patrick that the toxic factor in the two strains is identical. Although there are antigens common to both strains, our findings do not support the suggestion that the two toxic substances are identical.

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The Target Area of Mammalian Red Cells

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When a suspension of N red cells is placed in a beam of parallel light, its opacity depends in a complex way on the projected area, or "target area," which the cells present in the direction of the light (*3*). As extreme cases, all the cells might be oriented edge-on, or all face-on, and in the former case the opacity would be less than in the latter because the target area is smaller. When the cells are oriented at random, the target area, T, is somewhere between these two extremes. Although the mammalian red cell is a biconcave discoidal body, all its possible projections in a beam of parallel light are those of a similar discoidal body in which the biconcavities are replaced by two planes, one on each side of the cell, passing through the circles of points along the greatest thickness of the rim. We can thus obtain a simple solution of what has been hitherto a troublesome problem by using a little-known theorem which was proved by Cauchy and to which attention has recently been called (*1*): If a body is convex and has area A, A is equal to four times the mean of the area of the projection of the body on a plane for all orientations of the latter. To find the target area of a suspension of red cells oriented at random, we have therefore to find the area, A, of a body of the same shape as that of the average red cell, except that the biconcavities are replaced by the planes described; the target area, T, will then be equal to $NA/4$.

Computations of A have been made from scale drawings of the average red cells of several animals (*2*), using Pappus' theorem for the surface of a solid of revolution. The values are given in Table 1, which also gives the values of S, the surface area of the biconcave discoidal red cell.

The ratio A/S varies from 0.88 to 0.91 in these five types of red cell, and, while the mammalian erythrocyte is by no means constant in shape in all species, it is probably good enough for the purposes of opacimetry to take A as equal to 0.9 S.

TABLE 1

Cells of	A, μ^2	S, μ^2
Man	144	163
Rabbit	100	110
Elk	71	79
Sheep	60	67
Tahr	24	27

The target areas corresponding to the *spherical* forms of the red cells of man, the rabbit, and the sheep are $N \times 25\ \mu^2$, $18\ \mu^2$, and $12\ \mu^2$, respectively.

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Soil Nitrogen and Thrips Injury to Spinach

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That the nutritive qualities of agricultural crops are influenced by the fertility of the soil on which they are grown is a well-established fact. Also, that a relationship exists between soil fertility and the production of plants resistant to, or unsuitable as food for, insect pests has been demonstrated by recent work at the Missouri Agricultural Experiment Station (*2*). Some of the possibilities in this as yet little explored field of entomology have recently been suggested by a striking relationship observed between the amount of soil nitrogen provided for spinach plants and their "resistance" to attack by the common greenhouse thrips (*Heliothrips haemorrhoidalis*).

New Zealand spinach was grown under controlled conditions in gallon glazed crocks using colloidal clay cultures (*1*). A series of 16 soil treatments was prepared by supplying calcium and nitrogen levels each of 5, 10, 20, and 40 milliequivalents per crock with all possible (*i.e.* 16) combinations in these amounts of the two nutrients. Each series was replicated 10 times. Calcium acetate and ammonium nitrate were the respective sources of the variable elements, and all other nutrients were provided in constant amounts for all treatments. The plants were placed in a greenhouse infested with thrips, the insects being left free to choose whatever plants they wished. During the first