

of temperature ; generally speaking, they show an increase of 1° C. in grades of about 30 to 34 metres (104 to 118 feet). The results yielded by borings have been confirmed by observations in the great Alpine tunnels.

The Italian geologist, Giordano, published in 1870 exact observations made in the Mont Cenis tunnel, and the German civil engineer, Stapff, published those in the St. Gothard tunnel (1877-80). In the middle of the Mont Cenis tunnel the rock has a temperature of 29.5° C.

In spite of the numerous local variations in the exact rate of increase of temperature, there can be no doubt that the temperature of the ground increases so far as depths below the surface have yet been reached ; the probability is that at still greater depths still greater increase of temperature takes place. Hot springs in many cases rise from great depths, and cannot be shown to have connection with volcanoes or with any particular geological formation.

Calculations have been made with respect to the probable rate of progression in the increase of temperature at depths still unattained, but the results cannot be regarded as trustworthy. Thus, although all geologists agree that the rise of temperature in the earth's crust is due to the internal heat of our planet, we have not yet sufficient data to determine either the prevailing inner temperature or the thickness of the earth's crust.

At the same time, the hot springs and geysers indicate temperatures that reach the boiling-point in the earth's crust, and the wide distribution of volcanoes demonstrates still higher degrees of temperature in the crust. The scientific authorities in the first half of the nineteenth century regarded it as an accepted fact that the earth's nucleus was molten, and was surrounded by a comparatively thin crust. Humboldt and Elie de Beaumont valued the thickness of the earth's crust at 40 to 50 kilometers, and this result almost agrees with the more recent work of the Rev. O. Fisher, who valued the thickness at 25 English miles. But the calculations made by various authorities differ very considerably, some calculations giving a result of only 14 English miles for the thickness of the earth's crust, others a result as great as 75 English miles.

The great chemist, Sir Humphrey Davy, did not believe in the original molten condition of the earth's nucleus. He believed that the earth's nucleus was originally composed of