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The Field.

On the "Tchornoi Zem." or Black Earth of Russia.

The soils comprised under the designation of *Tchornoi Zem*, or Black Earth, have long been known for their great extent and extraordinary fertility. They occupy the great central plain of Russia, and although their boundaries have never been rigidly defined, they are computed to cover at least sixty or seventy thousand square miles. These soils occupy a considerable portion of Hungary, and from recent observations are supposed to extend, northeast, into the vast plain of Siberia. In the settled portions of Russia, this soil already supports a population of more than twenty millions, and yields vast quantities of wheat and other grains for exportation to various European countries. It must not be supposed, however, that this vast extent of country is occupied by soils of the same high and uniform fertility. This Black Earth occurs, indeed, in areas sometimes consisting of several large parishes, and is invariably the superior deposit, covering all other accumulations of clay, sand, &c. In thickness it varies greatly from five to twenty feet. "In travelling over these black tracts," observes Sir Roderick Murchison, "in the dry summer of last year, my companions and myself were often, during a whole day, surrounded by a cloud of black dust arising from the dried-up 'Tchornoi Zem,' which, even in rich grass countries, like those east of Odoyef, is of so subtle a nature as to rise up through the sod, under the stamp of the horses' feet, and form so dense a cloud, that on arriving at our station, we were often amused at our chimney-sweep appearance."

These soils,—for the "Tchornoi Zem" differs somewhat in its chemical and mineral composition, (although as a whole it is most remarkable for its uniform character)—have long been distinguished for extraordinary productiveness in grass and grain, and among the peasants of central Russia, the use of manure appears to be almost unknown. Vast heaps of it are said to have accumulated on most of the farms, often constituting a great nuisance, and wasting away by the natural process of decomposition. Under a system of constant and indiscriminate cropping, with imperfect cultivation, carried on for a great number of years, diminished returns at length resulted; a circumstance that roused the attention of the proprietors, who awakened the tenants to the necessity of improved methods of culture and the application of manure. Root and forage crops, which were formerly unknown, have of late years been partially introduced. It would appear that nothing more is required to sustain the high natural productiveness of the soil than clean tillage and moderate manuring, apart from the use of all extraneous substances.

This soil, as its name indicates, is, when moist, of a jet black, and when dry, of a dark brown color. It is remarkable for having its organic and mineral constituents so minutely divided and intimately mixed. The organic portion varies considerably, but it is always relatively large, varying in the dried samples that have been subjected to analysis from six to eighteen per cent. Its different parts being so thoroughly commingled, the mechanical texture is comparatively free and open, thus allowing air and water a ready communication with the roots of plants; a condition highly favorable to nutritious and healthy growth. The amount of nitrogen which it contains is always considerable, and thus a large quantity of ni-

trogenous compounds is formed by the agency of air and moisture, so favorable to the growth and maturity of farm crops.

Professor Johnston observes that "in this black earth the composition of the mineral or inorganic part is also such as to promote fertility. In one of the richest varieties, in which the organic matter amounted to eighteen per cent., the mineral was found to consist of:—

	Per Cent.
Potash.	5.81
Soda	2.31
Lime	2.60
Magnesia	0.95
Alumina and oxide of iron, with traces of phosphoric acid.	17.32
Silica, of which 7 or 8 per cent. were soluble.	70.94
	99.93

The above analysis clearly indicates how admirably nature has adapted the mineral constituents of this soil to the growth of plants. That celebrated French agricultural chemist, M. Payen, after analysing a portion of this black earth, remarks:—"The composition of this earth is remarkable for the proportion of azotised matter which it contains, and the volume of the azote. The connection between this earth and the organic substance, when the latter is so rich in azote, appears to me to be essentially one of the surest indications of the fertility of the soil, other conditions of chemical properties and mineral composition being favorable. In this respect, and according to my compared analyses, the earth in question approaches very near to two of the most fertile soils in France: that or the Limagne d'Auvergne (valley of the Upper Loire), and that of the neighbourhood of St. Denis, near Paris, notably in the farms of Marville and Stains." He observes further, that the peculiar gaseous contents of the black earth may be the