

# SCIENTIFIC AMERICAN

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

Vol. XXXIII.—No. 11.  
[NEW SERIES.]

NEW YORK, SEPTEMBER 11, 1875.

[\$3.20 per Annum  
[POSTAGE PREPAID.]

## THE CENTENNIAL BUILDINGS.

We have already placed before our readers views of the Main Building and the Art Gallery, now being erected for the Centennial Exposition, in Fairmount Park, Philadelphia, Pa.; and we herewith publish a view of the Horticultural Building, a large conservatory: an extremely ornate and commodious building, which is to remain in permanence as an ornament of Fairmount Park. It is located on the Lansdowne Terrace, a short distance north of the Main Building and Art Gallery, and has a commanding view of the Schuylkill river and the northwestern portion of the city. The design is in the moresque style, the principal materials externally being iron and glass. The length of the building is 383 feet, width 193 feet, and height, to the top of the lantern, 72 feet.

The main floor is occupied by the central conservatory, 230 by 80 feet, and 55 feet high, surmounted by a lantern 170 feet long, 20 feet wide, and 14 feet high. Running entirely around this conservatory, at a height of 20 feet from the floor, a gallery 5 feet wide will be erected. On the north and south sides of this principal room are to be four forcing houses for the propagation of young plants, each of them 100 by 30 feet, covered with curved roofs of iron and glass. Dividing the two forcing houses in each of these sides is to be a vestibule 30 feet square. At the center of the east and west ends are similar vestibules, on either side of which will be the restaurants, reception room, offices, etc. From the vestibules ornamental stairways will lead to the internal galleries of the conservatory, as well as to the four external galleries, each 100 feet long and 10 feet wide, which are to surmount the roofs of the forcing houses. These external galleries are to be connected with a grand promenade, formed by the roofs of the rooms on the ground floor, which have a superficial area of 1,800 square yards.

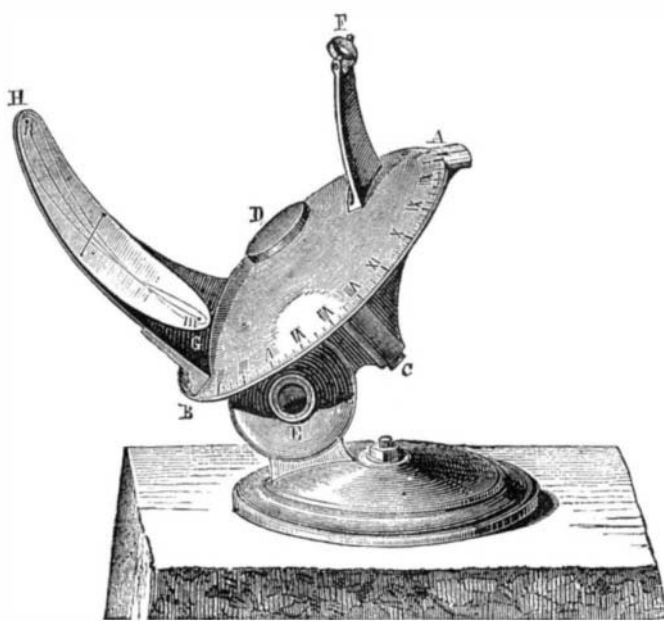
The east and west entrances will be approached by flights of blue marble steps from terraces 80 by 20 feet, in the center of each of which an open kiosque, 20 feet in diameter, is to stand. The angles of the main conservatory are to be adorned with eight ornamental fountains. The corridors

which connect the conservatory with the surrounding rooms, open fine vistas in every direction.

In the basement, which is of fireproof construction, are the kitchen, store rooms, coal houses, ash pits, heating arrangements, etc.

## A SOLAR CHRONOMETER.

In the accompanying illustration is represented a solar



FLECHET'S SOLAR CHRONOMETER.

chronometer, recently invented by M. Fléchet, from which, according to *La Nature*, the hour may be determined with accuracy. It consists of a rounded disk, A, divided into 24 hours and their fractional parts. This turns about an axis, C D, which is placed parallel to the earth's axis according to

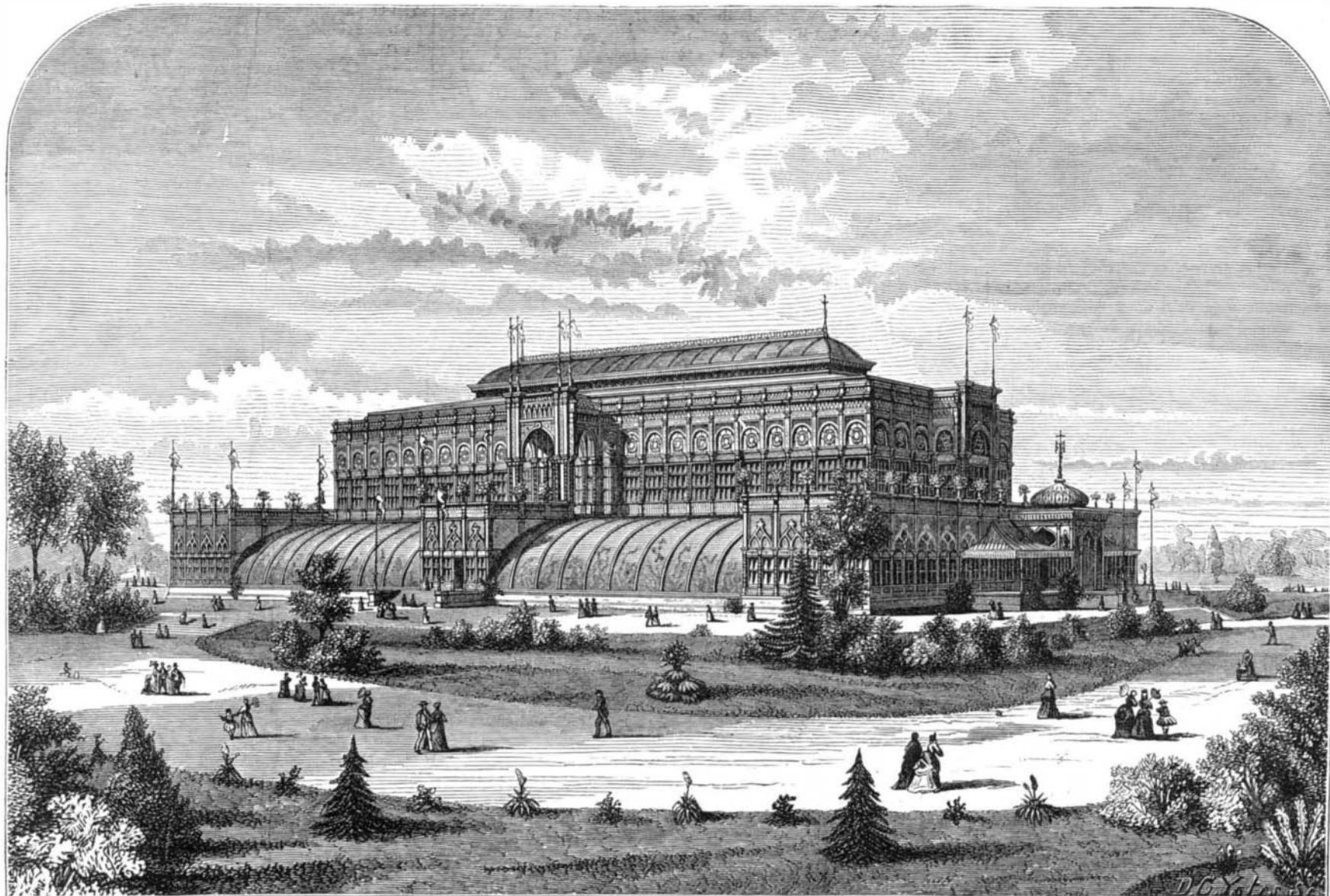
the latitude of the place, by means of the point, E. F is a lens, located in the center of an exactly spherical concave plate and capable of adjustment toward the sun.

When the instrument is arranged so that the axis is inclined as above noted, the disk, A B, is turned so that the image of the sun produced by the lens, F, falls on the arc, *m n*. The hour is given by the pointer at A, and the corresponding hour mark on the disk. The instrument is said to be accurate within one quarter or one third of a minute.

## The Steam Donkey.

At a recent *séance* of the French Academy of Sciences, some interesting particulars about a new locomotive of M. Fortin Hermann were given: Its propulsion is produced by the rising and falling of six articulated feet, which strike the ground or rails something like the feet of a quadruped. These feet are arranged in two groups, three support the fore part of the machine, and the other three the after part. The two middle feet are connected together by a horizontal shaft; the four others are independent, and strike the ground successively in such a manner that, while the middle feet move at a moderate pace, the others have a highly accelerated motion. Each of these groups of three feet is affixed to a single trunk. The force of the steam is applied in such a way as to drive these feet toward the ground.

The experiments made by the Eastern Railway Company at Paris with one of these machines have demonstrated that, when the feet are shod with soles of india rubber weighing one kilogramme (2.2 lbs.) each square centimeter (4-10th inch), an adherence to the rails or road is obtained equal to three fourths of the weight of the machine itself. In the ordinary locomotive this adherence does not go beyond one fifth of the weight of the machine; it may be added that this adherence is, in point of fact, variable; on wet or damp rails it is not more than one half; but in the newly invented locomotive of M. Hermann, although the state of the rails or ground will always have an influence, as in the case of the machines in actual use, it will always be greatly superior. The experi-



CENTENNIAL HORTICULTURAL BUILDING PHILADELPHIA PA.