

THE SPANISH CENTENNIAL BUILDING.

Although the Spanish display at the Centennial Exhibition is not of very large extent, it is varied in character and contains many objects of exceptional beauty, especially in the art department. In the Main Building, 11,253 square feet have been allotted to Spain, which the Spanish Commission has inclosed, making an entrance through doors in the middle of the front. This inclosure is 46 feet in height, the material being wood and canvas, painted, carved, and gilded in a very rich and elaborate style. There is a grand doorway in the center, and two side portals, all handsomely decorated. The doorways are to be hung with heavy folds of silk curtains—red and yellow, the Spanish national colors.

The Spanish Commission has also constructed the octagonal building shown in the annexed engraving. The structure is well proportioned, and the slight amount of exterior ornamentation is characteristic of its nationality. This structure is separate from the one inside the main building above referred to.

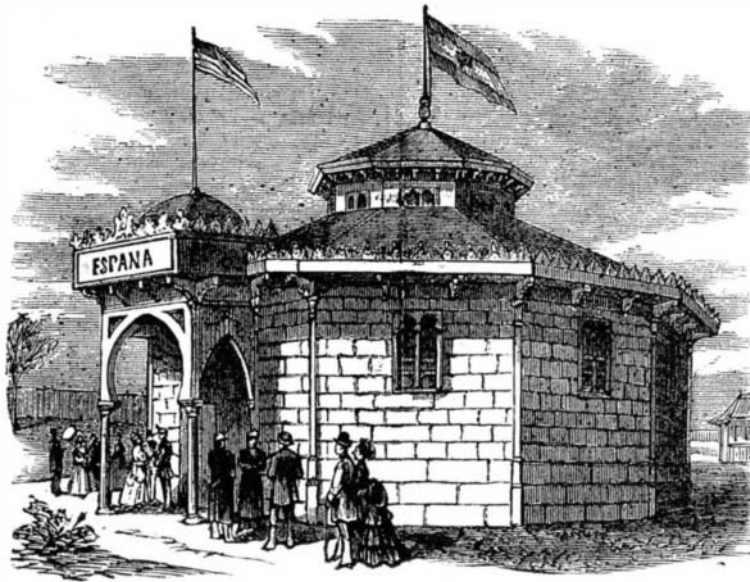
Speed of Railway Trains.

The following are the highest authentic instances of high railway speeds with which we are acquainted; Brunel, with the Courier class of locomotive, ran 13 miles in 10 minutes, equal to 78 miles an hour. Mr. Patrick Stirling, of the Great Northern, took, two years back, 16 carriages 15 miles in 12 minutes, equal to 75 miles an hour. The Great Britain, Lord of the Isles, and Iron Duke, broad gage engines on the Great Western Railway, have each run with four or five carriages from Paddington to Didcot in 47½ minutes, equal to 66 miles an hour, or an extreme running speed of 72 miles an hour; the new Midland coupled express engines, running in the usual course, have been timed 68, 70, and 72 miles an hour. The 10 A. M. express on the Great Northern, from Leeds, we have ourselves timed, and found to be running mile after mile at the rate of a mile in 52 seconds, or at 69.2 miles an hour. The engines used are Mr. Stirling's outside cylinder bogie express engines, the load being ten carriages.—*Engineer.*

THE CENTENNIAL BUILDINGS.—THE NEW JERSEY BUILDINGS AND THE WOMEN'S PAVILION.

The State of New Jersey has erected a building at Philadelphia in the rustic gothic style, the high roof and the protected windows and porch being especially noticeable. It is an elegant and well built structure, and is likely to be carefully investigated by country visitors, whose interest in commodious, elegant, and cheap homes seems to know no abatement. The New Jersey building appears in the center of our engraving herewith, "The South" restaurant appearing on the left, and a new view of the Women's Pavilion being shown on the right

of the picture. The last named building has already been described in our columns; and we are informed that it owes its origin to the refusal on the part of the Centennial Commission to allot separate spaces within the principal buildings for exhibiting women's work. The display of work within the building, it will be acknowledged, shows well the great variety and number of industrial pursuits which are open to females, the demands of which on the hand and brain are not, as a rule, so excessive as to reduce the workers to a condition

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of hard and badly recompensed toil. The large proportion of the exhibits show that there is an immense field for women's work, requiring the deftness of finger and the taste for which their sex takes the precedence of man, and affording ample remuneration for steady, capable workwomen.

The Water Gas Humbug Again.

The Chicago *Times* is the latest victim of the absurd water gas delusion. A "Professor" Kendall, that too confiding journal asserts, has exhibited to its representative "an apparatus which burns from one fourth to seven eighths as much water as it does any other combustible fluid," makes gas better than that produced from coke (!) at 50 cents per thousand feet, and produces sufficient fire "to do the cooking and washing for six persons for seven days for a like small sum." The *Times* says that "the result overwhelms the mind with its wonderful possibilities," and that "it will astonish the scientist as well as the unschooled and the undisciplined." We fear that all the astonishment regarding the subject will be at the ignorance and credulity of the Chi-

cago paper. Water is nothing but the result of burnt hydrogen, which gave out its heat at the time of its combustion. No fuel can be burnt twice, and it is as impossible to burn hydrogen in water or watery vapor as it is to burn carbon in atmospheric carbonic acid.

Fixing Pencil Lines and Colors on Drawings.

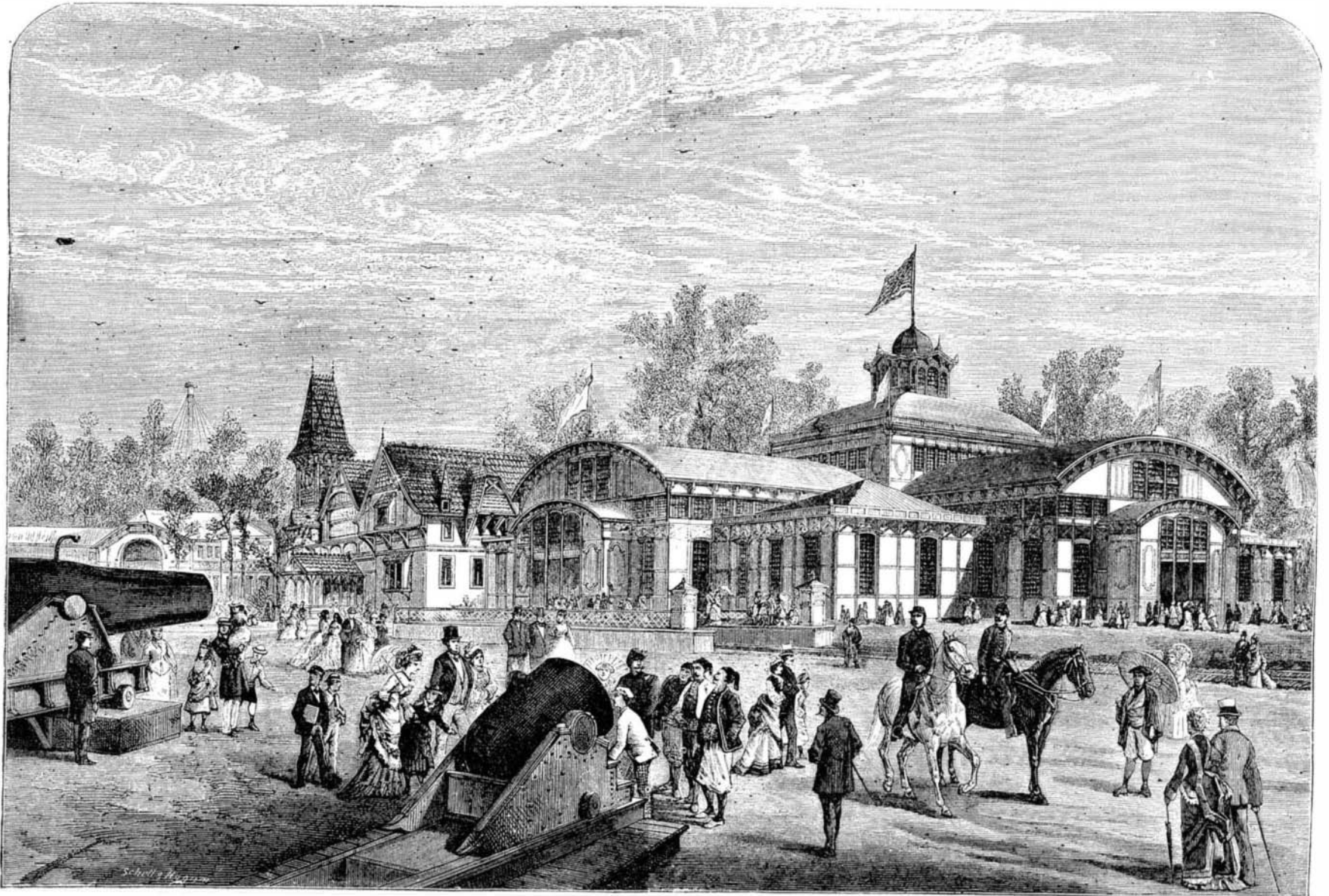
W. E. Debenham describes a method of fixing powder and other colors after they are applied.

"I immerse the drawing in or flow over it a solution of freshly prepared moist gluten in alcohol, the alcohol to be at a strength of about seventy or eighty per cent, or a solution of gelatin or metage-latin or kindred substance (the word gelatin will be used hereafter to include kindred substances), in water, with as much alcohol added as the solution will bear without precipitating the gelatin. If the solution be hot, it will bear a large addition of alcohol. It is necessary that the solution be very alcoholic, or the colors may run, as they would in an ordinary aqueous solution. The gelatin coating may be rendered insoluble by treatment with tannin or chrome alum; the chrome alum is either added to the gelatin solution itself, or applied separately, and afterwards exposed to light.

"To prepare a photograph or drawing that color may adhere, I apply either of the alcoholic solutions already mentioned, or a solution of glycerin or sugar, or a mixture of any of these; and this preparative liquid should contain fifty per cent or more of alcohol in order that it may penetrate evenly. If the work can be colored before being mounted, as in the case of a photograph to be enameled, I apply the preparation liquid to the back of the paper. The alcohol makes it penetrate to the front, and the color is taken in a very even and fine manner.

"The fixing solutions are also applicable to water color, pencil, and crayon drawings; and I prefer to employ gluten solution as an aqueous solution of gelatin, if desired, as an additional coat, or for the purpose of attaching it to the collodionized glass in enameling. The fixing solution itself may also be used for this latter purpose, and the coloring or touching is not to be disturbed. When it is required that the gluten solution should contain more gluten than the alcohol will take up, I evaporate rapidly, but not to precipitation, a portion of the solution, and mix with the remainder."

NEWSPAPER and other publishers will be supplied with electrotypes of the Centennial Buildings and most of the other engravings which appear in the *SCIENTIFIC AMERICAN* and *SUPPLEMENT*, on very cheap terms. For prices address the publishers, and indicate at the same time what engravings are desired, and the date of the issue in which they appeared.

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