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AGRICULTURAL FACTS.

The cultivated part of the earth's surface is called the soil, and that immediately below the subsoil.

The soil is composed of a variety of combinations of the three primitive earths united with organic matter in a state of decay.

The three principal earths are Silex, Alumina and Lime.

Silex is generally an ingredient of the soil in the form of fine sand, an impalpable powder, coarse sand, sharp and gritty gravel, or nodular masses of flint.

Alumina is the pure earth, or characteristic matter of clay, and was called allumina because it was obtained from alum in its greatest purity, by the abstraction of the potash and sulphuric acid, which were then in combination with it.

Lime in the protoxide of calcium; it is powerfully caustic, and has properties intermediate between those of an earth and those of a pure alkali; it is therefore called an alkaline earth.

In combination with other elements of matter, it is a large and important constituent of the aggregate rocks of the earth's crust.

The poorest soils are generally the purely silicious sands. An excess of alumina or clay also produces an unfaithful soil, it being a tenacious adhesive substance, retaining water, which combines chemically with it to a considerable extent.

When lime forms the principal ingredient in a soil, it is usually a carbonate of lime. It too is barren of purely limestone; yet as it absorbs moisture and some portions decompose rapidly, the valleys are generally made fruitful from the debris of the hills.

Some tracts of country contain what are called Diluvial and Alluvial soils.—Geologists have given the name of diluvium to accumulations of sand, gravel, and other materials, which are occasionally found covering in masses some of the older formations.

Alluvium is the material which is washed by the floods of rivers from the surface of the surrounding hills and lands, when their motion is rapid, and consists of minute particles of their soil and vegetable matter, which are deposited on the level ground over which they flow when their motion is sluggish.

Peat soil exists in a variety of forms, and has various names applied to its different varieties; all soils that have a superabundance of half decayed vegetable matter in them are called peaty soils.—The most extensive tracts of this class are what are called flow, or fibrous bogs. Peat is found in the counties of Welland, Renfrew, and Ottawa.

To be continued.

MATHEMATICAL CORNER.

1.—The national debt of Great Britain is seven hundred and fifty-six millions of pounds, out of which the commissioners have redeemed one hundred and seventeen millions and a half, how long will the remainder take in paying off, if eight millions be applied annually, at the rate of five per cent, compound interest for the purpose?

2nd.—What is the expectation of a life at 66, according to the tables used by all the chief Life Assurance offices?

2.—What is the difference between an annuity during a life of 26, and an annuity certain for 20 years at 5 per cent?

4.—A club of 21 persons agreed to meet weekly, five at a time, so long as they could without the same five persons meeting together; how long would the club exist?

5.—There are three parties of cricketers, in each eleven men; in how many ways can eleven men be chosen, one out of each?

ANSWERS TO THE MATHEMATICAL QUESTIONS IN OUR FIRST ISSUE.

1st.—As radius is to a breadth of a degree of longitude on the equator—60 miles, so is the co-sine of any parallel of latitude to the breadth of a degree of longitude in that parallel.

As the question just answered is one which pupils often ask, we will give the proof. Because the parallels of latitudes are small circles drawn parallel to the equator, which are getting smaller as they approach the poles, and as all circles are in proportion to their diameters, it is evident that a similar portion of each circle will also be in proportion to their radii; consequently as the co-sine of each latitude is the radius of the circle of that parallel of latitude, it follows that radius is to any portion of the equator, as the co-sine of any latitude is to a similar portion of a parallel circle in that latitude.

2nd.—Take the difference between the sum of the northings and southings from their respective columns, and this difference will be the whole difference of latitude made good; and the difference between the sums of the eastings and westings will be the whole departure made good.

3.—Draw a line at the bottom of the paper, and with a pair of dividers taking 60 off from any scale of equal parts, with this divide the said line to represent the degrees of longitude, then by erecting perpendicular lines, one at each edge of the paper, and laying thereon the meridional difference of latitude from one degree to another, beginning from the lowest latitude of that part of the coast we have to construct to the highest; and after the outlines of the chart have been thus prepared, draw the parallels of latitudes and longitudes at such convenient distances as not to crowd the paper with too many lines, then marking the limits of latitude and longitude on their respective lines, proceed to lay down the line of coast by cross bearing from one given station to another, until the survey be complete, taking care to note the configuration of the shore, the views of remarkable headlands, watering places, rocks, shoals, channels, dangers, depth of water, setting and drift of the