brown color to them. It is this which gives our red and yellow clay soils their peculiar color and frequently also tinges sand —which thus colored is called Ferruginous sand. It has several important uses in the soil.

1st. It is one of the necessary constituents of the human body being always found in the blood of healthy persons. From the impossibility of its existence in the air, we know that the body must be supplied with it from the food which it consumes; but the plants used for food can no more obtain it from the *air*, than animals can, hence they must obtain it from the soil, and it is therefore a necessary constituent of soils.

Not only is it itself food for plants, but it is a gatherer of food for them from the atmosphere.

Baron Liebig, one of the ablest writers on agricultural chemistry, of this or any other day, though overlooking the first use of iron in a soil, so clearly and satisfactorily explains the second, that I cannot do better than use his own words:

* "Per oxide of iron and alumina" says this able and eloquent writer, "are distinguished from all other metallic oxides," (i. e. rusts of metals,) "by their power of forming solid compounds with ammonia. The precipitates obtained by the addition of ammonia to salts of alumina or iron are true salts in which the ammonia is contained as a base. Minerals containing alumina or oxides of iron, also possess in an eminent degree the remarkable property of attracting ammonia from the atmosphere and retaining it. * * * * Soils therefore containing the oxides of iron and burned clay, must absorb ammonia, an action which is favored by their porous condition; they further prevent by their chemical properties the escape of the ammonia once absorbed. Such soils act indeed precisely as a mineral acid would do if extensively spread over their surface."

"The ammonia absorbed by the clay of ferruginous oxides is separated by every shower of rain and conveyed in solution to the soil."

Our red and yellow clays need not burning, the iron in them being already in the state of per oxide, heat would not benefit them. It is only in the white or dark clays where the iron is in the state of protoxide, that heat would be of any use if applied.

The per oxide of iron in a soil, also absorbs and retains moisture, and whatever else of the food of plants which exists in the air.

3rd. It gives firmness and compactness to the soil, and better fits it for those plants which flourish best in those soils.

4th. It gives color to soils which makes them absorb heat better, and in this way it gives crops a quick, early growth.

The quantity of the peroxide of iron, which exists in soils is very variable. In the red clay lands of Cecil, I have found as much as (4.80';) four and eight tenths of one per cent. In some of

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*Chemistry in its Applications to Agriculture and Physiology. (Edited by Lyon Playfair and Dr. Gregory, 4th London Edition.)