

countries unconsciously contribute, in this way, to each other's welfare—before we proceed to remark the results of some recent valuable observations on the effects produced by the presence of water, and the action of the atmosphere, in drained and undrained soil.

It is, indeed, as a writer in the *North British Review* recently remarks, only the breezes of the encircling air which flows above and around us, that makes the whole world kin. The carbonic acid with which to-day our breathing fills the air, to-morrow seeks its way round the world: the leaves of the date-trees which grow around the Falls of the Nile, will drink it in; it will add to the stature of the cedars of Lebanon; the cocoa-nuts of Tahiti, the palms and bananas of Japan, will change it into flowers. The oxygen we are breathing was distilled for us some time ago by the magnolias of the Susquehanna; and the great trees which skirt the Orinoco, and the Amazon, the giant rhododendrons of the Himalayas, the roses of Cachmere, the cinnamon-trees of Ceylon, the deep forests of Central America contributed to it. The rain we have seen descending so copiously was exhaled by us from the warm surface of the ocean—thawed for us out of the icebergs which we watched for ages the polar star.

The amount of that rain, in Surrey (where the average fall is about 24 inches; it was only 19½ inches in 1858, and 22.25 in 1857, was but 20 inches in the last six months of 1859. It has been about 29 inches to December 1, 1860 as will be seen from the following table, which shows—

THE RAINFALL AT CROYDON, 250 FEET ABOVE THE LEVEL OF THE SEA, IN THE YEARS 1859 60.

	1859.	1860.
January .....	0.89	2.45
February ....	0.78	1.00
March .....	1.06	1.88
April .....	2.36	1.55
May .....	2.74	3.05
June .....	1.62	5.81
July .....	4.69	2.65
August .....	1.00	2.99
September ...	4.90	3.00
October .....	3.88	1.97
November ...	2.65	2.75
December....	2.47	to the 18th. 1.43

29.04

With such widely-differing depths of rain, we hardly add, how very interesting to the farmer is the proportion of these varying amounts of rain-water which his land-drains have to get away! This has been carefully determined on different kinds of soil—as on the chalk of Hertfordshire, by Mr. Dickson and Parkes (*Jour. Roy. Ag. Soc.*, vol. v., p. 11); on the limestone formation of Yorkshire, Mr. C. Charnock; *Ibid.*, vol. x., p. 516); and

on the London Basin clay and the gault, by Mr. J. B. Denton (*Ibid.*, vol. x., p. 273); and, in the course of these valuable observations, both Mr. Parkes and Mr. J. B. Denton had their attention drawn to several curious effects produced by the removal of the land-water on the temperature of the soil.

The rain-fall in Hertfordshire, during eight years, is given by Mr. Parkes in the following table in tons. By this record the farmer will see how much the relative evaporation and filtration of the rain-water varies at different seasons of the year, and, as might be reasonably concluded, its annual amount also; and he will note that, in practice, almost all the filtered portion must either be removed by drainage, or will remain as land-water, dissolving the saline matters, and in several other ways impairing the fertility of the soil:

April to Sept., incl.			Oct to March, incl.		
	Filt.	Evap.		Filt.	Evap.
1836 ..	212	1,023	..	1,574	330
1837 ..	10	982	..	693	452
1838 ..	12	1,082	..	855	393
1839 ..	263	1,500	..	1,246	159
1840 ..	—	980	..	829	362
1841 ..	—	1,514	..	1,437	269
1842 ..	131	1,099	..	1,059	387
1843 ..	100	1,822	..	720	538
Mean	91	1,192		1,052	360

Of the several injurious effects of leaving the soil soaking in water, the lowering of its temperature must be regarded as one of the chief. The different temperature of a drained and the adjoining undrained soil was ascertained by Mr. Parkes on another kind of land—viz., the deep peat of Chat Moss, in June, 1837 (*Ibid.*, vol. v., p. 141). He ascertained that, although the constant temperature of the *natural bog*, surcharged with water from 12 inches to 30 feet, was 46 deg., and the thermometer planted in the same substance at 7 inches deep constantly indicated 47 deg., yet that in a portion of the same bog, well drained and deeply stirred, at a depth of 31 inches, it indicated a maximum temperature of 48½ deg., having gradually gained 2½ deg.; and that in such well-prepared soils the action of the atmosphere is much more considerable and rapid than is commonly believed, is shown by the observation made during the same valuable experiments, that, although the temperature of the natural, unstirred soil at a depth of 7 inches, was only 46 deg., yet that the mean temperature during 36 observations of the stirred and drained soil was 10 deg. higher and that after a thunder-storm it rose to 66 deg. The following is the result of their observations:

Temp. of Atmosphere in Shade.	Time of Observation.	Depth below Surface, in inches.				
		81	25	19	13	7
June 10. 70.0	9 A.M.	46.10	48.2	50.0	53.0	57.0
15. 60.4	9 A.M.	47.35	49.8	50.8	53.0	57.0
17. 67.0	9 A.M.	48.0	50.0	52.8	55.6	58.8