to have to put the + sign underneath. Again, the line underneath is sometimes desired to represent the chromosome itself.

(Editors' remark: Underlining to designate attached X's is used in the DIS circular because this sign is available on our typewriter. To type a line over a symbol requires handshifting of the roller, which is both a cumbersome and a slow process, especially with single spacing of the lines).

H. J. Muller Rearrangements in general. No very simple system is possible for a complete and practicable representation of all possible chromosome rearrangements, but one of the least complicated, though admittedly applicable only to well-analyzed cases in which it is desired really to show the details, is illustrated by the following example of brown-Variegated 4, based on data of Glass, -px+. st+:- ; :-sp+. .3at- Here each independent dot (period) represents a point of rearrangement. To the left of the dot is placed the designation of the chromosome (where necessary) and of the first chromosome locus know to be to the left of the break in question, and to the right of the dot the corresponding items for the latter region. In the designation of the locus, either the locus symbol, such as px, or the locus number (in this case 2,100.5) may be used, but several considerations make the letter symbol ordinarily preferable. Where it is desired to show that the genes, as represented, lie in an inverted order, an arrow pointing backwards may be used and will sometimes obviate locus designations; for typing, an arrow may be shown as a colon followed by a dash. Where it is desired to represent the locus of attachment of the spindle fibre, "at" is used, and for a free (or originally free) chromosome terminus, "tm"; the latter symbol may, however, be understood when there is a blank space to the right or left of a dash or arrow. Pieces attached to the side of the chromosome are shown in parenthesis between the loci bounding the region of their attachment (e.g., Pale is 2(px-)⁻; 3e (.px -)ro).

H. J. Muller Deficiency. As a logical and practical extension of the system of using one basic symbol for all genes of a given original locus, with exponents in the form of letters or numbers for different mutant allels (a system which I developed while in the Drosophila laboratory at Columbia University), and with the exponent + (plus) for a normal allel (as I have done for some years at Texas, and explained in a letter of about 1931 to Stern, and as was recommended in the first "Information Service"), it will often be found convenient to use the exponent - (minus) in cases of small deficiencies, and in general wherever it is desired to designate the absence of loci that might otherwise be expected to be present. Thus, Notch 8 can be indicated as w⁻ fa⁻ A⁻ or, more correctly yet, as (w⁻A)⁻; Notch "172b", which seems to include the originally free end ("tm"= terminus) and extends beyond echinus on the right, would, similarly, be (tm-ec)⁻, or (-ec)⁻.