

present Government. It is therefore sincerely to be hoped that the forthcoming Exhibition at Edinburgh will be the means of putting a new spoke in the wheel, and that before the close of the Exhibition, or soon after, something tangible may have resulted in making forestry one of the branches of education either in distinctly constituted forest schools, or in our present agricultural colleges.

It is satisfactory to know that the arrangements of the Exhibition are in a forward state, and that, if the promises which have been received by the executive are fulfilled, the Exhibition will exceed the anticipations of the promoters.

JOHN R. JACKSON

RAINFALL OF NEW SOUTH WALES¹

UNDER the energetic direction of Mr. Russell the investigation of the rainfall of New South Wales is being prosecuted with much success, and the interest of the colonists may now fairly be regarded as awakened to the importance of the inquiry. This is evidenced by the recent rapid increase of stations, the number of rain stations for the five years ending 1882 being 96, 153, 191, 256, and 308, having thus trebled during this brief interval. A comparison of the maps of stations for 1878 and 1882 shows that the increase has been pretty evenly distributed over the whole colony; and of particular importance is it to note the spread of the rain-gauge over the extensive regions which lie to the north and north-west of the Murray River.

Mr. Russell draws pointed attention, in the following extract, to the practical value to the colonists of well kept rain registers:—

“As a proof of the necessity for the use of the rain-gauge all over the colony, not only for purposes of science, but also as a necessary instrument on every run, I may mention that on Goolhi station six gauges are kept on various parts of the run, and the records range from 19·81 inches to 27·75 inches. It would obviously lead to a false estimate of the grass the run would produce if only one gauge had been used, and that one where only 19·81 inches were recorded. I hope that the facts which the yearly records bring to light will have the effect of awakening those interested to the immense importance of collecting these statistics carefully, and at once, so that every year will add to the knowledge which will be of such value in forming estimates of the seasons which are to come, and of the possibility of conserving water.”

Lately much speculation was indulged in, and various schemes were proposed of increasing by artificial means the rainfall of New South Wales, particularly in seasons of drought when day after day the sky becomes covered with dark, dense-looking clouds which regularly pass away without a drop of rain. In these cases, science can as yet hold out no hopes to the agriculturist. The successful instances of rain-production by artificial means have occurred when the atmosphere in the district where the experiment was made was at or near the point of saturation, a state of things which does not exist in the arid plains of the interior of Australia under the meteorological conditions when clouds daily darken the skies and as regularly mock the expectation of the farmer.

It must then be to a judicious and skilful cropping of the rainfall that the Australian farmer must look for the supply of his wants in the dry season and still more in seasons of exceptional drought. Now, as contributions towards the solution of this problem, the annual rainfall reports of Mr. Russell are simply invaluable. These reports give the rainfall and total days of rain for each month and for the year, to which is added the mean annual rainfall and rainy days calculated from previous years' observations at each place available for the purpose.

¹ “Results of Rain and River Observations made in New South Wales during 1873-82.” By H. C. Russell, B.A., Government Astronomer for New South Wales.

The annual rainfall for each year is represented on a large map of the colony, 22 by 26 inches, where the fall for each station is entered in its place as a black spot, the diameter of which is proportioned to the quantity of rain. By this device, the eye takes in readily and at a glance the distribution of the rainfall for the year. The comparative results of the five years for the different districts of the colony are most instructive.

Owing to its position on the globe and its physical configuration, New South Wales presents extremely different climates according to the varying amounts of the rainfall. Thus at Antony, on the coast near the borders of Queensland, the mean annual rainfall amounts to 65·15 inches; whereas at Mount Poole, in the extreme north-west, it is only 8·38 inches. For the nine years beginning with 1874, an approximation to the annual rainfall of the colony for each year has been calculated by Mr. Russell, the results for the separate years being 33·46, 29·38, 27·66, 20·48, 25·05, 30·75, 19·93, 20·73, and 20·11 inches, each of the last three years showing a marked deficiency. Now the interesting point is this, and it is a peculiarity which every other country possesses, but particularly those which exhibit climates so diversified as New South Wales, viz. that the rainfall of any month, or of any year, is very far from being equably distributed. The amounts of the excesses above, or the defects from, the average, tend really to partition the country into several well-defined rain districts for the time, these being determined apparently by river basins, watersheds, and other features of its physical configuration taken in connection with their relations to the thunderstorms and the rain-bringing winds. It is quite in the future, as an outcome of Mr. Russell's work, that the settlers in different parts of the colony will receive specific directions as to the cropping of their rainfall so as to provide even against the recurring calamitous droughts of the Australian climates.

An interesting feature of the reports are the diagrams, showing, by curves, the heights for each day of the Darling, Murrumbidgee, and Murray Rivers. A heavy flood occurred at Bourke, on the Darling River, on February 4, 1882, and reached its maximum, 26 feet 2 inches, by the end of the month, and the river did not fall to its summer level until April 5. This flood was occasioned by heavy tropical rains, from February 1 to 7, that fell over the northern part of the Darling watershed, which took two months to drain off, as is proved by the fact that little or no rain fell during the latter half of February and all March. In a few years these systematic observations of the heights of the principal rivers of Australia will furnish invaluable data for the determination of not a few important problems of meteorology and physical geography, which the marked insular character of this continent is so well suited to elucidate.

CALCUTTA BOTANIC GARDEN

SIR JOSEPH HOOKER has kindly placed at our disposal the following letter on the Calcutta Botanic Garden:—

“Our beautiful garden is now looking very nice. Let me tell you what I am looking out upon. On the right is a fine *Terminalia Catappa*, a mass of dark green foliage from base to summit, its branches with a quantity of *Soranthus longiflorus* on them. Further off, towering in the distance, is a clean-stemmed, stately-looking *Dipterocarpus alatus*, its branches the roost of vultures and *cheels*. Almost as tall, to one side of the *Dipterocarpus*, is a beautiful *Terminalia Arunja*, with mahoganies and the golden-flowered *Peltophorum* in front. *Dillenia pentagyna* in front, and *Morinda tinctoria* covered with masses of *Vanda Roxburghii*. There is a fine *Adina cordifolia*, one of the monarchs of the garden; its straight, strong stem, disdaining to bend in the sudden squalls and rain-storms, bears evidence of having been topped before,