

Apatite, although of some importance to the manufacturer of the element phosphorus, and in the preparation of certain varieties of porcelain, derives its chief interest from its power, when used in conjunction with nitrogenous substances, of restoring exhausted lands to their original fertility, and of increasing the value, for agricultural purposes, of such as have always been, more or less, sterile and unproductive.

Phosphoric acid is an essential element of all but the lowest animal structures; and the large quantities of phosphate of lime found in the chitinous tests of *Lingula*, as well as in the shields of the *Trilobitidæ*, prove that the element phosphorus possessed, from the earliest geological epochs, the same importance, in its relation to the animal kingdom, as at the present day; and, since the sole source of the phosphorus in animal organisms is from the vegetable kingdom, it is not surprising to find that the element is equally essential to the higher orders of plants, and, more especially to those which are the most adapted to the wants of animals.

The following Table, extracted, partly from the works of S. W. Johnson, and in part derived from Emmons' Report, on the Geology of North Carolina, exhibits this relation in a very striking manner, and proves, moreover, that not only the most nutritious plants, but also the most valuable portions of the same species contain the highest percentages of phosphoric acid:—

TABLE I.  
PHOSPHORIC ACID IN THE ASHES OF PLANTS.

Series A—Edible Substances.		Series B—Miscellaneous substances.	
P. O. <sub>5</sub> per cent.	P. O. <sub>5</sub> per cent.	P. O. <sub>5</sub> per cent.	P. O. <sub>5</sub> per cent.
Rice.....53	Rice straw.... 1	1 Leaves of Catawaba Grape...18.3	
Rye.....50	Rye straw.... 4	2 White Oak ( <i>Quercus Alba</i> )	
Wheat...50	Wheat straw.. 3	Twigs.....12.7	
Maize...45	Maize straw...17	3 Do. do. Wood.. 4.5	
Oats.....44	Oat straw..... 3	4 Cotton (wool of).....11.6	
Barley...39	Barley straw.. 3	5 Tobacco .....	6.5
Beans....38	Bean straw... 7	7 Fibre of Flax.....	6.2
Peas.....33	Pease straw... 5	Seaweed (average).....	0.28
Turnips..13	Turnip tops... 9	AUTHORITIES:	
Potatoes..13	Potatoe tops.. 8	Series I. Johnson.	
Clover...18	Beet root..... 8	Series II. 1-6 inch. Emmons.	
Cabbage..12	Meadow grass.. 8	7. Way.	

The phosphorus of plants appears, for the most part, to be confined to the softer and more highly organized portions of