soluble substances, both through the activity of its own waters and by drainage from the surrounding soil; these substances are derived chiefly from the dissolution of rocks, with or without preliminary chemical decomposition, in which not only water but also carbonic acid and humic acid play a part. The general geochemical effect of flowing waters may be described as the action of a very dilute solution of carbonic acid on the earth's crust, resulting in a continual transference of matter to the ocean. Thus it is impossible for any river to be quite free from dissolved solids; but, on the other hand, the breaking down of rocks into soluble matter is an exceedingly slow process, and is very far indeed from keeping pace with the supply of pure meteoric water. Hence river waters, regarded as solutions, are necessarily of extreme dilution. The formation of anything like concentrated solutions only occurs in enclosed basins, *e.g.* the ocean or terminal lakes, as will be illustrated on a later page. Of the elements found in solution, the foremost are calcium, magnesium, potassium, and sodium, as ranking among the most abundant constituents of the lithosphere; further, sulphur (as sulphates) and chlorine, as being, though less abundant, of highly soluble tendency; whereas silicon, aluminium, and iron, the most abundant elements of all, are but insignificant items, owing to their insoluble tendency.

Wherever there are sedimentary formations, that is, in most parts of the world, there is sure to be calcium carbonate in some form; this substance readily goes into solution, up to certain limits, in water containing carbonic acid, and, though it is very liable to be extruded by other solutes, or by removal of free carbonic acid, is to be regarded on the whole as the principal solute in rivers and fresh-water lakes. The precise form in which the various inorganic constituents exist in solution cannot here be dealt with at length. Broadly speaking, they are present not as definite salts, that is, combinations of an acid and a base, like sodium chloride, magnesium sulphate, etc., but as ions. Basic and acidic constituents, in fact, exist independently in solution, whilst salts as such are practically limited to the solid state. The result is that, if ever two ions, derived originally no matter from what salts, are in solution together to such an extent that the salt combined from them would be supersaturated, that salt is precipitated out of solution as a solid.

The presence of calcium carbonate in a water which otherwise contains only sulphates and chlorides causes the water to show a weak alkaline reaction towards delicate indicators; but it is important to note that, when a water is spoken of as "alkaline," it owes its alkalinity not to calcium but to the alkali metals, sodium and potassium. These latter, when leached out of igneous rocks, are not accompanied by a strong acidic principle (*e.g.* Cl or SO_4)