

PART II.

STRUCTURAL GEOLOGY.

THE earth, separate from its water and air, — that is, the *lithosphere*, as it is sometimes called, — is made up of rock-material, and the portions, whether masses or beds, which come under geological study, are termed *terrane*s. Structural Geology treats of the mineral constituents of terranes; of the rocks which the minerals form; and of the structure and general arrangement or positions, and other characteristics of terranes. Some terranes, though unconsolidated, in a general way come under the head of rock-deposits; for consolidation is an incident that may or may not take place.

The subdivisions of Structural Geology as here adopted are: —

- I. Rocks: their constituents and kinds.
- II. Terranes: their constitution, characteristics, positions, and arrangement.

I. ROCKS: THEIR CONSTITUENTS AND KINDS.

THE ELEMENTS, AND THEIR SIMPLER COMBINATIONS.

The number of elements, or substances, not yet shown to be compound, that have been obtained from the earth's rocks and minerals is 70. Of these, oxygen, nitrogen, hydrogen, chlorine, and fluorine, at the ordinary temperature and pressure, are gases. A few facts are here stated respecting the elements of most geological importance.

Oxygen. — Oxygen is the most abundant element. It constitutes 88·89 per cent by weight of water, 21 of the atmosphere, and about 50 of all other material in the earth's structure. It owes its importance in nature to the intensity of its chemical attraction for nearly all the elements. Ordinary combustion of wood, coal, or gas is due to the combination of its elements with oxygen; and living growth is dependent on the same process.

Combined with (1) *hydrogen*, oxygen forms water, H_2O ; with (2) *potassium* (called also *kalium*), potash, K_2O ; with (3) *sodium* (*natrium*), soda, Na_2O ; with (4) *lithium*, lithia, Li_2O ; with (5) *calcium*, lime, CaO ; with (6) *magnesium*, magnesia, MgO ; with (7) *iron* (*ferrum*), the two oxides, FeO and Fe_2O_3 ; with (8) *aluminium* (the metallic base of clay), alumina, Al_2O_3 ; with (9)