double screen of this material, and when no side screen was interposed, the swing and fixed thermometers always read alike, even when the temperature of the air was over 100°, and the sun temperature 150° Trials were made by day and at night, in both cloudy and clear weather, and the indications were always within a fraction of a degree of that of the swing thermometer, while thermometers in the other stands differed from it frequently two or three degrees, and in some cases four or five degrees.

81. After these experiments were completed, a new shed was erected at the Observatory in March, 1880, which has been used ever since for shading the thermometers, and has given every satisfaction; and, whenever an occasional trial with the swing thermometer has been made, the thermometers fixed in it have always agreed very closely indeed. Sometimes, after a very cold night, they have shown a slightly higher temperature (sometimes fully half a degree) than the swing thermometer, which is perhaps due to the ground beneath the shelter being less cooled by radiation during the night. The shed itself consists of six uprights of wood fixed in the ground, carrying a double roof of galvanized iron, with low gables north and south, and eaves east and west. The area covered is 12 feet by 12 feet; height of ridge above ground, 8 feet; height of eaves, 6 feet; space between two roofs, 9 inches. On the north gable a light trellis extends from the apex of the gable to within 4 feet 6 inches of the ground. The three other sides are fully open, except three louvre-boards just below the eaves on the east and west sides, to keep the direct rays of the rising or setting sun from reaching the thermometers. The 9-inch space between the two roofs is also open all round. The thermometers themselves are exposed in a cage of open wire netting hung from the roof, and about 1 foot below the iron of the inner roof, and, while fully exposed to the air in all directions, are out of the reach of driving rain. A photograph appended shows the form.

82. The ombrograph is placed beneath this shed, with the collector on the roof.

83. The swing thermometer is a very good one, in glass tube, by Greiner of Berlin. It is attached to a silk cord, about 2 feet 6 inches long, with loop to pass over finger. It is usually swung at full length eight or ten revolutions at a moderate speed, then stopped and immediately read, while the fixed thermometer is read by another observer.

The Best Method of measuring the Velocity and Pressure of the Wind.

84. I have made numerous experiments in these directions since the first meeting of the Conference, but I am certainly not prepared to give any opinion yet as to the best method. According to my experience, the mean velocity for short periods, as furnished by the Robinson's anemograph, does not answer all the questions that arise, and a good method of measuring the pressure of gusts is wanted. There is no doubt that the Robinson, if kept in good order, is the most satisfactory of all forms now generally in use; but in the Kew pattern used here the register scale is too small and close—unnecessarily so, I think—so that it is almost impossible to obtain the maximum velocities in high winds, which generally take place in very short periods.

85. It was necessary, some months ago, to thoroughly repair, indeed to remake, our anemograph, as nearly twenty years' wear had made it very shaky in all its parts. I therefore took the opportunity of introducing some modifications, especially in the registering portion of the apparatus, and in replacing the original anti-friction ball bearings by the oil-cup and Smeaton ring, as now used at Kew, with the effect of securing a beautifully silent and smooth motion, combined with equal sensitiveness.

86. The registering apparatus is quite different from the old form, and the record sheet much larger, being 12 inches wide and 18¾ inches long. The direction record for a full revolution of the wind covers 4¼ inches wide, and the velocity 5 inches for fifty miles' motion. An hour's movement of the record proper equals about ¾ of an inch. The velocity pen—a glass one, charged with aniline ink—falls back to zero every hour by means of a clutch on the velocity-shaft, which is released by an electro-magnet every hour, the contact for which is made by the clock. Should the velocity exceed fifty miles an hour, the pen moves a lever at the end of its range and makes contact, allowing the pen to fall back to zero at the completion of the fifty miles. This acts exceedingly well, and the pen commences its new curve the instant it has fallen back to zero.

87 In order to facilitate measurements for short intervals during strong winds there is a second electro-magnet, which gives the pen an upward movement, when in action, forming a short off-set on the velocity curve. By inserting a plug the clock actuates this electro-magnet every minute; the velocity curve is thus divided by cross marks every minute, and an easy way of obtaining the velocity for short intervals is thus supplied.

88. The direction record is given by spring pencils on a pair of endless chains running over two rollers, a cam plate throwing the pencils, not in position for registering, out of action. The more open scale of the record sheet, and return of the velocity pencil to zero every hour, enables the sheets to be much more easily read off, furnishes more precise results, and the minute marks on the curve made when the second electro-magnet is connected promises to be a very useful addition for occasional requirements.

89. There still seems to be some question as to the exact ratio of the rotation of the cups to the velocity of the wind in Robinson's anemometer, as it is stated that this varies with the length of the arms and size of the cups. It appears to me, therefore, very desirable to adopt some method by which the results of the several anemometers in Australia shall be comparable. With this in view I have lately made some experiments with Hagemann's vacuum anemometer, described in the Journal of the Meteorological Society for October, 1879, because it appears probable that exactly similar conditions can be easily secured at each observatory for such an instrument, which, moreover, has the advantage of being simple and cheap in construction. The conditions necessary are, that the height above buildings or trees, or like disturbing causes, and the size and shape of the orifice of the top of the vertical tube, shall be similar in each case; and perhaps it may be also desirable to have the capacity of the floating air-chamber nearly similar.

90. I have had placed on the Observatory a light mast carrying a ¼-inch gas-pipe, about 25 feet above the main roof, terminating in a nozzle similar to that described by Hagemann, having an aperture of about 3 or 4 millimetres diameter. The pipe leads to a "gasometer" arrangement in a chamber