

FOURTH THEORY OF SURFACE GEOLOGY.

General Statement.—Since the tertiary period, those countries where drift and terraces exist have been depressed in a great measure beneath the ocean; the United States from 2,000 to 3,000 feet, England 2,300 feet, Scotland from 1,000 to 1,200 feet, and Switzerland from 2,500 to 3,000 feet. Subsequently they have been slowly elevated to their present levels, and drainage has gone on from their entire surfaces.

Drift is mainly the result of these four agencies—glaciers, icebergs, waves of translation, and landslips—acting upon the surface while it was sinking beneath, and rising above the ocean. The forms of modified drift were produced by the same agencies with the addition of rivers. From the close of the tertiary period to the present time, these operations have formed an uninterrupted series. We will now present a particular statement of the condition of this continent at the several divisions of this period.

The Drift Period.—Near the close of the tertiary period there commenced, we suppose, a reduction of the general temperature from the sinking of the land. When sufficiently depressed it would bring oceanic currents from the polar towards the tropical regions. If North America was now submerged, east of the Rocky Mountains, a current from the northwest would flow over it; and if South America was submerged, east of the Cordilleras, a current would flow over it from the southwest.

In connection with this gradual submergence, taking North America and the west part of Europe as an example, two causes would operate to reduce the temperature: 1. The Gulf Stream (the present cause of the higher temperature of Europe than the United States, and of the Atlantic coast above the interior) would be diverted from its present course, and pass along the eastern base of the Rocky Mountains into the northern ocean, and thence perhaps along the coast of Asia. 2. The current from the Arctic regions would be loaded with icebergs, which would be stranded along the shores, and so reduce the temperature that probably the summer could not melt away the ice; and the sea, like that around the poles, might be choked with ice as far south as we now find drift.

As a consequence of this access of cold, while the land was sinking glaciers would form on mountains comparatively low, and where they do not now exist. These would reach to the sea, as they now do, in Arctic regions.

The enormous icebergs that would be moved southerly in such circum-