kehren in der gleichen Breite auf der linken (bzw. rechten) Hälfte des nachfolgenden Blattes in umgekehrter Reihenfolge wieder."

Dies beruht darauf, daß die Blätter in zwei diametral gegenüberstehenden Reihen angeordnet sind, und mit ihrem Grunde den Stengel völlig umfassen. Die reproduzierten Figuren, in denen schematisch 2 aufeinanderfolgende Blätter in eine Ebene projiziert sind, erläutern diese Verhältnisse.

Die Pflanze bildet also in vieler Beziehung ein Gegenstück zu Baurs Pelargonien. Ihr Vegetationskegel ist aus zahlreichen, grünen und weißen Sektoren verschiedener Breite zusammengesetzt. Achselsprosse, die zufällig völlig in einen grünen Sektor fallen, bleiben reingrün, solche die aus einem weißen derivieren, rein weiß. Es wäre von Interesse zu erfahren, wie sich ihre sexuelle Nachkommenschaft verhält. H. Buder.

Spillman, W. J. Inheritance of "*Eye*" in Vigna. Am. Nat. **45**: 513—23. 1911.

Spillman has studied various races of the cow pea *(Vigna unguiculata)* with special reference to the manner in which certain seed coat color factors are inherited. Races were investigated in which pigmentation of the seed coat was complete, in which it was incomplete, and in which pigment was wholly lacking. The data presented refer largely to the study of the partially pigmented races in which the color is distributed around the hilum in a peculiar pattern commonly known as "*Eye*".

The investigation discloses four distinct types of "*Eye*", to which the names *Small Eye*, *Large Eye*, *Watson Eye* and *Holstein Eye* have been given. *Small Eye* varies considerably in the extent of its pigment pattern, — from that of a pigment spot on each side of the hilum to an area covering about two fifths of the ventral surface of the pea. *Holstein Eye* is divided into two classes; one in which the pigment area has extended over the micropylar end of the seed, the other in which the pigment covers the whole seed with the exception of the dorsal portion of the chalazal end. In both types small pigment spots are present in these non-pigmented areas. In *Large Eye*, the pigment covers nearly the whole ventral surface and has a characteristic notch at the micropylar end. The data thus far collected indicate that this form of "*Eye*" is always heterozygous for the factorial difference between *Holstein Eye* and *Small Eye*. Three classes of *Small Eye* have been distinguished and there is some evidence that they are the DD, DR, RR of a Mendelian pair. The study of these three classes is very complex and their investigation is being continued. The fourth type, the *Watson Eye*, is genetically distinct from the *Holstein Eye*, although similar to it in appearance. In this pattern the pigmented area surrounds the hilum, and the micropylar end of the area has an indistinct margin, stipuled with fine pigment granules.

Small Eye × *Solid Color* (complete pigmentation) gave in F_1 dominance of *Solid Color*. F_2 gave individuals of *Solid Color*, *Watson Eye*, *Holstein Eye*, *Large Eye* and *Small Eye* in the proportion of 9 : 3 : 1 : 2 : 1 respectively. In some of the families of the F_2 generation, the *Large Eye* and *Small Eye* producing individuals were not separated. In such cases the ratio approximated 9 : 3 : 3 : 1, in which the heterozygous portion of the third class plus the fourth class constitute 3 instead of 2 : 1 as given in the previous ratio.

Holstein × *Solid Color* gave in F_1 complete dominance of *Soldid Color*. Out of 100 F_2 individuals, 75 produced *Solid Color* seeds and 25 *Holstein* seeds, making the ratio an exact 3 : 1.

Watson Eye × *Solid Color* gave in F_1 complete dominance of *Solid Color*. The F_2 generation approximated 3 : 1, there being 3 of the *Solid Color* to 1 of the *Watson* type.

Small Eye × *Holstein* gave in F_1 the *Large Eye* type. Only one cross was made and the F_2 numbers were very small. 3 *Holstein*, 4 *Large Eye* and 1 *Small Eye* individuals were produced. SPILLMAN looks upon this scant data as showing the possible presence of a 1 : 2 : 1 ratio, *Large Eye* being the heterozygote between the two parents.

Four hypotheses have been formulated to explain these results, all of which, though apparently differing from one another, are in reality in exact agreement so far as the statistical data are concerned. In all four of them two pairs of factors are postulated to account for the manner in which the pigment patterns are inherited. The difference between them lies, not in relation to any actual data which the author possesses, but in their relation to something which is as yet hypothetical, namely, — the functions of certain cell organs.

As a type of these four analyses, one may take the following interpretation. Suppose the *Small Eye* type by represented by the formula wwhh, then the *Holstein Eye* differs from it by possessing one dominating factor, — or function as the author would say, — and the *Watson Eye* differs from it by having another dominant factor. The three zygotic formulae, therefore, may be represented in this manner:

Watson Eye . . . . WWhh
Holstein Eye . . . wwHH
Small Eye . . . . wwhh

Further, since the solid color differs from the *Holstein Eye* by one dominant factor and from the *Watson Eye* by one dominant factor, its zygotic formula may be represented by the term WWHH.

The only complication in the data is the action of the H factor. In the heterozygous condition (Hh) it appears to enlarge the pigmented area only half of what it does when in the homozygous condition. It is unknown whether or not the W factor acts in a similar manner.

The author restates his views on the meaning of the word "factor" as used in Mendelian analysis. For exemple, by "presence of a factor" and "absence of a factor" it is not meant to imply the presence (W) of a material body in one race and its absence (w) in another, as he believes (?) some observers think It rather refers to the difference in the manner and the conditions under which the same cell organ functions in different races. Thus (W) represents a certain cell organ performing a specific function under specific conditions, while (w) represents the same kind of a cell organ in another race, which does not perform this specific function under the particular conditions of the first mentioned race. This term (w) does not necessarily mean the inability to perform the function that is performed in the first race, but simply that it is not performed. "Presence" then, according to the writer's idea means the performance of a function, while "absence" implies its nonperformance. In this paper, one secures a more definite idea of Dr. SPILLMAN's beliefs in reference to a physical basis of inheritance than from any of his preceding papers.

In the opinion of the reviewers, Dr. SPILLMAN's position as a critic of the supposed beliefs of other Mendelian writers is unsound. He would entangle Mendelian interpretation — in which a factorial notation with no presumption as to the nature of these factors has been used as a convenience — with the chromosomes before such entanglement is justified by the facts. And as a matter of fact SPILLMAN's distinction between his views and those imputed to others reduces to an absurdity. He supposes the difference between race No. 1 and Race No. 2 to be due to a more potent chromosome function in Race No. 1. In other words the total chromosome functions are:

$$\text{Race No. } 1 = X + A$$
$$\text{Race No. } 2 = X$$

The difference is the presence and absence of the activity of a hypothetical something A, or as expressed in Mendelian notation A and a. There is no difference in the two notations. But SPILLMAN assumes a more or less definite physical basis of inheritance, even though he calls it a physiological basis, while other writers make no assumptions whatever as to nature of their hypothetical factors.

E. M. EAST and O. E. WHITE, Harvard University.