

which is obtained by the mechanical operations of farming. They accelerate the decomposition of the soil, in order to provide a new generation of plants with the necessary elements in a condition favorable to their assimilation. It is obvious that the rapidity of the decomposition of a solid body must increase with the extension of its surface; the more points of contact we offer in a given time to the external chemical agent, the more rapid will be its action.

The chemist, in order to prepare a mineral for analysis, to decompose it, or to increase the solubility of its elements, proceeds in the same way as the farmer deals with his fields—he spares no labor in order to reduce it to the finest powder; he separates the intangible from the coarser parts by washing, and repeats his mechanical bruising and trituration, being assured his whole process will fail if he is inattentive to this essential and preliminary part of it.

The influence which the increase of surface exercises upon the disintegration of rocks, and upon the chemical action of air and moisture, is strikingly illustrated upon a large scale in the operations pursued in the gold mines of Yaqul, in Chili. These are described in a very interesting manner by Darwin. The rock containing the gold ore is pounded by mills into the finest powder; this is subjected to washing, which separates the lighter particles from the metallic. the gold sinks to the bottom, while a stream of water carries away the lighter earthy parts into ponds, where it subsides to the bottom as mud. When this deposit has gradually filled up the pond, this mud is taken out and piled in heaps, and left exposed to the action of the atmosphere and moisture. The washing completely removes all the soluble part of the disintegrated rock; the insoluble part, moreover, cannot undergo any further change while it is covered with water, and so excluded from the influence of the atmosphere at the bottom of the pond. But being exposed at once to the air and moisture, a powerful chemical action takes place in the whole mass, which becomes indicated by an effervescence of salts covering the whole surface of the heaps in considerable quantity. After being exposed for two or three years, the mud is again subjected to the same process of washing, and a considerable quantity of gold is obtained, this having been separated by the chemical process of decomposition in the mass. The exposure and washing of the same mud is repeated six or seven times, and at every washing it furnishes a new quantity of gold, although its amount diminishes every time.

Precisely similar is the chemical action which takes place in the soil of our fields; and we accelerate and increase it by the mechanical operation of agriculture. By these we sever and extend the surface, and endeavour to make every atom of the soil accessible to the action of the carbonic acid and oxygen of the atmosphere.—We thus produce a stock of soluble mineral substances, which serve as nourishment to a new generation of plants, and which are indispensable

to their growth and prosperity.—*Liebig's Familiar Letters on Chemistry.*

*Chemical Analysis.—Red Rust.*—As an instance of the benefit of analysis, I may here briefly mention, that on a recent chemical examination of the soil of several of our fields at Flockton, Mr. Haywood, the analytic chemist whom we employed, discovered in it an appreciable quantity of phosphate of iron, and traced this substance to be the cause of the red rust (?) which so frequently attacks the wheat. To satisfy himself that the presence of this substance was the cause of that disease, he collected a quantity of this rust, which he minutely analysed, and he satisfactorily proved that it was composed of phosphoric acid and iron, a combination which, it appears, is injurious; but to ascertain a mode of correcting or decomposing this injurious compound, he subjected it to the action of quick lime, when he discovered that two fertilizing substances were immediately formed, namely, phosphate of lime, which is the chief ingredient of bone, and peroxide of iron, which also is a substance possessing fertilizing properties, both from its being an ingredient in many cultivated plants, and from its having the power of fixing ammonia. The known fertility of many of the red soils is owing to the presence of this latter compound, and the efficacy of burnt clay, as a tillage, is, in a great measure, due to the conversion of the protoxide into the peroxide of iron, by the operation of burning. On afterwards examining fields of wheat which had been lately limed, and others which had not been so treated for many years, in the former we did not discover the rust, but in the latter it was prevalent.—*Eng. Ag. Gaz.*

*A nice and wholesome Sweetmeat for Family Use.*—Pare or not, as you choose, a quantity of sweet apples to fill an earthen or stone jar; add a little sugar and molasses, and if the apples are not sufficiently juicy, a little water; cover with a thick paste of flour and water, and put into a brick oven with your bread. Let them stand till morning. They will have the flavor of baked pears, and can be had fresh at all seasons.—*Am. Ag.*

*Valuable Recipe for Whitewash.*—Take about a peck of unslacked lime, and slake it in hot water; add to this, while hot, about six pounds of lard, or any house grease; then put in about two pounds of glue, and if for nice inside painting a pound of Spanish whiting, and a few handfuls of salt. Apply it on while hot. This recipe was obtained from Mr. John Noble, of the Dennison House, who has been very successful with this on his buildings. No rain or dampness has any effect to darken this whitewash at any time.—*West. Far. and Gar.*