Edmondson, in 1950 and 1951. These were all shown to be in the left arm of chromosome 2.

Known alleles which were probably induced, but may be spontaneous:

Chromosome 2

dumpyTh: 1 case by Meyer, 1951.
dumpy-oblique: 1 case by Meyer and Byers, 1951.

Chromosome 3

claret: 1 case by Meyer, 1950, sterile in homozygous female.
glasslike: 1 case by Meyer, 1949. This is an allele of a spontaneous mutation like glass in the third chromosome, found in this laboratory, but not tested for allelism with glass itself, to which both may be allelic.

Nakamura, K., Immaizumi, T., and Kitazume, Y. Amino acids in D. melanogaster. Surveys were made by two-dimensional paper chromatography of the free amino acids found in alcoholic extracts of larvae, pupae, and adults, respectively. In each stage 17 kinds of amino acids were found; leucine, phenylalanine, valine, proline, tyrosine, arginine, histidine, alanine, lysine, threonine, glycine, serine, asparagine, glucosamine, glutamic acid, aspartic acid, and cystine, besides two unknown ones. Of these, leucine and cystine were present in greater quantities in larvae than in pupae and in adults; smaller amounts of phenylalanine were found in adults than in larvae and in pupae. Hydrolysates of normal, lethal (YY), and unfertilized eggs were tested by two dimensional paper chromatography. Leucine, phenylalanine, valine, proline, tyrosine, alanine, arginine, histidine, lysine, threonine, glycine, serine, aspartic acid, and two kinds of unknown elements were found in each of them. A third unidentified one (cystine?) was found in lethal and unfertilized eggs, but was lacking in normal eggs.

Nolte, D. J. Secondary genic products. A long-term investigation has been undertaken on the eye-pigmentary system of Drosophila, with particular reference to the eye-color mutants of D. melanogaster, the main techniques being a histological study of eye structure and a spectophotometrical assessment of the pigments. Part of the work has been published, several papers are in the press, and further work is in progress. The mutants include 30 of the main eye-color genes, 24 multiple alleles of ten of the foregoing genes, and 4 position effects; 3 wild-type strains are being used for comparison, one being a South African strain.

Four regions of pigment concentration have been located in the compound eye: the primary, secondary, basal, and post-retinal; great variation occurs in the various mutants with regard to the arrangement of the cells, their size, the size of the pigment granules, and the type of pigment contained. The content of brown pigment varies independently of the content of red pigment in the series of mutants already tested, and the color of the eye is not directly proportional to the amounts of the two pigments, but often dependent on the ratio between these amounts. In two series of multiple alleles already tested, one shows a simple quantitative proportional ratio between the two pigments, but the other shows more of a qualitative ratio or relationship, in that the two pigments do not follow the same series of increases in quantity. Although in general the two pigments of any specific strain seem to vary independently in quantity from culture to culture, there appears to be some connection between them at one or another stage of their synthesis; there appears to be, in some mutants, a competition for an assumed common substrate, and thus it was found that pr has more brown pigment than the wild-

type, while cd has more red pigment.

As the work progresses it is becoming more and more evident that many of these eye-color genes are such only by nature of some secondary reaction--for example, the provision of a by-product of their primary action, this by-product being utilized in the synthesis of one or the other, or both, of the pigments. While some genes, as for example w, v, cn, bw, might be assumed to be primary eye-color genes, others, as for example rb, cm, g, car, do not appear to be connected with a series of basic stages in pigmentation. In compounds between these genes no epistasis appears, but instead a sub-additive type of interaction, and sometimes even a super-additive interaction as in the case of the compound rb g car, which produces more red pigment than the compound rb car.

Novitski, E. Autonomy of sterility of transformed females. Using the unstable ring In(1)X^{c2}, w^{VC}, which has been shown by Griffen and Lindsley to give rise to a high frequency of gynandromorphs, it was possible, from transformed females of the constitution In(1)X^{c2} w^{VC}/In(1)dl-49, y Hw m^2 g^4 f5/Y; tra/ tra, to select mosaics in which the ring had been eliminated in early cleavage, giving rise to part normal-male and part transformed-female tissue. Of 24 such mosaics, 16 were sterile and the remaining 8 produced, among their 1595 female offspring, no progeny carrying the ring-X which would have been indicative of the normal proliferation of 2X+Y spermatogonia in the mosaics.

Novitski, E. The compound X chromosomes. There are four ways in which two single X chromosomes may be arranged to give simple compounds since (1) the order of loci may be mirror-image or tandem, and (2) the centromere may be median or terminal. Since each type is unique in its pairing configuration and gives different kinds of information about crossing over, the writer wishes to suggest that each type be given a simple designation. Although the type that is generally called attached-X had, in the earlier days, been referred to at times as double-X, and the double-X of Muller has, more recently, been described as an attached-X, it is felt that a simple consistent scheme is provided by referring to those compounds with median centromeres as attached-X's and those with terminal centromeres as double-X's. In the ordinary attached-X, as well as in Muller's double-X, the arrangement of the two chromosomes is in mirror-image fashion. Consequently, the distinction between the mirror-image tandem arrangements may be adequately provided by referring to the latter as tandem double-X's, as the case may be, and by using no further designation for the mirror-image types.

Two new types have been recently derived; these are (1) the double-X and (2) the tandem double-X.

(1) The double X. Pairs by simply folding back on itself (like the attached-X). Unfortunately, from the standpoint of further genetic analysis, the double-X discovered by Muller and now commonly used instead of the attached-X for stock keeping carries In49 in the heterozygous state. Two new cases have been discovered in the progeny of sc^8 f v cv/y w females where, apparently, a crossover occurred between the distal heterochromatic region of sc^8 and the base of the normal chromosome. The double-X is designated structurally as Normal X + sc^8 and genetically as y w + f (?) v cv sc^8. Homozygosis for the heterozygous mutants may be achieved by double crossing over (singles produce bridges in this type of compound X), and both cv and v appear with a low frequency. Cases of homozygosis for forked have not been