## Relations of Geology to Agriculture

of 60 or 80 feet. Its effects on the surface of the district therefore are chiefly to improve the soils of the linestone at the points of junction, and to form occasional narrow stripes and patches of stiff clay, richly calcereous, and productive in wheat. When the escarpment of the Helderberg limestone is less bold than where I visited it, near Syracuse, its surface is generally overspread with the débris of the softer rocks which adjoin it on either side. It is so in the line of the cross section N S (Section, No. III.), and there the soile which cover it form a prolongation of the rich land, fertile in wheat, which covers the plains below.

In the accompanying outline map it will be seen that the belt formed by these rocks (5 and 6) is very narrow in Western New York. Farther to the west however it expands, and along the north shore of Lake Erie it forms a wide and valuable tract of land in the fast filling-up and fertile region of Western Canada.

No. 7, the Hamilton Group, consists of olive and dark-blue shale, which, when alone, forms stiff dark-coloured clays far less rich in calcareous matter than the Onondaga soils. They are therefore less open and friable, and in consequence more difficult and expensive to work. Still they are capable of producing excellent wheat under favourable circumstances, or when properly prepared. The celebrated Genessee valley rests on this formation, but the natural soil of the Hamilton shales is there modified, or altogether covered by drifted fragments of the Niagara limestone and other more northern formations, which have been washed up the valley. Hence the quality of the Genessee soils is not that which is natural to those of the Hamilton group.

This group is of great thickness, and, as is shown in the map, forms a belt of land 10 or 12 miles in breadth. Where the shales are rich in lime they are submitted to arable culture. They are everywhere however difficult to keep clean, and are especially infested with corn gromwell (Lithospermum arvense), called here pigeon-weed. They are for the most part, therefore, like our own stiff clays of the lias and other formations, left to perpetual grass, which they produce of excellent quality. Here, therefore, the grazing and dairy country of Western New York commences.

Nos. 8 and 9. The Genessee Slate (No. 8), which is separately distinguished in the cross section (No. III.), is too thin to form an important agricultural feature of the country. It crumbles more slowly than the Hamilton shales; but where its fragments mix with those of the Tully and other thin linestones and calcareous shales beneath it—also represented in the section—it forms good soils.

The Portage and Chemung Groups (No. 9) consist of alternations of shales, poor in lime below, with flagstones and massive sandstones. They are of enormous thickness, and extend south-

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