

the earthy and alkaline metals, and that its prevailing high temperature was due to chemical processes. Davy's explanation afterwards found favour with De la Rive and Charles Lyell. Volger explained the heat of the earth partially as a product of the pressure which the higher mountain-systems exert upon the regions underlying them, partially as a result of the chemical changes constantly going on in the earth's crust; and the Ultraneptunist chemist, Mohr, in his *Geschichte der Erde* (1866), explained the internal heat of the earth as a transmutation of the sun's energy by chemico-physical processes.

Lichtenberg and Franklin thought that the firm earth's crust surrounded a half-gaseous, half-viscous mass of very great density. This opinion was accepted by Herbert Spencer, and has since been placed upon the basis of the Mechanical Heat Theory by Ritter (1879) and the geographer Zöppritz (1882). According to this theory, there is under the firm crust a zone of viscous material, then a zone of more fluid material; the earth's nucleus itself, however, is said to consist of an outer gaseous part, in which the gases are in their normal condition, and an inner gaseous part, in which they are above the critical point. Owing to the excessive pressure, the gaseous material of the earth's nucleus is said to become no less dense than liquid or solid bodies.

The English physicist, Hopkins, has been one of the most famous champions of the theory of the earth's rigidity. Seeing that the earth behaves as a firm mass in response to the attraction of other bodies in the universe, and that the phenomena of precession and nutation are not consistent with an even partially fluid or plastic condition of the earth, Hopkins concluded that the earth has been rendered for the most part solid, in consequence of the cooling and of the great pressure within the earth. Like Hopkins, Poisson and Ampère (1868) were also of opinion that the earth's nucleus could not be fluid, as otherwise the attraction of the moon would cause gigantic tidal waves to take place in the firm crust.

The physicists, Lord Kelvin (Sir W. Thomson) and George Darwin, also attribute great importance to the enormous pressure existing in the interior of the earth, and the consolidation of the nucleus from this cause. Darwin agrees with Hopkins in respect of the behaviour of the earth relative to the sun and the moon, and tries to prove by calculation that