the scale. Our unit of measurement is the distance from the sun to the earth, and this has never yet been determined in miles to the satisfaction of astronomers.

How then can the distance of the sun be found by observing the passage of Venus across his face? To explain this simply, it will be better to consider not the distance of the sun, but the diameter of the sun in miles as the object of search. If either can be found the other can be calculated from it by a simple proportion (which need not be here discussed) so that the above question becomes—"How can we, by observing the passage of Venus across the sun's disc, find the diameter of that disc in miles?" A general explanation is all that will be attempted here. Referring again to the illustration of the map, but letting the map now correspond not to the solar system, but to the sun's disc only, it is obvious that if we knew the actual distance in miles between any two points represented on the map, we could readily find the distance in miles between any other two points, the map being supposed accurately drawn. For example, if we have a map of any city, Montreal for example, carefully drawn, but without any scale attached, we could by knowing the distance between any two parallel streets, such as St. Catherine street and Dorchester street, tell the entire length of the city, because the ratio of this length to the other is given by the map. Similarly in the case of the sun's disc, if we know 1° the distance in miles between any two parallel lines on its surface, and 2° the ratio of the whole diameter to this distance we evidently can find the diameter. The problem thus but consists of two parts:

1° The distance of the two parallel lines in miles.

2° The ratio of the diameter to this distance.

If we reverse the order of these we may say that they correspond to

1° Drawing our map, but without knowing the scale.

2° Finding the scale.

The map, however, we have to draw of the sun's disc is a bare outline. If we draw any circle to represent the sun's disc, we have merely to lay down on this circle a diameter and two other lines parallel to one another. (See Fig. 2.)

H K, C D, Paths of Venus as seen from Northern and Southern Stations. A B., distance between the 2 chords.

But how are the lines on the sun's face to be selected? This may be explained by another illustration. Go into a room with a gasalier hung from the ceiling, sit down on a chair, look at one of the glass globes, and notice what part of the opposite wall it hides from you, then sliding the chair in a straight path across the room observe that the part of the wall hidden from time to time during the motion will form a line on the wall. Next, stand up, and moving along the same path on the floor you will, of course, see that the glass globe hides a different line on the wall. It is clear that the distance apart of these two lines depends on the difference of the heights of the eye in the two cases and on the relative distances of the glass globe from the eye and the wall. Here the wall corresponds to the sun's face; the glass globe corresponds to Venus, and would correspond better if it moved across between you and the wall, instead of compelling you to move in order to produce the same effect. Another illustration might be this: Hanging up a large circular sheet of paper against the wall to represent the sun, and getting a friend to pass a cent steadily between it and your eyes while you, at a considerable distance, are on the first occasion sitting down, and on the second standing up, you will see two different lines traced out.

Let the observers be at A and B, Fig. 3, the two extremities, suppose, of the diameter of the Earth (E) which is perpendicular to the ecliptic. Then, when the observer A sees the centre of Venus projected on the sun's disc at a, the observer at B will see it at b; and the lines CD and GH will represent the lines or the paths that appear to be described across the disc. The distance apart in miles of these two lines can be found without any great difficulty, because it depends obviously on the distance between the stations of the two observers, which is easily found, and on the known ratio between the distances of Venus from the Sun and from the Earth, about $2\frac{1}{2}$ to 1. Thus one part of the problem is solved, viz., that corresponding to measuring the distance between two parallel streets on the map of Montreal.

The most difficult part, however, remains, viz., that which corresponds to finding the ratio on the map between the length of the whole city and the distance just mentioned. We have to find the ratio of the whole diameter of the sun to the distance between the two lines on its surface that have been observed. The observations for this purpose are simply enough stated. The two observers already mentioned have only to notice the exact duration of the passage in each case.

PREPARATIONS AT McGILL COLLEGE FOR OBSERVING THE TRANSIT OF VENUS, DEC. 6th 1882.

At the time of the transit of 1874 the College was very poorly supplied with astronomical instruments. It had a refracting telescope of 2¾ inches aperture, which, together with a small transit instrument and chronometer for taking time observations, constituted practically its whole equipment. In order to call public attention to our wants, I wrote a letter, therefore, to one of the daily papers, pointing out the importance of the coming transit of 1882, and the need of proper instruments to observe it; but this had no immediate effect. About the end of the year 1878 some of our citizens who felt an interest in astronomy held two or three private meetings to consider the possibility of establishing a public astronomical observatory as an independent institution governed by trustees. In accordance with a request from them, I wrote a letter on the subject which was inserted in the newspapers in January, 1879, and in this I again directed attention to the approach of the great astronomical event. The times were apparently unpropitious. There was no public result.

In September, 1879, however, Mr. Blackman, B.A., of Yale College, U. S., then a resident of this city, made a very handsome donation to the College of astronomical instruments, including a 6¼-inch equatorical of 7-ft focal length, a large transit instrument, an excellent mean time clock, a sidereal clock and chronometer. Subsequently, two good but smaller telescopes of 4¼ and 4 inches aperture were placed in the College, one left to the Trafalgar Institute by the late Donald Ross, and committed for safe keeping to McGill College, and one lent by G. A. Drummond, Esq. As far as instruments sufficient for transit observa-