

manuscripts and literature; and when learning revived the practice of husbandry diffused itself, and the noble art sprang as it were into new life.

Modern agriculture has for some of its leading characteristics a more general and effectual draining of wet lands, deeper and more thorough cultivation by means of improved implements, as sub and trench ploughing; a more scientific rotation of crops; the economising and more effective application of manures, and the proper adjustment of animals to the amount of land cultivated.

*Question 4*—How is matter divided? Define and illustrate *elementary, compound, organic* and *inorganic* substances? What are soil, plants and animals composed of?

*Answer*.—Matter exists in the following states, viz:—solid, liquid, gaseous and vesicular. A familiar example is water, which by being exposed to a low temperature, becomes a solid, (ice) which again is liquified by heat, and by still further heat is converted into an invisible vapour (steam.)

An elementary substance is matter that cannot be reduced to a simpler form; *e. g.*, iron, oxygen, sulphur, &c. A compound body is that which is made up of two or more elementary substances; *e. g.* oxide of iron or rust, consisting of oxygen and iron, sulphate of potassa, composed of sulphur and potassium, &c.

Organic substances are the result of life, in the vegetable or animal, and by heat become decomposed and converted into invisible gases; *e. g.*, carbonic acid, oxygen, hydrogen, &c.

Whereas inorganic bodies do not consume by heat, were never the seat of any sort of life, being purely mineral; *e. g.*, iron, silica or sand, iodine, manganese, &c.

Soils are generally composed of a number of different substances, the principle being clay, sand, and lime, potash, soda, magnesia, manganese, &c., are more or less found in connection with organic substances in all fertile land.

Plants consist mainly of carbon, oxygen, and hydrogen, with small portions of nitrogen, combined with the several substances mentioned in soils.

Animals consist of the same organic elements constituting plants, but with a much larger proportion of nitrogen, and a very great amount of the phosphate of lime in the bones, so valuable as a manure.

*Question 5*.—State the composition and uses of *atmospheric air and water*, and their relations to vegetable and animal life.

*Answer*.—Atmospheric air mainly consists of two gases, nitrogen and oxygen; about 79 parts of the former and 21 of the latter in every 100 of common air. There are also diffused through the atmosphere small quantities of carbonic acid gas, ammonia, and some aqueous vapour.

Water consists of a chemical combination of oxygen and hydrogen, in the proportion of 8 of the former with 1 of the latter. This is pure rain water, but the waters of springs, rivers, &c., have in them a number of other ingredients, as lime, soda, &c., in varying proportions.