

with about 14 per cent. of water,) is abundant, although it does not form an essential constituent of rocks. It constitutes the rust of iron and is formed when the silicates and other salts of iron become altered by exposure and disintegrate.

It constitutes the ore called brown hematite, which forms extensive beds and masses. It is common in the upper portions of metalliferous veins under the name of gossan.

13.—OXIDE OF MANGANESE,

Exists as a silicate in numerous minerals and rocks, and also in masses and in veins.

Both iron and manganese are so extensively distributed over the surface of the earth, that there are few rocks or clays in which they do not occur, either as essential or adventitious ingredients.

14.—SULPHUR,

Occurs in volcanic regions, and in combination with metals is extensively distributed. It is most abundant as sulphuret of iron or pyrites which occurs in veins and in masses, as well as disseminated in various rocks, whose destruction it hastens when exposed to atmospheric action. The oxygen of the air converts it into acid sulphate of iron, or copperas, which flowing over other minerals affects chemical changes therein. When it comes in contact with limestone or marl it produces gypsum or sulphate of lime. It is by this means nature often supplies gypsum to the soil.

Sulphur or its sulphurets or sulphates, are so universally distributed that there is no soil where plants can grow, in which at least a trace of one of them cannot be detected.

15.—PHOSPHORIC ACID,

In some of its combinations is also in every soil, because there can be neither animal life nor vegetation without its aid. Phosphates of lime, alumina and iron are found among minerals. Phosphate of lime, although more abundant than other phosphates, occurs in few localities in large quantities as a mineral. We find it in a few mineral veins, and in small proportion in certain marls derived from fossils. The beds of phosphate of lime in the more recent formations are evidently of animal origin as in the case of the coprolites of Europe.