting in a building; and it is likely to be useful in ascertaining the sufficiency of the lighting of class-rooms and public buildings intended to be used for educational purposes.

The Modern Steamer.

In order to appreciate the great development of the steamship, which borders on the marvelous, the *Polytechnic* says, we have only to make a few figures as to the possibility of propelling a vessel with oars at the calculated speed of the Campania. If it were possible to place 300 oars on each side, making 600 oars altogether, each worked by three men, there would be 1,800 men at work at one time. As they could not work continuously for twenty-four hours, but only for a total of eight hours each man, divided into four-hour watches, it would be necessary to have a crew of 5,400 men alone to man the oars. If six men could develop one horse power, the total horse power developed by the 600 oars handled by 1,800 men would be but 300, as against 30,000 in the Campania, or the same power would require the employment of 180,000 oars and a crew of 558,000 men to manipulate them. The first steamer built by the Cunard Company was the Britannia, which was launched February 5, 1840, or fifty-three years ago. She was built of wood, by Robert Duncan, at Port Glasgow, her length being 207 feet; breadth, 34½ feet; depth, 22½ feet; tonnage, 1,156; passengers carried, 115; cargo, 224 tons. The engines, by Robert Napier, were side levers, with two cylinders, 72 inches diameter by 82 inches stroke of piston, driving paddle wheels 28½ feet diameter. Steam of 20 pounds pressure was provided by four flue boilers, with twelve furnaces, which consumed 38 tons of coal per diem. The speed of the vessel was 8½ knots, with the engine developing 710 indicated horse power; coal consumption, over 5 pounds per indicated horse power: time in making the voyage, 14 days.

SCIENTIFIC AMERICAN

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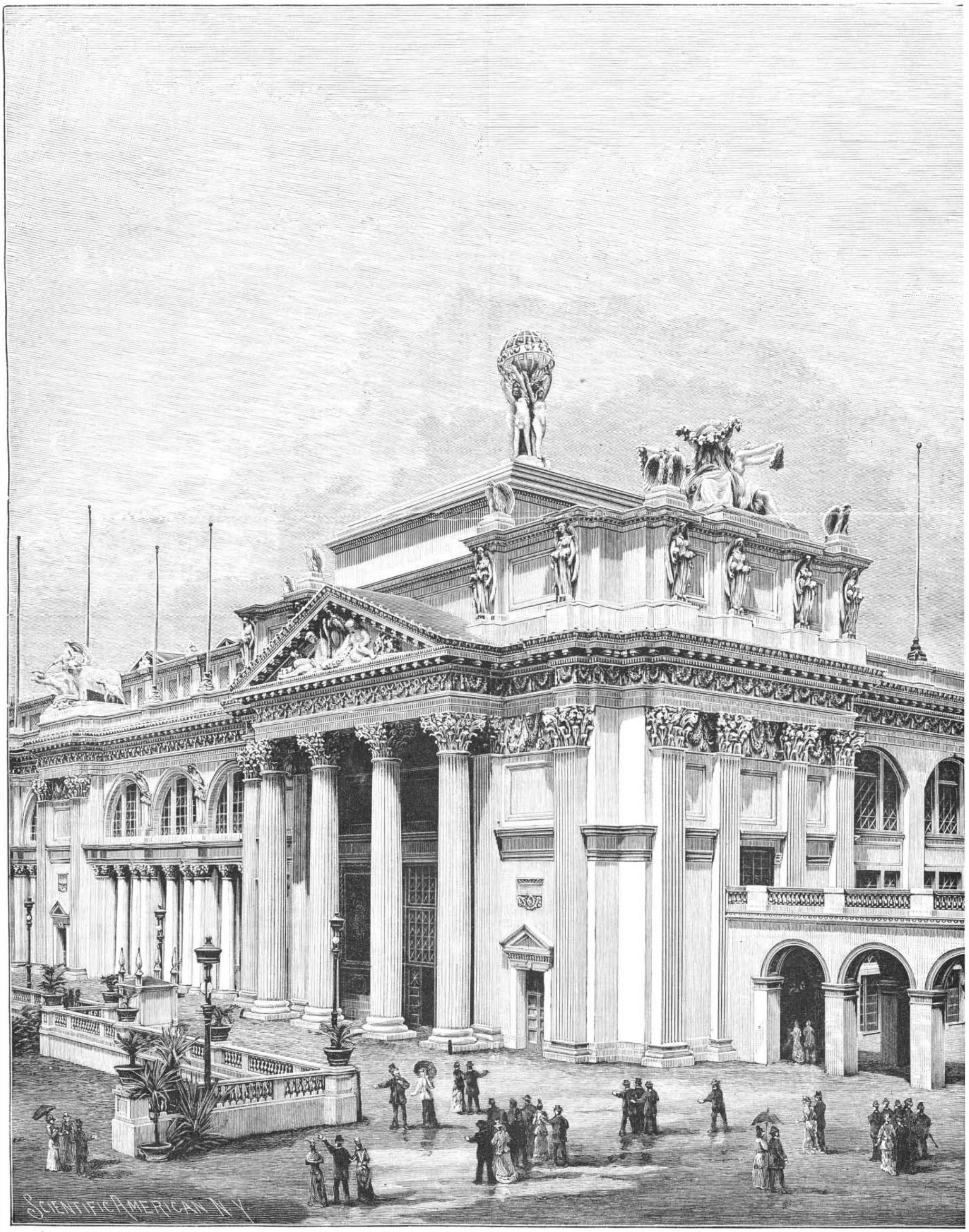
A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LXIX.—No. 9. ESTABLISHED 1845. NEW YORK, AUGUST 26, 1893. $3.00 A YEAR. WEEKLY.



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