Research Notes

Eloff, G. and Nolte, D. J. Appearance of unexpected eye-colors. Certain unexpected and as yet unidentified eye colors appeared among the f_2 of certain crosses with the y w stock, being the sex-differentiated eye colors pinkish orange in ♂ and a diluted red or shaded reddish color in ♀, with yellow body color. The following were the numbers obtained:

1) 24 ♀ and 8 ♂ among 3063 individuals in the f_2 of a cross y w ♀ x wild ♂.
2) 12 ♂ among 2062 individuals in the f_2 of a cross se ♀ x y w ♂.
3) 126 ♀ and 74 ♂ among 12230 individuals in the f_2 of a cross y w ♀ x se ♂.

These color variations seem to breed true; preliminary tests have produced the following results:

1) Diluted red ♀ x y w ♂.
   f_1 Diluted red ♀, pinkish orange ♂.
   f_2 223 diluted red ♀ + pinkish orange ♂: 55 white ♀ & ♂.
2) y w ♀ x pinkish orange ♂.
   f_1 42 diluted red ♀ + 35 white ♂.

Gowen, J. W. Hermaphrodites in D. melanogaster. A dominant gene apparently located in the third chromosome has appeared in our cultures which causes the insertion of parts of the male genitalia between the anus and ovipositor of adult flies which would otherwise be normal females. These changes extend into the reproductive tract and sex combs. The sex combs of these individuals are much smaller than those of a normal male but are distinct. The reproductive tract may include the presence of ovaries and testes as well as other secondary sexual glands.

The case is of further interest in that super females, despite their three X chromosomes and the tendency of these to push toward the female type, also are carried toward the male. Thus far the changes noted are not so pronounced as those in diploid females but are of the same type.

Gowen, J. W. Possible demonstration of dominant sex-linked lethal in melanogaster. In connection with our advanced class in genetics one of the students, Mr. Nelson, has found a very interesting case in the mating of a test male to a female carrying one set of irradiated chromosomes and a tester set containing the ClB genes in the sex and Moiré Stubble ebony in the third. The result of this cross led to a progeny of 100 males and no females. Thus far none of these males were beadex, the gene carried by the tester male. They all carry the wild type x-ray chromosome.

Kalmus, H. Survival and weight change of Drosophila mutants and species of different body colors fed on sugar-water mixtures. Yellow mutants of melanogaster, pseudoobscura, and subobscura died earlier on mixtures containing over 50% sugar (sucrose, glucose or sorbitol) than did wild type flies, while with mixtures containing less sugar there was no difference. Yellow flies lost more water than wild type on high concentrations, but did not differ on low concentrations. Black and ebony melanogaster died earlier at all concentrations, but the differences were somewhat less at high concentrations. Comparing melanogaster, funebris and pseudoobscura, the last gained weight and lived.

longer on mixtures rich in sugar, where melanogaster lost in weight. Melanogaster lived longest on solutions containing 2-5% sugar, and funebris was intermediate. At its optimum concentration pseudoobscura lived longer than the other species at their optimum. These observations accord with some ecological rules regarding the relation between cuticle color and the water supply and humidity of the environment (Nature 148, p. 428).

Muller, H. J. Locus of Pale-lethal. Owing to the fact that the small section removed from the right arm of chromosome 2 in Pale translocation was for years assumed to be terminal, it had been thought that the lethal effect which this translocation has when homozygous was due to a small deficiency or position effect on a gene located near the break between arc and plexus. Since, however, the section removed is an interstitial one (even though the right-hand break is very near the right end of the chromosome) the lethal would, so far as evidence reported thus far is concerned, be just as likely to be near the right as near the left break. That it is not near the left break has now been shown by the obtaining of individuals homozygous for Pale translocation which have the region of the right break, but not that of the left break, covered by the section of chromosome 2 inserted in the Y obtained by Dompster. This inserted section has both its left and right breaks to the right of those of the Pale section; it fails to cover plexus (but, as Dempster found, covers brown), and it covers the lethal. Tests are under way to determine whether it also covers the Pale eye effect (dilution of eosin) found by Bridges. That this is probable is indicated by the fact that single crossers between Plum-1 and normal, having the left end of the normal and the right end of the Plum-1 chromosome and being thus deficient for a small terminal piece of 2R, have a Plum eye color considerably paler than usual for Plum-1. Probably then the pale eye color is due to hypomorphism of a haplo-insufficient gene near the right-hand break of Pale, and the lethal effect to hypomorphism of another gene very near to this or of the same gene. These genes would be to the right of all those listed in the map of 2, except possibly the extreme Minute.

Muller, H. J. Insertional Translocation involved in "In(dp)" Though described as consisting of structural changes composed only of a complex of inversions, "In(dp)" proves to have a section of the left arm of chromosome 2, located very near the centromer, attached, presumably by insertion, to chromosome 3. Individuals haplo-deficient for the section are quite inviable; those with three doses ("duplicational") are morphologically recognizable by their arched wings, etc. and have low viability, imaginal vigor, and o-fertility; females are sterile. The section in question includes the locus of purple and of other genes nearby. In our formulae, we designate the deficiency in 2 as pr and the insertion in 3 as pri. Tests of the location of pr^1 in 3 are under way; it crosses over freely with genes in the region of ebony and we have stocks of this deficiency and insertion combined in the same chromosomes as those of the Pale deficiency and insertion.

Muller, H. J. Viable non-crossover X chromosome. In order to facilitate work on gene mutations and translocations of the X, a stock has been made up in which the X contains two inversions, one including the other, effectively preventing the obtaining of crossovers (when crossing over is not interfered with in other chromosomes), that has at the same time a fair viability and fertility when hemi-or homozygous, and in which there are two "markers", one dominant and one recessive, that are not likely to interfere with the classification of other genes. This X has the left end of scute 8 and the right end of yellow 3P and hence has the loci

of yellow and achaete duplicated (present near both ends), while the locus of scute (near the right end) is hardly affected, the inversion being except for the small duplication like that of scute 8, bobbed+ and block A being at the left. Included in the chromosome is Inversion S, which is similar to but slightly smaller than "delta 49". (In an otherwise normal chromosome the position of the left breakage point of S would be slightly to the right of the position of the left breakage point of dl-49, while that of the right breakage of S would be slightly to the left of the right breakage of dl-49.) The recessive marker is "yellow, dark bristles" as the scute 8 chromosome used had the extreme yellow y^{Si} near its left end and the y^{3P} chromosome has an allele near its right and which gives the yellow dark bristle effect (the darkening affecting mainly the abdominal bristles and epidermal color). The dominant marker included is Bar. Formula: y^{Si} sc^{8} B In-S y^{3P}. When heterozygous inversions occur in autosomes, an appreciable frequency of crossovers is obtained, especially of double crossovers in the region of B, spearating B from In-S, but by following both markers, y and B, at once, such crossovers can readily be allowed for in experiments involving the detection of lethals and translocations. This stock is of especial use where it is desired (a) to detect mutations arising in the female in X's of originally normal structure, or (b) to detect mutations arising in both paternal and maternal X's.

Muller, H. J. Stock with marked inversions of all major chromosomes.

The stock with marked non-lethal inversions of the X above described has been combined with stocks having marked inversions in other chromosomes to form the following "marked inversion" or "MI" stock:

y^{Si} sc^{8} B In-S y^{3P}; al^{2} Cy lt^{3} L^{4} sp^{2}/dp b Pm^{7}; ru h D CXF ca/Sb In 3R

This requires some selection for retaining L^{4}, as this (but not the associated In(Cy R)) tends to escape by double crossing over; occasionally D also escapes. Many flies are needed to maintain the stock. Without the L^{4} it may be maintained much more readily.

Philip, U. Spermatogenesis in Drosophila.

Though spermatogenesis is rare or absent in newly hatched ♂'s, it has been found both in melanogaster and subobscura a few days old. Testes are dissected out and squashed in acetic acid-orcein (LaCour). Previous failures can be attributed to the use of sectional material. Mitoses and meioses are readily observable. In both species X and Y form a chiasma, but autosomes do not. Primary non-disjunction has been observed in both species. Meiosis in XO subobscura proceeds normally, though the spermatozoa may not be motile. In XYY subobscura the three sex chromosomes form a group of 3, but chiasmata have not been observed. This would explain their random distribution.

Pontecorvo, G. Deletions and translocations of X^{c2} (X-rayed).

Translocation 26, T (X^{c2}:2)26, covers car and bb, hom.=1. proximal region of X^{c2} inserted into base 2L. Deletion 1, Del(Xc^{2})1, free small ring, not yet studied. Deletion A, Del(X^{c2}) A, free ring carrying almost all prox. heterochrom. and distal 1A-F (salivaries by Slizynska). Deletion 38, Del(X^{c2}) 38, free small ring with little proximal heterochr. and 1A-F (saliv. Slizynska). Deletion 40, Del(X^{c2}) 40, free small ring almost as Del 38.

Pontecorvo, G. Drosophila simulans; an X-ray induced deletion.

Deletion covering y, Del y+, genetic breaks between y and w, and probably left of bb. mitotic metaph. length about 1/3 to 1/2 of X. Fully viable hyperploid males and females and hybrids with melanogaster. All show slight increase in hairyness. Del. crosses over very easily in females with XX giving X with right arm Dp.

Pontecorvo, G. Age of the females as determing the success of the D. melanogaster x simulans cross.

It is well known that the success of mating melanogaster females with simulans males is very erratic. When the females are triploids, the difficulty of obtaining such mating is greatly increased. Schultz & Dobzhansky, who first made the latter cross, obtained about one fertile out of one hundred cultures; Muller and the writer (1940) obtained about one out of three. It is now apparent that a decisive factor in determining the interspecific mating is the age of the females when first put together with the males, irrespective of their being diploid or triploid. The interspecific mating occurs without difficulty with females not more than two days old, especially if the males are older and have been isolated for a few days. We have only erratically obtained, and only with diploids, fertile cultures from females put together with the males when four or more days old. With young females once the first mating has taken place, successive matings take place until old age. It looks as if the mating reaction of the young female were not fully determined and still liable to conditioning by the male of the different species. No clear conclusions have so far been reached on the reciprocal, and far more difficult, cross of simulans females by melanogaster males.

Pontecorvo, G. Disappearance of bobbed from stocks carrying it.

Unsystematic observations on bb stocks in which bb had 'disappeared' suggest that one of the mechanisms of this common occurrence is crossing over in the males between X and Y with production of an XY^L chromosome. As bb+ is carried in the short arm of the Y, this means that crossing over occured left of the bb locus.

Pontecorvo, G. Somatic crossing over (?) in hybrids between D. melanogaster and D. simulans.

It is well known that melanogaster x simulans hybrids die before the imago stage if they do not carry the simulans X-chromosome. We have made preliminary investigations, by Demerec and Hoover's technique, to assess whether the absence of part or all simulans X is also cell-lethal in the imago. Using all possible combinations of yellow and singed, or forked, with their wild type allels on the chromosomes of the two species, consistent results have been obtained showing that in the hybrid females recessive spots appear only of those recessives that are carried on the simulans X and not of those carried on the melanogaster X. If the interpretation generally accepted for the origin of recessive spots in heterozygotes is correct, then we must conclude that the absence of part or all X-simulans is cell-lethal in the hybrids.

Rendel, J. M. Effects of y and wi on mating in subobscura.

Matings of 10 x 10 $\frac{y}{y}$ ♀ x y ♂, $\frac{wi}{wi}$ ♀ x wi ♂, or $\frac{y}{y}$ ♀ x wi ♂ impregnate 75-90% ♀s after 7 days. $\frac{vi}{wi}$ ♂ x y ♀ impregnates about 10%.

After brother-sister mating for 7 generations, during which y and wi were kept heterozygous, mating of extracted $\frac{wi}{wi}$ ♀ x y ♂ was still very inefficient. y wi ♂s rarely mate with anything but y wi ♀ and y ♀, though they occasionally do so with some mutant ♀s. No morphological differences have been found to account for this behaviour.

Rendel, J. M., Philip, U. and Spurway, H. Non-disjunction in subobscura.

Primary non-disjunction in ♀s can be detected by sex-linked recessive genes such as y. In ♂s it can sometimes be detected by wi, a sex-linked gene whose expression is normally limited to the ♀, but shows up in some at least of XO ♂s. The frequency of primary non-disjunction is about 1 in 4500 in the ♀, and of the same order or higher in the ♂. Progeny of exceptions have been tested cytologically and genetically. The frequency of secondary non-disjunction seems to be under 1%. Patroclinous ♂s have also occured due to a fragment (?deletion) of X covering the locus of y, and matroclinous wi ♂s were not all XO.

Silzynska, Helen Salivary gland chromosome analysis of deleted rings.

Ten ring chromosomes in D. melanogaster were studied cytologically; 8 were obtained by Dr. G. Pontecorvo from X-ray treatment of normal ring chromosome (XC2), these are all small deleted rings with centromere. The other two were obtained by Dr. H. J. Muller and were found by genetical means to be translocations between the XC2 and the left arm or chromosome-III. The results are summarized below:

No. of stock DIS-14	Bridges' sections included in the ring	Bridges' length in μ
	Deletions	
35	-sp-f-20-19-18-17A5,6-	62
36	-sp-f-20-19-18-17A5,6-	62
37	-sp-f-20-19-18-17-16F3,4-	65
40	-sp-f-20-1A4-1F4-	28
41	-sp-f-20-1A4-1F4-	28
42	-sp-f-20-1A4-2A1,2-	28.5
43	-sp-f-20.1A4-1F4-	28
	Translocations	
125	-sp-f-20-75C-80D--1A4-2-3...20-	524
126	-sp-f-20-19-18-17A9-75C-76..78-74 -17A6-..1A4-	474.5

Slizynski, B. M. and Helen Slizynska The effects of X-ray treatment of early embryos of D. melanogaster.

Experiments which were carried out in order to determine the optimal age of the eggs and the most effective X-ray dosage, have shown that eggs treated with 500 r units at 12-14 hours after laying, contain the highest frequency of changes. They consist of all known types of structural rearrangements. The longitudinal, as well as transversal size variations of these changes exhibit a very wide range. Though the data obtained so far are not sufficient to draw any definite conclusions, the results suggest that the deletions and deficiencies are very often only 'partial'--i.e., only some, and not all the chrononemata which constitute the polytene chromosome of the salivary gland nucleus, are affected.

Spurway, H. Spontaneous X-chromosome mosiacs in subobscura.

1) Gynandromorph. Parents $\frac{y + cd\ cp\ ct^{ar}}{y + cd\ cp\ a}$ ♀ x + cv + + ct^{fr} ♂. Most of abdomen, and genitalia ♀ and y+, remainder ♂ and y. But eyes cd+, probably cp, and wings cv+ and ct^{fr} (♂phenotype). Internal genitalia ♀, one sterile egg, no sperm, observable in spermatheca.

2) Hermaphrodite or gynadromorph. Parents $\frac{cv + ct^{fr}}{+ cd +}$ ♀ x cv + ct^{fr} ♂.

Head ♂, sex-combs normal ♂, abdomen ♀, genitalia ♀ slightly twisted, eyes and wings +. Internal genitalia in gelatinous tissue included two pear-shaped testes, two rudimentary ovaries, two spermathecae and a sperm sac. Copulated as ♂ and ♀, but sterile.

3) ♀, in mass culture segregating y and cd. Head, right thorax, legs and wings and dorsal and ventral patches on right abdomen y, remainder y+.

4) Gynandromorph. Parents $\frac{+ cd l_1 sin\ ct^{fr}}{cy + + + ct^{fr}}$ ♀ x v ♂. Head ♂ aristapedia (effect of ct^{fr}), wings cv ct^{fr} (♂ phenotype), abdomen size shape and posture ♂, number of sternal plates ♀, no external genitalia except ♀ anal plate. Found dead, viscera discolored, not dissected.

Note that mosaicism is usually fore and aft rather than bilateral.

Steinberg, Arthur G. An astonishing gynandromorph.

Among the offspring of the following cross: In(1)dl-49, y Hw m^2 y^4/+; $\frac{rucuca}{+}$ ♀ x +; rucuca/rucuca ♂ one fly having the following phenotype was found:

Left side: no sex comb h or Hw, th st ca abdominal pigment ♀

Right side: sex comb present th st cu sr e^s ca abdominal pigment ♂

The external genitalia were ♀. The head was e^s on both sides, the thorax on the right side only. The right half of the thorax was smaller than the left. The cells of the right wing were smaller than those of the left.

This fly was mated to 5 rucuca ♂♂. Fifty-five eggs, none of which hatched, were laid over a period of 6 days (only 2 on the 5th). Upon dissection the internal genitalia were found to be ♀.

Live sperm were found in the seminal receptacle. No simple explanation for the origin of this fly suggests itself, although some rather involved explanations could be offered.

Steinberg, Arthur G. The interaction of hairy and certain X-chromosome characters.

During the course of an experiment (done in collaboration with Mr. F. C. Fraser) in which the effect of various X-chromosome inversions on crossing over in the third chromosome was being studied, it was found (a) that the expression of h was greatly exaggerated in the presence of the dl-49 inversion which carries Hw; the exaggeration consists of a great increase in the number of hairs on the veins plus the formation of hairs (bristles?) in the wing cells themselves. In some instances extra veins not connected to those normally present were formed, these extra veins were heavily haired; (b) In(1) sc^8, sc^8, bb w^a also greatly exaggerates the expression of h although in the absence of h, In(1) sc^8, sc^8 bb w^a has no effect on wing hairs and (c) In(1) sc^7, sc^7 w^a suppresses the expression of h. These phenomena are to be examined more closely.

Sutton, Eileen Relation between euchromatin, heterochromatin and mottling.

25 rearrangements with breaks in both euchromatin and heterochromatin have been tested for visible effects of genes in the heterochromatic regions which have been translocated to euchromatin. The loci studied, stocks used for test crosses, and a summary of the results are given in the following table:

Locus	Normal position	♀s with rearrangement mated with—	No. of rearrangements tested	No. showing locus affected
bb	X heterochromatin	X ple ♂s (bb^L)	6	2
lt	2L heterochromatin	Cy/lt std ♂s	5	3
ltd	2R heterochromatin	ltd ♂s	6	? 1
in	3L heterochromatin	in p^p ♂s	5	—
ri	"	ri p^p ♂s	3	—
p^p	3R heterochromatin	in p^p or ri p^p ♂s	8	1

The bb and lt changes appeared in F_1 as mottled types (reduction or loss of some, but not all bristles in heterozygous bb, and a mixture of + and lt tissue in heterozygous lt). The p^p change was not mottled, but showed a uniform coloration intermediate between p^p and -. The doubtful case of affected ltd appeared very slightly lighter than +, and uniformly pigmented.

It is clear that mottling is due to a change of environment as between euchromatin and hererochromatin, and can be induced either by translocation of euchromatic genes to heterochromatin (Schultz 1936) or by the converse relationship. This was already indicated by recorded cases for lt (Schultz 1934) and ci (Dubinin et al 1935).

Tan, C. C. Two new karyotypes in Drosophila. From two new species of Drosophila found in China, namely, D. hexastriata and D. mutandis (the descriptions being given by Tan, Sheng and Chang, in press, Science Record), there were identified two types of mitotic chromosome complements, which have as yet not been recognized in any other species of Drosophila. The larval ganglial metaphase plate of D. hexastriata consists of 1 pair of V-shaped, 2 pairs of rod-shaped and 1 pair of dot-like chromosomes in the females. The larger pair of rods represents that of X-chromsomes, since one of these is replaced with a J-shaped Y-chromosome in the males. This is the eighteenth karyotype found in Drosophila and will be known as type "R". Another new karyotype, type "S", has been observed in D. mutandis, which possesses 5 pairs of rods and 1 pair of dots in the female. But 2 pairs of rods are unusual in length, about twice as long as the other 3 pairs. The X- and Y-chromosomes, which are almost indistinguishable from each other, are the largest of the set.

Vogt, Marguerite Further experiments on the species-specificity of the gonadotropic factors in Drosophila species. Ovaries transplanted between the species malanogaster, funebris, virilis and pseudoobscura never develop normally. This fact together with the possibility of stimulating the development of the implanted ovary (by co-implantation of brain-ring-gland-complexes of the same species into the foreign host) in reciprocal combinations supports the hypthosis of species-specificity of the gonadotropic hormones in Drosophila. It is to be expected that this species-specificity may be weakened by greater quantities of foreign hormone. The following experiments favor this hypothesis: ananassae-(Monod and Poulson), vir.-, fun.-and pseudoobsc.-ovaries develop better in fes-females and mel-/sim-hybrid-females, compared with +(m)-hosts. If +(m)-ovaries are implanted together with the foreign ovaries into fes-or mel/sim-♀♀, the foreign ovaries develop only as far as in +(m)-hosts. Thus the better development in fes-and mel/sim-♀♀-hosts seems to be due to a greater quantity of gonadotropic hormone in those hosts rather than to a qualitiative difference of the hormone of those hosts.

The comparison of the development of the foreign ovaries in the different species might prove of value for the determination of species relationships in the genus Drosophila. According to Sturtevant there seems to be a closer relationship between the pseudoobscura-group than between the melanogaster-group and the subgenus Drosophila. The degree of development of the ovaries of the 5 species tested up to now, points into the same direction: the species may be classified in the following order:

melan.
simul.---pseudoobsc.-funebris--virilis

No difference in the gonadotropic hormones of mel. and sim. were found; pseudoobsc. seems to be nearer to funebr. than to melan.; virilis seems to be the least related to melanogaster.

Waddington, C. H. and Pilkington, R. W. Development of facet, lozenge, morula, opthalmopedia. In a weakly-expressed facet the abnormality was due to overgrowth of secondary pigment cells which compressed the cones, causing the overlying corneal facet to bulge. In lozenge there is a failure of the cells of the middle layer of the optic disc to penetrate between those of the outer layer. The surface of the eye is thus covered with a layer of primary pigment (cornagen) cells, beneath which lie cone-cells and then completely disorderly retinular bundles. Morula eye is like that of split (Pilkington, 1941). In opthalmopedia (Gordon, DIS-14) overgrowth of eye-disc leads to folding of optic rudiment, the folded part sometimes becoming everted, sometimes remaining inverted, but never developing ommatidia.

Whittinghill, M. A position effect in brown/Moiré heterozygotes. T(2;3)Mé carries the bw locus and the tip of 2R with the Mé complex of 3R. Matings of various brown and Moiré stocks showed that flies genotypically Moiré might appear either as the usual Moiré or as dark Moiré, almost like brown, which nevertheless tested for Mé. It was not possible, until after five months, to isolate a dark Moiré strain. Usually both dark and bright Moiré flies came from either kind of selected parents. The difference between dark and bright eyes is definitely greater than the variability found within several Moiré stocks.

Whittinghill, M. Temperature effects with supressor of forked. Su-f modifies f^5 to a phenotype like that of f alone. The combination is temperature sensitive even to the extent of closely resembling wild type. From cultures subjected to temperatures of 9 to 36 degrees C. for one or two days it was found that the scutellar bristles were lengthened in both sexes after treatment at 9, 28, and 30 degrees, particularly if it was given at 5 to 7 days after egg-laying. At other temperatures and ages no females were affected, and a smaller fraction of the males showed lengthened bristles. This sex difference parallels the appearance of untreated f su-f flies, in which males look more completely wild type than do females. Eye shape also was altered to lozenge-like after treatment at 30 or 32 degrees.

Lees, A.D. and Waddington, C. H. Development of bristle mutants. The bristle-forming cells are distinguishable in the epidermis at about 15 hours after pupation, by which time they are slightly larger than the other epidermal cells, and have already divided to form a pair, the trichogen which lies below and secretes the bristle and the tormogen which lies above and forms the socket. The secretion is most active between 30 and 55 hours, during which period the

nuclei are very large, with polytene chromosome thread and large nucleoli.

In scute the bristle-cells may be absent at 19 hours; in hairy and an "extra-bristle complex" additional cell-groups were present by then. In split there is frequently an extra division, giving four cells which may (1) fail to reach surface of epithelium and give no bristle or socket, (2) develop 2 bristles, 2 sockets, or 1 bristle and 3 sockets, depending on orientation. Dicheate may produce effect (1) of split, or give extra division of trichogen only, giving two bristles in single socket. In Hairless trichogen lies beside and at same level as tormogen, and like it gives a socket. In Stubble, the trichogen is shifted slightly to the side, so that tormogen does not invest the growing bristle so closely. In shaven the trichogen is irregularly displaced and usually partly converted to socket. Spineless and morula slow growth of bristle cells; singed, forked and Bristle affect nature of secretion. In combinations of mutants, threshold phenomena are important, particularly with the H, Sb, sv group.

Technical Notes

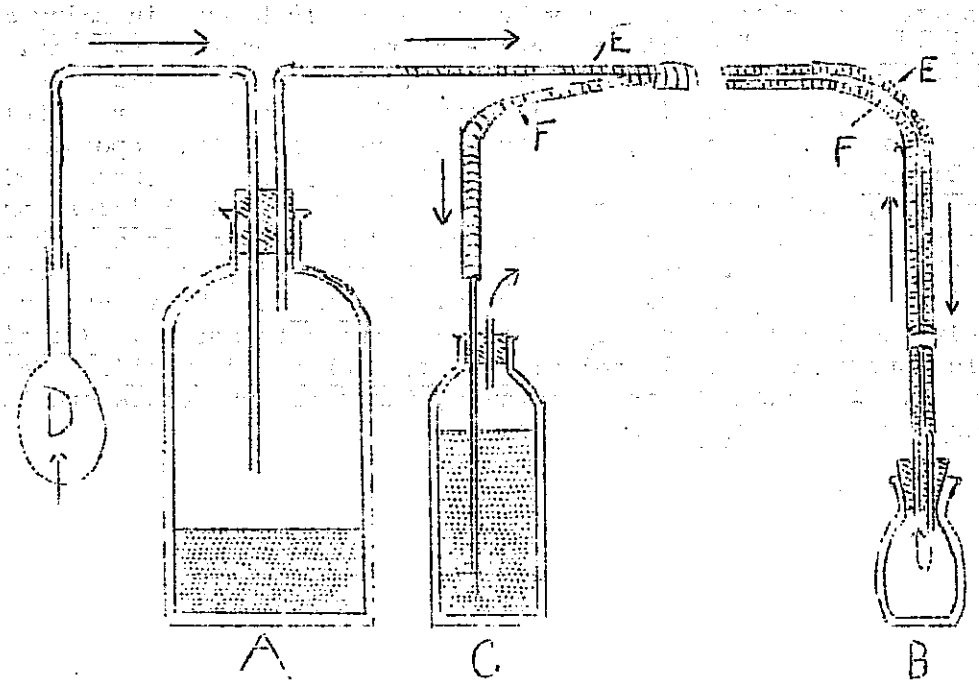
Columbia University Method for filling vials with food. The system for filling fials with thick oatmeal food, at Columbia, is as follows: Whipped-cream bags (ordered from a bakers' supply company) are fitted into copper tubes. The food, while half hot, is poured into the top of the bag and squeezed through the tubes into the vials.

The whipped-cream bags may be obtained from: R. C. Williams and Co. Inc., 265 Tenth Avenue, New York, N. Y. They may be ordered as "Dressing bags" number 5, at $.25 each or $3.00 a dozen.

The copper tubes were made by hand here in the laboratory.

Glass, H. B. Improved formula for Drosophila food. A number of different formulae were tested in order to find a food utilising a minimum amount of agar but with greater firmness than the current oatmeal medium. The following formula proved to be superior to any medium in the author's experience, since (1) it utilizes so small a quantity of agar as to represent a real saving over the current cornmeal formula; (2) it is considerably firmer

(This drawing of a new type etherizer, by H. D. Stalker, should follow the text on 16:72).



than the current oatmeal medium; (3) it never dries out and becomes crumbly; (4) by incorporating the yeast in the medium, it is unnecessary to open bottles from the time they are plugged or capped immediately on pouring until they are used; and (5) the food has higher productivity than the standard cornmeal medium. The amounts of the ingredients are given in the measures most conveniently used, and as proportions of a liter rather than in per cents.

Agar.....6 gms. (vary from 5 in winter to 7 in summer)
Oatmeal.....1/4 cup
Cornmeal.....1/2 cup
Brewer's yeast..... 10 gms.
Water.....600 cc.

Mix cold, and boil until agar is dissolved and mixture is smooth. Add:

Syrup.....120 cc.
Moldex solution..... 7 cc. (8 gms. moldex in 90 cc. of 95% alcohol)
Additional water.....113 cc.

Pour into bottles. Insert a cone of paper towelling in each. (Do not spray with yeast suspension.)

Lewis, E. B., California Institute of Technology
Cornmeal-Molasses-Rolled Oats Food.

(This formula is intended to supersede an earlier one of R. MacKnight.)
Formula for approximately 100 bottles.

Water to be put to boil.....2886 cc
Water to be saved cold to moisten cornmeal.....1200 cc
Cornmeal..... 900 g
Molasses (unsulfured)..... 600 cc
Rolled oats to be stirred into food just before pouring.... 90 g
Salt..... 6 g
Moldex in alcholoic solution containing 0.1 g per cc..... 42 cc

Materials: The cornmeal we use is of uneven grind, containing a good deal of fine and coarse. Other types of corn meal may require different handling. The rolled oats should not be of the quick-cooking sort. The type sold for chick feed should prove satisfactory.

Remarks: The crucial thing in preparing this food is to cook the cornmeal long enough so that it will jell firmly in the bottles, yet not to cook it so long that it becomes difficult to pour if not impossible. The time required will vary from one sort of cornmeal to another. Also, our cornmeal thickens more rapidly if it is boiling vigorously than if it is barely simmering. Once the cornmeal is cooked to the proper consistency it must all be poured as quickly as possible. It takes practice to judge when the cornmeal is done. It should be viscous and beginning to hold its shape momentarily.

Directions: Put the water for boiling, salt, moldex solution and molasses in a large kettle, cover, and heat until boiling. When this is boiling, and not before, stir into the cornmeal in a spearate kettle the cold water reserved for that purpose. Then add the well-wetted cornmeal (avoid lumps) to the boiling water, etc. Stir at once and continue stirring until the cornmeal no longer settles to bottom, whereupon turn off the flame and cover.

Dip some of the hot mixture, enough for 50 to 60 bottles, into a gallon teakettle with an open spout. Boil, not too vigorously, the food in the teakettle stirring frequently until the cornmeal is cooked to the proper consistency. Then stir in the dry oats, cover the teakettle, remove from the fire and pour immediately from the teakettle into the bottles, which should be arranged around the edge of a table. Arrange the bottles 10 x 10 and turn

a fan on them to keep flies away. Clean the teakettle and fill with more of the hot mixture, cook and pour. Repeat the process until the original batch is used up. Then wipe mouths of bottles free of any spilt food, add a drop of thick yeast suspension, paper and stopper.

Further remarks: If less than 60 bottles are needed, the food may be made directly in the teakettle. As many as 400 bottles may be made at a time; i.e., the total amount of food is partially cooked as above and then divided into 6 to 8 separate teakettle batches. This food should set firm in 10 to 15 minutes. If when the bottle is laid on its side the food flows perceptibly, it is underdone and will be too soft for convenient handling. If desired, dry oats may be placed in the bottom of bottles before the food is added, using 95 g evenly distributed among 100 bottles. Using the above method of thorough cooking of the cornmeal it has been found possible to dispense with this addition of oats.

For species other than D. melanogaster we stir in with the oats just before pouring 9.0 g (1 heaping tsp.) of cottonseed meal per 20 bottles. It is generally agreed that this is undesirable for D. melanogaster.

The above is condensed and modified from an unpublished account by Dr. R. H. MacKnight.

Stalker, Harrison D. A new type of etherizer. A new type of etherizer has been in use in our laboratory for over three years and has been found to give very satisfactory results. It consists principally of three bottles: the ether container (A), a bottle of approximately 2 liters capacity; an etherizing chamber (B), a quarter-pint culture bottle; and an ether-vapor trap (C), a bottle of approximately 500 ml. capacity partially filled with waste alcohol. Pressure on an inflating bulb (D), causes air to pass over the surface of liquid ether in A. The ether vapor is carried by the rubber tube (E) into the etherizing chamber B. The air displaced from B passes through a hole in the cork, (the hole is covered with a double piece of chemise cloth, fastened with Duco cement) and by way of tube F is carried to the ether vapor trap C, where it bubbles through the waster alcohol. It is found advisable to fasten the two pieces of glass tubing in the cork of B with Duco cement, as otherwise repeated handling may work them loose and allow the ether fumes to escape into the air. The two rubber tubes connecting A and C with B should be about two feet long, and should be fastened together with adhesive tape.

This type of etherizer allows the worker to vary at will the concentration of ether-vapor in the etherizing chamber. While one squeeze of the bulb will only partially displace the air in B, repeated pressure will gradually increase the ether-vapor concentration to any desired level. This is particularly useful when working with species differing in their susceptibility to ether. Since the etherizing chamber is cheap and easily obtainable, it can be replaced whenever it becomes contaminated with food or mites, and the cork can be wiped off with phenol.