hand, from an absence of practical knowledge of the real wants of the farm on the part of botanists and horticulturists, and on the other, from the want of a sufficient amount of botanical knowledge on the part of farmers to give them trust in novelties and the means of ascertaining those peculiarities necessary for their successful culture.

The reciprocal relations of Soil Plant and Animal, must therefore be ever kept before us in their physiological capacities while we discuss the relations of chemistry to practical farming.

Professor Daubeny, of Oxford, remarks that one of the most beneficial aids of chemistry is to impart greater precision to the known and familiar methods of culture, by pointing out the causes upon which their efficacy depends, and thus to enable the agriculturist to employ greater discrimination in their use; while another not less important practical end is that of furnishing a clue to the discovery of new and economical sources for materials of acknowledged utility in husbandry, and instructing us how to preserve, in all their integrity, the constituents on which their virtue depends. The diffusion of scientific information among farmers is valuable, not merely as regards the attainment of truth, but likewise in the exclusion of error. While it promotes the progress of agricultural knowledge in a right direction, it guards at the same time against the evils produced by fanciful hypothesis.

How interesting says Johnston, it is to contemplate the relations, at once wise and beautiful, by which organic matter, intelligent man, and living plants, are all bound together. The dead tree and the fossil coal lie almost useless things in reference to animal and vegetable life. Man employs them in a thousand ways as ministers to his wants, his comforts, or his dominion over nature; and in so doing he himself directly, though unconsciously, ministers to the wants of those vegetable races which seem to live and grow for his use and sustenance. How beautiful also does the contrivance of the expanded leaf appear! The air only contains one gallon of carbonic acid in 2500, and this proportion has been adjusted to the health and comfort of animals, to whom this gas is hurtful. But to catch this minute quantity, the tree hangs out thousands of square feet of leaf, in perpetual motion, through an ever-moving air; and thus, by the conjoined labours of millions of pores, the substance of whole forests of solid wood is slowly extracted from the fleeting winds.*

The contrast and antagonism between the processes of animal and vegetable life, whereby they counteract each others effects, and give rise to harmonious action in the phenomena of nature, are well shown in a table given by Dumas and Boussingault:—

AN ANIMAL is	A VEGETABLE is
An apparatus of Combustion or oxidation.	An apparatus of reduction or deoxidation.
Possesses the faculty of locomotion.	Is fixed.
Burns Carbon	Reduces Carbon.
" Hydrogen.	" Hydrogen.
" Ammonium.	" Ammonium.
Exhales or gives off Carbonic acid.	Fixes Carbonic Acid.
" Water.	" Water.
" Oxide of Ammonium	" Oxide of Ammonium.
" Azote.	" Azote.
Consumes Oxygen.	Produces Oxygen.
" Neutral Azotised matters.	" Neutral Azotised matters.
" Fatty matters.	" Fatty matters.
" Amylaceous matters.	" Amylaceous matters.
Gum and Sugar.	Gum and Sugar.
Produces Heat.	Absorbs Heat.
" Electricity.	Abstracts Electricity.
Restores its Elements to Air and Earth.	Derives its Elements from Air and Earth.
Transforms organized into mineral matters.	Transforms mineral into organized matters.

Whilst animals are endowed with organs of locomotion, and other apparatus giving them great powers of *selecting* their food, vegetables are, on the other hand, stationary organisms, dependent for their supplies upon the earth and air immediately around them. Even plants, however, have certain powers of selecting from the substances presented to the absorbent surfaces of their roots, according to the researches of Saussure, although these are not always sufficient to prevent the absorption of injurious matters. We are also required to keep in view that while an animal feeds on food (such as plants and flesh) already organized, and ultimately restores its element to the earth and air, the plant, on the other hand, feeds on inorganic substances, and transforms mineral into organised matters. Soils in different countries and in different parts of the same country present the substances required by plants in varying proportions, these differences arising partly from the peculiar geological character of the district, that is the nature of rock or sub-soil upon which the surface soil reposes. In nature there is a subsisting distribution of vegetable forms, in strict accordance with the varieties of soil constituents, each species of plant flourishing most abundantly on the land richest in its requisite inorganic materials. There are no exceptions to this rule, and modifications occur only where others step in, such as heat, light, and moisture,—for all these are essential to a healthy vegetation.

Plants are composed of two kinds of materials, termed respectively, Organic and Inorganic. When the plant is burnt, the organic constituents are completely consumed, while the inorganic remain in the form of ash, being in fact, incombustible. It must be kept in view, however, that all the organic matters of the plant, which, together with water, form the great proportion by bulk and by weight of its tissues, are originally derived entirely from, or rather consist of inorganic matter.— The plant is, in fact, a living structure reared from a minute seed, which gathers from around it the requisite materials, so far as these are placed within its reach. If these materials are provided in sufficient abundance, and in proper form, the structure will be perfected, the organism will attain the full developement of which its species or variety is capable. But on the other hand, if the materials are not placed within its reach at all, then the seed will germinate, exhaust its own resources, and die; or if they are supplied in inadequate quantity, then it will put forth its shoot to pine out a lingering existance, as is often manifested to us by the starved vegetation of a barren soil.

* Johnston's Elements of Agricultural Chemistry and Geology, 6th Ed. p. 41.

PEDIGREE OF "BEAUTY," A SHORT HORN DURHAM COW.

Roan, calved January 13, 1856. Bred by Thomas Arkell, Little Farnham Farm, Puslinch, near Guelph, Canada West. Imported into Nova Scotia, October, 1866, by G. Lawson.

Got by Kossuth, 619, or 1753 of vol. 3.

Dam, Snowdrop, by Durham, 1488.

g. d. Flora by Wellington, 183.

g. g. d. Victoria by Agricola, *alias* Sir Walter, (1614)

g. g. g. d. Beauty by Snowball, (2647)

g. g. g. g. d.—by Lawnsleeves, (365)

g. g. g. g. g. d. —— by Mr. Mason's Charles, (127)

"Beauty" is dam and grand-dam of most of Mr. Arkell's fine herd of Short Horns, at the Little Farnham Farm, including the calf "Nobleman," recently purchased by F. R. Parker, Esq., for $100, and is now in calf to "The Yeoman," a pure Short Horn, bred by Mr. W. F. Stone, of Guelph.

AGRICULTURE AT THE PARIS EXHIBITION.

The Paris Exhibition is not to be a mere "Fancy Fair," as some suppose, but a genuine exhibition of the results of skill and industry applied to the materials and forces of nature. We have in the newspapers a full description of the arrangements for agriculture, of which a brief resume may be given. There is to be an Experimental Farm established in connection with the exhibition on the Ile de Billancourt, a short distance from the Champ de Mars. One part of the farm will be assigned to barn machinery, such as threshing machines, winnowers, chaff-cutters, root-slicers, &c., in operation.— The process of fowl-fattening will go on; the manufacture of starch, sugar, alcohol, butter, cheese, wine, oil, bee-keeping, preparation of wax and honey. There will be forges at work, and artificers making baskets, cooper-work, wooden shoes for men and iron shoes for horses, charcoal, drain tiles, pipes, bricks, artificial manures,