HOME and GARDEN

Elements

By Marshall Pottenger

All forms of matter known to man are composed of about ninety-four different chemical elements, that is, of substances which cannot, by any known means, be separated into two or more kinds of matter. For example, pure sulphur is an element because, whatever processes we may put it through, we can not get anything out of it but sulphur; pure sulphur contains nothing but sulphur. Similarly, nitrogen is an element because no one has ever been able to show that it contains more than one thing, nitrogen. Other examples of elements are oxygen, carbon, phosphorus, iron, calcium, etc. Some of the elements, as commonly known to us, are gases, such as hydrogen and nitrogen, but most of them under ordinary circumstances are solids.

Although there are thousands of different kinds of plants growing on this earth, nevertheless, with all their variation of stem foliage, flower and fruit, they are made up from comparatively few elements. Of the ninety-four elements known, the following fourteen are commonly found in plants: calcium, carbon, chlorine, hydrogen, iron, magnesium, manganese, nitrogen, oxygen, phosphorus, potassium, silicon, sodium and sulphur. These elements occur in very unequal amounts in the vegetable world. For example, carbon, hydrogen, and oxygen alone make up over ninety-five per cent, on the average of all plants. Neither are these elements of equal importance to plant life. It has not been satisfactorily demonstrated that chlorine manganese, silicon and sodium perform any necessary function in plant growth, unless, perhaps, in isolated, exceptional cases. So far as we actually know, it is probably true that only ten chemical elements are really essential to plant growth under ordinary conditions.

There are other elements, in no way essential to plant life that occur under special conditions more or less frequently in plants; among these may be mentioned aluminum, arsenic, barium, boron, bromine, copper, flourine, iodine, lead, lithium, nickel, tin and zink. Their occurance is more a matter of general interest than of any actual value to the person interested in growing plants. Such substances may be regarded as straying into a plant without purpose or plan simply because they happen to be in solution in the neighborhood of growing plant-roots and go into the plant in company with the plant-food proper.

The elements required by plants are divided into two quite distinct classes, which show rather marked differences. These two classes are air-derived elements and soil-derived or mineral elements. The air derived elements are: carbon, hydrogen, nitrogen and oxygen. The soil derived elements are: calcium, iron, magnesium, phosphorus, potassium, sulphur (chlorine, anganese, silicon, sodium). These two classes differ about as follows. The air-derived elements come exclusively from the air (this may be directly, or it may be indirectly through the medium of the soil). The soil derived elements come directly and exclusively from the soil. When a plant is burned, the air-derived elements disappear, for the most part, in the form of gases; the soil-derived or mineral elements, usually much the smallest part, are left in the form of unburned residue or ash, upon which further heating has no effect. This distinction is not perfectly sharp, since some oxygen is always found in ash, while a small amount of chlorine, phosphorus and sulphur may be driven off in the form of gases during the operation of burning. Air-derived elements make up more than 95 per cent of the whole vegetable kingdom, while the soil-derived elements occur in small amounts varying in different plants and in different parts of the same plant, from a fraction of one per cent to 10 per cent, or even in some cases, taking the plant as a whole. However, because the soil-derived elements occur in such small proportions, does not mean that their importance is slight. Without them plants would not grow. This fact has a most important application in enabling us to influence the growth of plants. We cannot, to any appreciable extent, directly control, at least economically, most of the air-derived elements in the feeding of plants, but we can do so indirectly through the soil-derived elements. In other words, by controlling, under certain conditions, the five per cent or less of the elements that enter into the composition of plants, we can, in a large measure, control the other 95 per cent.

The chemical elements do not commonly exist separately from one another as pure elements. While we are familiar with impure carbon in the form of coal and charcoal, and with nitrogen and oxygen as they are mixed together in the air, we never find under ordinary conditions elements like hydrogen, phosphorus and potassium, etc., existing separate from other elements. Different elements combine to form compounds somewhat as the different letters of the alphabet combine to form words. The few chemical elements used in plant growth exist in the air and soil in the form of compounds; some of these compounds are used as food by plants; after being taken into the plant they are worked over into a great variety of new compounds, and these new compounds, which have been formed within the plant, are more or less regularly grouped or mixed together in a great variety of ways in the process of plant growth. The elements may, therefore be regarded as the raw materials from which plant-foods come.

While the absence of any one of the elements may seriously impair or wholly prevent plant growth, there is a sense in which some of the soil-derived elements are of much greater importance to plant growth than others. Certain elements are more extensively used by certain plants and sooner or later the soil may need special attention in the way of increasing the available supply of a certain element for a certain type of plant. Other elements are used in such small amounts, relative to the available supply, that they rarely need attention. The elements of special importance are: nitrogen, phosphorus, potassium and calcium. Nitrogen occurs in nature chiefly in the following forms: 1. atmospheric nitrogen, 2 ammonia, 3 in animal and vegetable matter, and 4 as nitrate.

Phosphorus. The original source of all phosphorus is the earth's crust. As immediate sources of supply for plant-food uses we have 1 the soil, 2 the large phosphate deposits and 3 the bones of animals.

Potassium. Numerous experiments have shown that when potassium compounds are lacking, plants suffer severely, though they may not actually die. Potassium forms a larger part of the ash of plants than any other mineral element. On the average, vegetable ash consists of about one-third potassium. Potassium is never found in nature uncombined; it always exists in compounds. Potassium in the soil is due to the partial solution and decomposition of rocks containing potassium compounds.

Calcium. This element is essential to the development of most plants. Its compounds commonly called lie compounds. It has its source in the crust of the earth, where it occurs in a variety of compounds, especially the carbonate (limestone).

Highland Park School Children Not Hoarders

School children of Highland Park may break a window occasionally, they may tear their clothes, or borrow dad's pet golf clubs without leave, or show any of the other mischievous traits that are common to children everywhere. But there is one thing they are not—they are not hoarders.

You don't find them stuffing their money in the old sock or under the mattress. Instead it goes into the school savings bank every Tuesday where it collects interest for the children and helps to keep men at work in the community. And when the bank messenger arrives at the schools with his empty bag to collect the children's deposits, there is something in the bag from more than two-thirds of the entire grade school enrollment.

Statistics for this story are supplied by Thrift, Inc., headquarters at Chicago for the school savings bank system, has just posted the name of this city on the Thrift Honor Roll published in the March-April issue of the Thrift Almanack. According to The Almanack, more than 60 per cent of the grade school population of this city are making regular deposits in the school savings bank. The Thrift Almanack is a bi-monthly journal published in the interest of school banking. It is distributed free to local teachers through courtesy of the Highland Park State bank, which cooperates with the board of education in placing thrift teaching in the curriculum.

Lincoln Civic Assn. Wants Sheridan Road Route In City Changed

(Continued from page 4)

appropriate location west of the corporate limits of the north shore municipalities.

The widening of Sheridan road within the corporate limits of Highland Park would not be of benefit to this community, and we would object to the levying of assessments against property in Highland Park for widening Sheridan road on the grounds that it would be of benefit to us. On the contrary, it would constitute a definite menace to life and damage to our property. With many intersecting streets, in addition, private driveways, there would be an increased danger of automobile accidents, and the high speed traffic of super-highways threatens the lives of our children. A constant and intensive flow of vehicular traffic will destroy the residential character of our city and ruin property values.

We request the assurance that this highway will be transferred to the west and not widened within the corporate limits of Highland Park.

Officers and Board of Directors,
Lincoln Civic Association,
Highland Park Illinois
by Eugene H. Klaber, Pres.
C. A. Sanborn, Sec'y.

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