Construction and maintenance of stocks

Note by editors: The material by H. J. Muller for the following sections was prepared in the form of pictorial diagrams on large wall charts, and was thus exhibited by him at the Sixth International Congress of Genetics at Ithaca in 1932. Photographs of these charts were supplied by Muller as the material for the following accounts. In order to reduce the charts to forms suitable for reproduction on stencils, the editors have transcribed them, with as few as possible changes in the basic plan of each chart. With respect to details, they have made minor changes, to wit: (1) recasting the nomenclature current in 1932 into that of 1935, (2) employing "f" as the marker for a "foreign" chromosome to be introduced into a given "homozygous" or "host" stock, which is marked by "h", and (3) substituting Pm for S, and eyD for ey, as markers. (ster can not easily be told in flies with other eye shapes, while Plum is excellent; the use of ey left the emergent stock encumbered with this character, while the use of dominant markers (cyD and ciD, available since 1932) for chromosome 4 gives a clean stock.

Muller, H. J. Construction of Homozygous Stocks. 
(See also similar technique by Bridges, Carn. Inst. Wash. Yr. Bk. 28:338, 1929)

markers in 2 and 3 may be replaced by T(2-3) with one dominant marker.

P1 9 = donor for desired homozygote (or donor may be ciD; if so, mate to y;Pm/2h;H+/?)
Pm/2;H+/? (Dominant markers)

F1, o/c1B;Pm/g2h;H/3h X ClB/;Cy/2;CC,D/3h

F2 Father

F3 1h;2h;3h completely homozygous.

For controlling 4 also, the 4th chromosome dominat cyD may be used together with Pm/2h;H/ (or with y;Pm/2h;H/), and ciD with ClB/;Cy/2;CC,D/.

F3 yields also all possible combinations of chromosomes of donor, homo- and heterozygously, and distinguishable by markers, for analysis of contributions of all the chromosomes (whether recessive or dominant) to multiple factor effects, and for tracing sources of variability. F3 reveals also all recessive lethal and visible mutant genes of P1.

Chromosomes of desired "h" stock need not carry any visible mutant.