

be said that this is very favorably above the minimum of 20 in. accepted as necessary for agricultural or pastoral purposes.

It is clear that precipitation in the Peninsula is not materially affected by deforestation, but is due more to the permanent conditions already outlined. The run-off is, however, very directly affected. The forest cover not only checks evaporation and snow melting but renders the surface permeable so that the water finds its way more readily into the ground to appear elsewhere in the form of springs, and by drawing up and exhaling moisture beneficially affects the atmosphere. Large swamps are natural reservoirs, like great sponges, and are extremely valuable in giving regularity to flow of springs.

The drainage area of the Grand River, as shown in shaded outline on the map, comprises nearly the whole of the counties of Wellington, Waterloo, and Brant, and parts of Dufferin, Halton, Oxford, Wentworth, Norfolk, and Haldimand, a total of 2,600 sq. miles, approximately one-sixth the area, and essentially the central part, of the Peninsula. In its original condition, about up to the year 1800, this whole area was densely wooded or covered with swamp. Some little clearing had been done before that date. From 1800 settlement extended as far as Waterloo County, which by 1820 was mostly taken up. From about 1850 on, settlement extended farther up, but the headwaters of the river in the townships of East and West Luther, Amaranth, Melancthon, and Proton remained practically intact until 1870. The township of Luther, now East and West Luther, as recently as 1871 is described as nearly wholly consisting of impenetrable swamp. The adjoining townships were largely swamp and partly hardwood forest. In the following years drainage of these townships, aided by special provincial legislation and provision of funds, became rapid, as did also the general clearing off of forests.

Up to about the year 1860 the flow of the river was fairly regular, with a good body of water throughout the summer and no great floods as a rule in the spring, except locally where the water might be held back by the formation of ice gorges. The spring freshets were in April or beginning of May, and only exceptionally as early as March. A record kept in Galt beginning with 1858 gives the spring freshets at that point as in March for the four years 1858, 1856, 1860, and 1861 (these years from other records appear to have been very low in snowfall) after which until 1877 they were almost all in April. After 1877 the floods were mostly in March and twice at the end of February.

The minimum summer flow seems to have decreased more particularly since about 1875, coincident with the drainage and