42 per cent. more during the day than during the night, and the large one 18 per cent. more during day than night, and it sometimes happened that it was more during the night than during the day The result of these observations may be expressed in another way: Comparing the two, the large one gave 13 per cent. less than the glass one during the day, and 23 per cent. *more* during the night, which seems to prove that the heat absorbed by the large one during the day was given off in vapour during the night, and not by radiation from the sides, as in the glass one.

74.

Year.	Shade Temp.	Humidity.	Miles of Wind.	Total Rainfall.	Evaporators.					Large greater than Glass.
					Amount in Tin.	Tin greater than Glass.	Amount in Glass.	Large less than Glass.	Amount in Large.	
1871*	62·4	74·9	96·821	52·147	65·756	22·785	42·971	9·643	33·130	In May and June large greater than glass.
1872	62·6	75·9	98·830	37·001	66·589	25·001	41·588	11·495	30·093	Greater in May.
1873	63·0	75·9	91·306	73·263	54·622	6·761	47·861	18·427	29·432	
1874	63·0	75·6	97·651	63·478	59·622	8·682	50·940	18·934	32·006	
1875	63·4	73·2	96·003	46·209	59·243	0·607	58·636	22·521	36·115	
1876	63·6	74·2	103·373	45·647	59·790	−3·692	63·482	24·699	38·783	
1877	63·8	74·6	95·087	59·517	49·599	−5·567	54·166	22·544	31·622	
1878	63·6	73·5	97·945	49·617	50·355	−3·733	54·088	21·404	32·684	
1879	62·1	75·1	99·061	63·193	43·785	4·887	38·898	10·081	28·817	In May greater than glass.
1880	62·8	73·2	91·112	29·513	47·556	7·350	40·206	8·690	31·516	In May greater than glass.
Means	63·0	74·6	96·719	51·959	55·692	6·409	49·283	16·863	32·420	

* Corrected for two months, January and February, when observations were not taken. Large evaporators started in March.

75. Another question presented itself, and was answered by several months' observation. It was, What ratio does evaporation in the shade bear to that in the sun? The shade chosen was the thermometer-shed, where the air has free access, but there is complete protection from the sun. The mean result of the measures was that 26 per cent. less evaporation took place in the shed than in the glass evaporator in the sun, or, comparing it with the large one, the result in shade was 9 per cent. more than in the large one; but, as the shade evaporator was placed 3 feet above the ground, where the air would probably be drier than on the surface of the ground, where it affects the large evaporator, it is probable that a small evaporator in the shade would give about the same result as one 4 feet over and sunk into the ground.

76. It will appear from what has been said that every change of condition under which evaporation is measured produces a change in the result, and, since the conditions are infinitely variable, so the results must be. Therefore, before any comparable results can be obtained, we must determine what it is that we want to measure. Is it the evaporation from water in the ground, from water in a glass or metal vessel on the ground, or from water at some distance above the ground? For the mere purpose of comparison, any one of these positions would do; but since the one in the ground comes nearest to the condition of a natural reservoir, I prefer it, because the results would be directly useful for a practical purpose, as well as for science.

Shade Temperature and Thermometer-Sheds.

77 Mr. Ellery reported as follows: Experiments with regard to true shade temperature, and best form of thermometer-shed, were made here early in 1880. The thermometer-stands previously in use at the Melbourne Observatory were—a Lawson's stand, and, for a short time, a modified Stevenson's stand. Prior to 1865 a form of Lawson stand, movable about a central column, so as to place its back to the sun three times a day, was exclusively used, but this was done away with in favour of an ordinary fixed stand, of the same form, in 1865.

78. Occasional experiments with a swing thermometer had shown that on hot days, in which a rapid change of temperature had occurred in the afternoon, the thermometers always indicated a higher temperature than that indicated by a thermometer swung in the air, and *vice versâ* after a cold night, showing that the stand itself retained a temperature different from that of the air a considerable time after an actual fall or rise of shade temperature; and further experiments showed that, in the ordinary small stands used for thermometer exposure, the temperature of the material or the stand itself always lagged behind that of the air.

79. In a Stevenson's stand, made for one of the country stations (with vertical instead of horizontal louvres), the indications were half-way between the Lawson stand thermometers and the swing thermometer. It was evident, therefore, that, if we assume a correct thermometer swung in the open air will give true shade temperature, thermometers shaded in the ordinary wooden stands (Lawson's or Stevenson's) do not always do so; and also that the mass of material in the stand, want of free traverse of the air through all its parts, its slow conductivity, and its proximity to the thermometers themselves, were probably the chief causes. It therefore appeared that the required shelter should be formed of some better and more rapid conductor than wood, that the mass of material used should be as small as possible, and that the circulation of air around every part of this mass should be as free as possible; also that the thermometers themselves should be as far as convenient from at least the more massive or worst-conducting portions of the stand, and thus free from the retarding effects of radiation.

80. Acting upon this, trials were made with shades constructed of zinc and galvanized iron, and it was soon found that under such shades the thermometers followed the swing thermometer very closely; and when a sufficient and thoroughly open air space was allowed between the sheets of a