

lished in 1824, there is found a plate showing one of the pods produced by Mr. Seton. This colored plate shows two green peas and three white ones in the same pod.

It is interesting to note how close these men came, in the year of his nativity, to the law which later made Mendel famous.

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#### THE FOOD OF PLANTS

DR. BENEDICT in a recent number of *SCIENCE* opens the question regarding the definition of the word food as used by botanists.

That we need to come to some agreement is, I think, generally felt by teachers in all grades of the subject.

If we have in mind the plant's relation to substances outside of itself which may be taken and used in any of its vital processes, then carbon dioxide, water and minerals are food. This notion was suggested by the animal organism, which, however, is essentially unlike a plant in respect to immediate external relations. The term plant food arose to emphasize the importance of certain mineral constituents of the soil. Its use ignores the green plant's unique place in nature, and by implication even denies it.

If on the other hand we have reference to growth and repair of living tissue, carbon dioxide, water and minerals are waste products, the antithesis of food.

The question resolves itself into this, to which concept of the plant's activities is the concept food most nearly related? If the answer is nutrition then only such substances as can be oxidized in the tissues and energy thereby set free, are foods. To answer the question otherwise is not only to invite trouble from such a term as reserve food, but worse, make the whole subject of metabolism impossible of presentation. If we write the words "energy stored" and "energy set free" in the equations for photosynthesis and for respiration, the term food, in its commonly accepted sense is clear, and the term as applied to inorganic matter an absurdity. Neverthe-

less, the term plant food as applied to nitrate of soda, etc., is with us to stay, just as surely as oysters will continue to be known as shell-fish.

It is our business to fit pedagogic methods to the facts and see that fundamental truths are clearly set forth regardless of how many qualifying terms we must employ.

I forbear quoting sentences from text-books in which the term food is used in opposite senses without explanation, thus by implication denying the importance of photosynthesis and ignoring the law of conservation of energy. Hypercriticism is born of pedantry, but consistency is a jewel. The agriculturist can not use our term fruit and we can not use his term plant food without contradiction and confusion. The trouble is not so much one of definition as of usage. A Frenchman who was learning English said: "When a horse goes rapidly you say he is fast, and when you tie him to the post he is fast. Your language is very difficult."

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#### A GOOD SOIL TUBE

GLASS tubes are generally used in soil physics laboratories when carrying on experiments on capillary rise and distribution of water in soils. To give the best results these must be one and one half to two inches in diameter, and are expensive and fragile. In student laboratories with class numbering 100 or more the writer has had an annual breakage of over 75 per cent.

During the past year a new style of tube has been used in the soil technology laboratories at the University of California. This form was suggested to the writer by Professor E. O. Fippin, of Cornell, and is in use there and in other laboratories.

The tubes consist of a wire-mesh cylinder, two inches in diameter and of the desired length, made by wrapping one fourth inch mesh wire netting around a form and riveting the edges at intervals of six or eight inches. Celluloid tubes made of thin transparent sheet