lished the old methods by advocating mulching, which is alright in a garden but not feasible on any larger scale. It took a strong and laudable stand against spraying poisonous sprays, but without finding any practical substitute.

After a time, it advocated sheet composting: in other words its method of composting was unsuccessful and the process of decomposition was transferred from the compost pile directly to the field. Now the job of breaking down compost materials has been relegated to the soil. Organic enthusiasts who accept this approach evidently take only rare walks through the woods to see how long it takes nature to break down organic matter. The soil bacteria are, by this sheet composting; absorbed in the chore of breaking down the compost materials. It can take them quite a long time too, and it is done in a haphazard way. The materials that are not broken down are of no use to the soil. If they were broken down, they would have the same, or a higher capacity of water absorption as the parts which are broken down, and they would be available as plant food.

“Organics,” apparently having found deficiencies in its methods of composting, is now advocating the use of fertilizers which are neither of animal origin nor of vegetable origin and yet, since they are not synthetically produced, are therefore called “natural.”

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**PLANNING FOR THE HOME VEGETABLE GARDEN***

**EVELYN SPEIDEN**

Self-sufficiency in a biological sense, is a necessity which arises out of the problems of the present economic system, and which will contribute to the solution of these problems. It is a necessity for the farmer who wishes to preserve the fertility of the land eventually to be inherited by his children. Not only must the farmer be worthy of what has been entrusted to him, but he must build his means of production on a solid foundation. When he has accomplished this first task, he can begin to think of cash crops which will provide money to buy things he cannot produce himself.

The idea of self-sufficiency extends beyond the farmer; it includes the small landholder who needs to wring a living out of a small acreage. Also it offers an opportunity to the man with a modest income from another source who owns a small piece of land and wishes to keep in touch with the productive forces of nature. Even for the city dweller, tired of stone walls and paved streets, it provides the joy of having a little piece of the

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earth's surface on which to cultivate flowers and vegetables in leisure hours, and the discovery that there is nothing so enjoyable and healthful as tasty, home-grown vegetables, ripened on his own fertile soil, moistened by the rains, swept by the winds, warmed by the sun, cultivated and raised by his own efforts, cooked and eaten the very day they are picked.

Those who thus come into contact with nature's living forces, soon find that no food chemistry, no adding to or subtracting from food, can improve on nature's original product. Whatever their motives for acquiring small garden plots, be it duty, pleasure, business, recreation or to find a balance for mechanical or intellectual pursuits, all these people wish to succeed in their venture. This necessitates a coordination of careful planning and skillful execution.

Ethical and aesthetic, as distinguished from economic values, need also to be appreciated. This we can understand as we observe the phenomena of growth in the warmth and light of the sun, as we become conscious of the changing seasons with their varying weather pictures. We experience it in the pleasure of watching the gradual development of plant life, in the quickened movement of the blood in our veins as we till the soil, weed out rank growths and harvest the good and useful. These are values not measurable in dollars and cents. Their ultimate importance is in the building of character. One who loves the soil develops a finer awareness of the synthesizing processes, the upbuilding forces of the world. He cares less and less for the more destructive, disintegrating processes. Gradually he becomes the bearer of a new mentality, capable of perceiving the permanent truths of life itself. However, the physical basis for the successful, small holding has to be built first. This is the primary task.

From a practical viewpoint, the small garden should furnish food, if not all one needs, at least an abundance. Also we must always remember that the beautiful flowers in the garden are food in another sense—food for eyes and nose. Even the most commercial garden can create a balance of beauty while fulfilling biological health requirements, making a total biological unit.

The smallholder's garden, if planted and tended in accordance with the laws of nature, life and maintenance, is in reality, a living being—a biologically sound totality—as regards self-sufficiency, healthy growth, and human food requirements. Monoculture is out of the question in such a unit. Neither the soil nor our stomachs would stand it. The balanced diet necessary for health presupposes a balanced production.

Proper planning first requires a consideration of our needs. The human being eats six, seven or eight times his own weight each year. The annual food consumption per head in the United States, according to statistics, is as follows:
Carbohydrates:  
- Bread and other flour products: 230 pounds  
- Potatoes: 180 "  
- Sugar: 100 "  

Proteins, etc.:  
- Milk: 200 "  
- Meat (including fish and fowl): 166 "  
- Eggs: 36 "  
- Nuts, etc.: 20 "  

Living energy:  
- Vegetables: 300 "  
- Fruit (including citrus fruits and tomatoes): 72 "  
- Oils and fats (including butter): 44 "  

1348 pounds

This, however, allows a wide margin for the individual. Other figures show an increasing demand for vegetables and fruit, and that is the very thing the smallholder's garden can contribute: greater health values. What is biologically right is economically sound and healthful too.

The planting system to be described later, and worked out in practice through many years, enables the smallest and poorest holder, as well as the great landowner, to produce with the least effort that which the body requires.

Moreover, whoever likes to dig deeper into the truths of nature will be surprised and pleased to discover how justly the good earth works to build up a closed biological unit—the little garden—in order to support that other closed biological unit—man himself.

We must consider three different aspects when planning the home garden; our needs, the size of the garden, and the quality of the soil, this latter being primary and basic. Include also the environmental conditions, especially climate. The intensity of cultivation is dependent upon it. In a rain-poor climate, a dry, sandy soil forms little humus, is quickly warmed by the sun, but cools off quickly too. On cool, clear nights it is liable to frost; on hot days the sand becomes overheated through reflection. A permanent ground cover and shading of the soil is necessary here. Cultures must be selected and mixed, with this in mind. Mulching gives its greatest benefits with such soils. They can be planted very early in Spring, as soon as it begins to get warm, although we must remember they are very susceptible to night frosts. With a great deal of humus added, they are suitable for early seed beds and portable cold frames.

A wet, tough, clay soil stands at the opposite pole. It is cold, warms slowly, dries slowly, in wet weather can be worked with difficulty or not at all. Lack of proper soil drainage is its worst enemy. Everything depends on selecting the right moment for cultivation. The gardener must wait until it is dry enough and then work quickly. The ability to handle a heavy soil correctly is achieved only through experience. It should be left rough after plowing or spading in fall, so that thorough freezing is assured over winter. During or after wet periods, beds should be heaped up and rounded so that more air penetrates and water can run off and evaporate. Deep-rooting legumes have a reme-
dial effect in the cultivation of heavy soils, and should be used often.

The ideal soil is the humus type with a loose and crumbly structure and a rich content of ripe, earthy, organic matter. It responds quickly to cultivation. Soil bacteria and earthworms care for its constant renewal. So great is its excellence that every measure for the attainment and maintenance of humus structure is justified, even if it involves extra labor and expense. Once attained, this friable, healthy condition saves labor and fully repays our original investment of time and energy. Whether soil is sandy or clayey, however, we can by proper treatment of it, become independent of the soil type. A humus-bound sand having some clay content, given the right care and continued fertilizing with compost and manure, can be just as fertile as a humus-filled clay soil. The extremes are brought into balance by the humus.

The lay of the land is also important. Low lying areas should be laid out with raised beds to regulate the air and water content. Wind protection must be provided in the layout. (Wind-breaks.) Steep slopes should be terraced not only to gain surface area, but to facilitate cultivation and avoid gullying and sheet erosion. Lay out garden beds at right angles to the slope and in contour, otherwise good soil will be washed down to the foot and the upper areas will become poorer and poorer. The intense radiation on a southern slope must be compensated for by soil shading, with closer planting or mulching, or both. On a northern slope it may be necessary to plant a thinner stand. In rolling or hilly land the planting should follow the line of the ridges.

The size of a home garden is usually definitely limited. This fact combined with the quality of the soil, determines the approximate yield. However, the experienced gardener, with soil-conserving crop rotations, maintenance of humus content, correct soil cultivation, and the selection of suitable varieties, can, perhaps, harvest double as much from the same soil as the novice. Thus, the yield still depends on the person and his labor. Nevertheless certain figures based on experience enable us to foresee how nearly a garden may fulfill our needs.

To meet the food requirements of one person in the temperate zone, an area of about one and one-quarter acres (6000 sq. yds.) is needed in medium heavy soil with humus content. But that is not sufficient for complete self-support. This requires maintenance of the means of production to keep the land in a permanently vital state with fertilizer produced on the place itself. For self-sufficiency a few livestock are included to maintain the soil, and for their feed a small, plowed field and some pasture and hayland are needed in addition to the garden. Space is allowed too, for production of some cash crops such as milk, fruit, honey, vegetables, potatoes, pigs, eggs, etc., to meet costs of clothing, repairs on the house, tools, school, doctor, taxes and occasional recreation.
Let us, therefore, consider these three possibilities for supplying family needs: A. Self-support as regards vegetables with only the home garden; B. Self-sufficiency with respect to food on a middle-sized homestead with some outside help; C. the smallest sized farm which meets the needs of a modest, but independent existence.

A. SELF-SUPPORT AS REGARDS VEGETABLES. In the temperate zone with medium heavy soil, a home garden of about 1000 square feet with good care can yield approximately 675 to 700 pounds of various vegetables. An example of a mixed, soil-conserving planting that has often been used successfully, is as follows:

Average Yield of a Home Garden of 30 by 30 feet (with 14 beds of 4 by 15 feet each.)

<table>
<thead>
<tr>
<th>Plants</th>
<th>No. of Plants</th>
<th>Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans - green or lima</td>
<td>27</td>
<td>176</td>
</tr>
<tr>
<td>Pole</td>
<td>50</td>
<td>22 - 26</td>
</tr>
<tr>
<td>Bush</td>
<td>14</td>
<td>26</td>
</tr>
<tr>
<td>Beets</td>
<td>3</td>
<td>26 (about 50 beets)</td>
</tr>
<tr>
<td>Cabbage - early Savoy</td>
<td>29</td>
<td>88</td>
</tr>
<tr>
<td>late heads</td>
<td>50</td>
<td>11</td>
</tr>
<tr>
<td>kohlrabi</td>
<td>12</td>
<td>44 - 50</td>
</tr>
<tr>
<td>(Broccoli, Brussels Sprouts, Cauliflower or Chinese Cabbage may be substituted)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrots</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Celeriac or celery</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>Chard</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td>Corn</td>
<td>9</td>
<td>9 (about 20 ears)</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Herbs</td>
<td>32</td>
<td>9 - 13</td>
</tr>
<tr>
<td>Leeks</td>
<td>32</td>
<td>31</td>
</tr>
<tr>
<td>Lettuce</td>
<td>48</td>
<td>31</td>
</tr>
<tr>
<td>Onions</td>
<td>85</td>
<td>31 - 35</td>
</tr>
<tr>
<td>Parsley</td>
<td>10</td>
<td>11 - 13</td>
</tr>
<tr>
<td>Peas</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Peas, sugar poded</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Radishes, early &amp; late</td>
<td>56</td>
<td>8 - 10</td>
</tr>
<tr>
<td>Shallots or garlic</td>
<td>15</td>
<td>8 - 10</td>
</tr>
<tr>
<td>Squash - summer</td>
<td>1</td>
<td>11 - 18</td>
</tr>
<tr>
<td>Squash - winter</td>
<td>1</td>
<td>23 - 35</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>16</td>
<td>66</td>
</tr>
<tr>
<td>Turnips</td>
<td>18</td>
<td>8</td>
</tr>
</tbody>
</table>

685 - 736 lbs.

Study of such a table leads to the significant conclusion that there is a relationship between man and the biological laws of nature. Only mixed cultures and rotation of crops maintain soil fertility. The human being needs variety too, for the best nutrition. A monoculture for instance, of potatoes, red cabbage, beans or onions is a biological absurdity. Likewise a diet of any one of these alone would cause trouble to the human being. Both he and the soil require a variety of vegetables, frequent change and occasionally a bit of spicy, green herb.

Usually the vegetable supply for 3-4 persons can be grown in a home garden such as this, even though it may seem difficult for the beginner to produce so much on so small a piece of land. Nevertheless, increasing efficiency and the intensive work possible in a garden of this size, both contribute towards the goal. Hundreds of gardeners have obtained such yields.

B. SELF-SUFFICIENCY WITH RESPECT TO FOOD. The vegetable needs of a family of 2 adults and 3 children are be-
between 660 and 1450 pounds. The space needed to grow this is between 1000 and 3000 square feet, depending on individual needs, type of soil and climate. On a small homestead of from 10,000 to 55,000 square feet, the basis of support, including the chief elements of nutrition, may be attained. As an example, a homestead of 13,500 square feet was actually observed in all its stages of development.

The owner, an industrial worker, purchased the land with his first savings, then built the house with the help of a small loan. He divided the land into three sections: 4500 square feet for vegetable garden; 4500 for house, lawn and flower garden, the remaining 4500 being seeded down to pasture.

In his vegetable garden he followed all the principles of the bio-dynamic method; compost and manure treatment, crop rotation, mixed cultures, etc. Also he kept some poultry. In spare time, outside working hours, he attended to such matters as fencing, laying paths and building a road.

After three years the vegetables in his garden were excellent in quality and more than enough in quantity for his own household. With the cash obtained from the surplus, he was able to cover additional costs of bread, meat and milk as well as a third of his taxes.

Many other factory workers living near him have successfully followed in his footsteps. A carefully devised crop rotation enables such homesteaders to do all the work in their land in their spare time and with a minimum of effort.

C. INDEPENDENCE ON FIVE TO SEVEN ACRES (subsistence minimum). The small farmer’s holding of a size which just maintains a family is an ideal of healthy self-sufficiency. Its size is conditioned by climate, soil type, amount of moisture and water supply. Such a holding furnishes a standard in an entire locality which has to reckon with the same conditions. On a small farm with a good ratio between tilled fields, pasture and hayland, the manure production can be brought into balance with the crop requirements. With a crop rotation of at least 4 to 6 years, diversified planting supplies food (bread, potatoes) for the household, fodder and straw (litter) for the cattle, as well as milk and meat. Doubtless there will be chickens too (eggs and meat), a small vegetable and herb garden and often a flower garden as well. Fruit trees and bees complete the picture.

It has been demonstrated over a period of more than twenty-five years, that such biologically sound farm units maintain the fertility of the soil without any loss of nutritive substances. A small farm with 40 to 60% tilled land and a corresponding area of pasture and hayland to support a proportionate number of cattle, can maintain itself and in addition produce cash crops on one to two fifths of the cultivated area. This is done by a long-term crop rotation, with not more than two grain years and at least one legume year in a five-year period. Such a holding can
provide money for needs other than food, such as taxes, medicine, clothing, education.

An area sufficient to maintain a cow, a calf and a steer, gives us the smallest unit. Add the area devoted to food for human beings—at least one and a quarter acres per person, a certain “fertility reserve,” and the area assigned to cash crops. Thus a small holding of five to seven and a half acres represents the smallest healthy unit on a soil of average quality, with medium rainfall (30 to 35 inches). The acreage is divided thus: one-fifth for vegetables, three-fifths for pasture and hayland, one-fifth for grain and fodder.

A detailed division of the garden area will grow out of particular needs. Any one-sided cultures are unhealthy for the soil and must be compensated for in the next year to maintain a well-regulated crop rotation. Fruit trees, berries, grapes and flowers can play both useful and ornamental roles in protective and boundary plantings, even in the larger plan. A low berry hedge may be a property line barrier or a border along a path or the street. Trees usually shade a garden too much, but planted to shade a path, the liquid manure barrel, the compost yard or even a summer house, they are in their proper place. It is strongly recommended that the space for every individual garden or group of gardens be enclosed. This is based on biological fundamentals such as shade, ripeness of the soil, protection of the soil’s carbonic acid content, and to break the force of wind. Bushes or grapevines may make a perennial hedge; sunflowers, corn or pole beans an annual one. Flowers and medicinal or kitchen herbs are suitable for bordering beds and paths. Thus it is possible to create an enclosed growing space with comparatively simple means.

### BIO-DYNAMIC

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Walter Buschman  R. D. 1  Chester, N. Y.

(ADV.)

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