

and countries with the expectation of seeing the water emerge from them as pure and sparkling as from a good "spring," and the greatest surprise has been manifested at the failure to secure the same results when apparently every condition was supplied. The question remains, "Was every condition supplied?" Modern science answers, "No."

The peculiar action of the above salts upon the portion of impurities said to be held in solution is well illustrated by the effects produced by dissolving soap in a water of great (so-called) hardness. The white flakes that almost instantly appear are composed not alone of dissolved soap (for soft water would not show such individualized flakes), but a mixture of soap and some substance hitherto held in undisturbed solution in the water, but now withdrawn from that condition and floating about in mechanical suspension.

It will be plain that if this soap-treated water was now poured into the earth at one point, and made to emerge at another some distance off, it would be found purged of not alone the soap it contained, but also of the modicum of foreign matter held in its embrace, and which went to make up the quality of hardness spoked of.

This subject is so little (generally) understood, that it seems necessary to use the above illustration for the benefit of the casual reader, although to the chemist a hundred different applications of the same law will suggest themselves. Indeed, it is noted here for the purpose of calling more emphatic attention to the simple fact that water may contain impurities in absolute (chemical) solution, and that such impurities, by the addition of another substance, may be rendered tangible, and capable of withdrawal from the water by purely mechanical means.

Equally clear and understood should be the statement that water may contain impurities in a state of fine (mechanical) suspension,—so fine that they would flow wherever water would flow,—and these, by the addition of another substance to the water, be made to flock together into groups, a thousand or two into one (as clouds are condensed into drops); and that one, with its fellows, be tangible, and easily removed from the water by purely mechanical means.

It follows, that if the earth contains in abundance this "substance," which has the dual property of disengaging matter held in solution, and rendering the same tangible, and also of curdling together matter held in so fine a state of division as to almost elude the senses into a state of perfect tangibility, we at once get at the secret of how nature makes the true spring-water, so wonderfully pure and sweet to the taste, as well as brilliantly clear, and inviting to the eye.

What is this substance or substances? Usually some combination of lime, iron, potassium, aluminum, etc., with other bases, such as sulphur or carbon,—all existing naturally in the great mother matrix, the earth.

The almost universal diffusion of the aluminiferous earth (red clay) makes that substance take a more prominent place among the agents above alluded to. Water cannot flow far in any part of the world without encountering in its course the coagulating or curdling effect of this single element. Some of these clays are more heavily charged or freighted with aluminous compounds than others. Waters fouled by such are more quickly subsided. In this fact we have a clew to the explanation of why it is, that, of two different waters showing the same degree of turbidity from clayey impurities, such impurities will subside quickly in one, while in the other they may not subside in