

Research Notes

Argelander, A. and E. H. Strasburger. A case of genetic dysfunction of the ovaries.

In a cross between ♀ ClB sc¹ v/y² sc⁸ wa X ♂ y² sc⁸ wa males were found with eyes considerably lighter than wa^a, similar to wa^a v. Seven of these males were mated to y² sc⁸ wa ♀♀ from the same culture. Three matings were without light-eyed flies, whereas in 4, half of the flies were y² sc⁸ wa and the other half had light eyes. The inversion made it impossible to analyze new eye color. Crossing with y² sc⁸ wa v showed, however, that v was not present in the new mutant. The light-eyed females proved to be sterile. 56 homozygous light-eyed females mated to light-eyed or Berlin wild stock males gave no offspring. y² sc⁸ wa ♀♀ heterozygous for the light eye color gave as many flies with wa^a as with light eyes. The light-eyed males proved to be fertile. The stock is since kept by crossing light-eyed males with females heterozygous for the light color. The histological investigation of homozygous and heterozygous light-eyed females was done by E. H. Strasburger. The ovaries, together with their adnexes, were fixed in Carnoy and stained according to Feulgen method. Preparations were made of virgin light-eyed females and of females which had been mated to light-eyed males. In both cultures no eggs were found. Result of the microscopic investigation: The ovaries of all the homozygous light-eyed females are obviously abnormal. However, they are normal as far as the number of egg tubes per ovary, the number of sections per tube and, though perhaps not always, the number of cells per section. The nuclei of the older egg compartments are always, those of the younger ones often absolutely pycnotic. In the older cells there is obviously plasma constriction. In the egg ducts often pathological heaps of eggs and nurse cells are found. The three spermathecae and the two paravaria are normal and always present. The heterozygous females were found to be normal.

Buzzati-Traverso, A. A sex-linked modifier of brown.

In the F₂ of a cross between a y ♀ and a bw; e wo ro ♂, flies appeared with rose eyes. This eye color proved to be due to a sex-linked recessive modifier of brown, which, when homozygous in presence of homozygous bw produces the rose eye color, and when homozygous in presence of heterozygous bw lowers the dominance of the normal allele of bw so that the flies carrying such gene combination are brown. Experiments are in progress to find out whether it is a specific modifier and to localize it in the X-chromosome.

Buzzati-Traverso, A. Direct proportionality between X-ray dosage and translocations between the 2 and 3 chromosomes of *D. melanogaster*.

Using the L²/Cy - 3-ple method to detect translocations between the second and third chromosome and X-ray dosage of 1500, 3000 and 6000 r (the irradiation being made in Berlin by K. G. Zimmer) it has been found a direct proportionality to the quantity of applied irradiation. 3,59±0,75, 6,14±1,82 and 12,21±1,83 are the percentages of translocations obtained with the three mentioned doses. Experiments are in progress to obtain more points along the curve, to check the wave-length and the time-factor effects.

Brasted, Adair Multiple effect
of "engrailed" in *D. melanogaster*.

The mutation "engrailed" in *D. melanogaster* was described by Eker in 1929 (*Hereditas* 12:217). He enumerated two of its effects: (1) a longitudinal split in the scutellum extending anteriorly from

the posterior border, and (2) shorter, broader and more thin-textured wings than in wild-type flies, with numerous abnormalities in venation. A third, hitherto unreported effect, discovered in October 1937 by Dr. Curt Stern, is the production of an extra sex-comb on the lateral side of the first tarsal joint, directly opposite to the normally present sex-comb. This extra sex-comb has fewer, more irregularly arranged teeth than the normal, and is considerably more sensitive to environmental variations. Its size has been found to vary inversely with temperature. The "split scutellum" was reported in DIS-7:20 as a new mutant (spc), due to erroneous labelling of a stock. It is now obvious, however, that this condition is one of the multiple effects of "engrailed".

Crew, F.A.E. and Rowena Lamy
Mosaics.

Mosaics of *D. pseudo-obscura* carrying autosomal as well as X-chromosome markers were obtained, and it was found that the autosomal characters as well as the sex-linked ones were expressed in the excep-

tional regions, indicating that these were haploid for the whole chromosome complement. As the other mosaics obtained from the Plexus strain (v. DIS-8) were also probably haplo-diploid, their normality as to sex is explained, since haploid tissue has been shown to be female (Bridges 1925). Three male mosaics obtained in the same strain are clear cases of double-nuclear fertilization.

Gershenson, S. Investigation of
genetical processes in wild popula-
tions of *Drosophila*.

An extensive work along this line has begun during the summer and autumn of 1937 in a locality near Kiev (USSR). This work involves not only a complete genetical and cytological analysis of wild populations of two species (*mel-*

anogaster and *busckii*) but also experiments on natural selection, rate of reproduction in nature etc., and an analysis of a number of ecological questions connected with the main subject. The work is to be carried on during several years.

Gershenson, S. *Drosophila* species
near Kiev.

The following species of *Drosophila* have been collected by the writer in Kiev and its suburbs during August-October 1937: (1) *melanogaster* (*fasciata*) (2) *obscura* (not *pseudo-obscura*)

(3) *busckii* (4) *phalerata* (5) *funebis* (6) *Spinulophila* (*Drosophila*) *immi-grans* (7) *Parascatomyza disticha* (8) *maculata* (new species, name provisional). The first five species are numerous; 6 and 7 are rare; *D. maculata* is very rare. Most individuals of *D. melanogaster* and all of *Parascatomyza* caught in nature were infected with the nematode *Chondronema* (family *Anguillulidae*, sub-family *Sphaerulariinae*).

Glancy, E. A. and R. B. Howland. A study of the histology of bristle growth in normal and mutant flies, especially in the mutants used previously for transplantation studies, is being carried on. The tormogen and trichogen cells in the mutant singed do not differ from wild type cells in relationship to each other or to the hypoderm, nor can they be distinguished from the wild type cells cytologically. Yet the singed bristle, from the moment it can be recognized (approximately 30 hours after puparium formation at 25° C.), is conspicuously stouter than the wild type, and is curved or otherwise distorted.

Goldschmidt, Richard. A note on Thus far 5 cases of so called mass mutation in *Drosophila* are on record (Spencer has in addition pointed to the existence of this phenomenon in a general way). Two of these have occurred in pure Florida stock (Gold-

schmidt '29, erroneously attributed to the simultaneous heat treatment, Demerec '37 ("explained" by a gene for mutation). The third (Plough and Holthausen '37) occurred in a Florida-cross. A fourth set of cases was found in Goldschmidt's plexus-blistered stock and a fifth by the same author in a cross bs x Oregon. In studying a certain position effect which is common to most third chromosome inversions Mr. Gardner found that crosses involving pure Florida stock produced the same effect. A salivary analysis by Mr. Kodani revealed a large inversion in the third chromosome of this stock (Meanwhile also found by others). The plexus-blistered stock (this is a purely descriptive name) is a very complicated translocation stock, as will be described in detail later. The standard bs, supposed to be an ordinary recessive, turned out, both genetically and in salivary analysis (latter by Mr. Kodani) to contain a translocation with strange position effects upon the bs expression. Thus all stocks which thus far produced the mass mutation phenomenon contained major chromatin rearrangements. A detailed description of our material is being prepared.

Green, Melvin. Variations in the expression of vesiculated-29c.

The mutant vs^{29c} usually manifests itself as a liquid-filled vesicle in the region of the first and second posterior cells of the wings. Deflation of the vesicle soon after emergence results in a glassy, ruffled condition of the wing. Individual varia-

tion is frequently encountered in size of vesiculation; and in a few cases flies appear with one wing completely wild type. The effects of temperature on vs^{29c} are now being studied. Preliminary experiments in which development took place at a temperature of 30 degrees \pm 1 degree C (except for a 2 hour egg-laying period at room temperature) gave the following results: 25/545 males or 4.6 \pm 1.03%SD had wild type wings; 53/452 females or 11.7 \pm 4.1%SD had wild type wings. The wild type males and females showed by tests to be genotypically vs. In two years handling of the stock at room temperature no males or females with both wings wild type have been observed.

Honer, E. Cytogenetic investigations on a complex dumpy.

A single dumpy⁸ arose in the F₂ of a cross of X₀ x Oregon. This dumpy was found to manifest itself only within a special genotypical milieu where it behaves like a dominant; homozygous lethal. Flies which

contain the milieu only have quite normal wings but tend to give phenocopies of dumpy when bred at higher temperatures (28-30° C). The milieu is built up by modifiers which are about to be classified. As dumpy gives a strong compound effect with the known dumpy (dp-2-13,0) (the wings are much more shortened

and the legs knobby) it is supposed to be connected with a small deficiency at the *dp* - locus. Slides of salivary glands did not show any typical aberration near the free end of 2L.

Law, L. W. Radioactive phosphorous and the lethal mutation rate in *Drosophila*.

The results obtained by use of X-rays in influencing the structure of chromosomes in *Drosophila*, have proved of invaluable aid to geneticists. It was thought worthwhile to attempt to influence the lethal mutation rate by

radioactive phosphorous. A 1% solution of radioactive Na_2HPO_4 was obtained from Dr. John Lawrence of the University of California. This substance had been removed from the cyclotron 15 days previously, so that at the time it was used it had a strength of 30 micro-curies per cubic mm. It gave off chiefly beta and gamma rays. A series of concentrations were then injected into 4 day old larvae of the Oregon-R strain (method of Beadle and Ephrussi) in order to determine the sub-lethal dosage. This was found to be 0.1%. Approximately 1 cubic mm. was then injected into Oregon-R males and lethals tested for in the usual ClB manner, using the stock of X-ple/ClB flies. No lethals were found in 250 tested X-chromosomes as compared with no lethals in 507 control chromosomes.

Ludwig, W. A Lamarckian experiment on *Drosophila*

In the Zoological Institute is bred since June 1933, a stock of *D. melanogaster* Oregon+, called "Lamarck" (130 generations up to date). Immediately after hatching the flies have their

wings and halteres cut off. The purpose is to find out if the wing-muscles show a reduction on account of the wings not being used. According to investigations on double-hemithorax-flies (DIS-7:17) which, in spite of lack of whole thorax-muscular-tissues, are able to run and spring nearly in the same way as the wild ones, it is certain that the wing-muscles are used for flying. Furthermore, from other species of flies which are not able to fly, it is known that this circumstance is accompanied by a reduction of the wing-muscles. An examination of "Lamarck" after 100 generations shows the following result in comparison to Oregon+. There is no difference in the total number of the nuclei in the muscles (= number of muscle-cells) the total number of fibres, and the total volume of the muscles, that is to say, up to now no influence in respect to Lamarckism could be detected. The investigations are continued, both from morphological and physiological point of view.

Ma, S. Y. Temperature experimente an *Drosophila melanogaster*, insbesondere zur Bestimmung der sensiblen Perioden für die Induktion einiger Arten von Modifikationen.

Eier, Larven, Vorpuppen und Puppen eines lang gezüchteten Oregon-Wildstammes wurden in verschiedenen Entwicklungsstadien mit Letaltemperaturen von 38,5° bis 41° C. gereizt. Es wurde dafür gesorgt, dass die Konstanz der verwendeten Methoden (mindestens innerhalb eines Stadiums oder einer Versuchsserie), die

Genauigkeit der Altersbestimmung und die Exaktheit der Hitzebehandlung stets aufrecht erhalten würden. Die Experimente und die Auswertung des Ergebnisses sind noch im Gange, die bisherigen Resultate zeigen aber bereits folgendes:
1. Es besteht ein Geschlechtsunterschied in der Entwicklungsgeschwindigkeit, d. h., ♀ entwickelt sich schneller als ♂. 2. Die Hitzesterblichkeit ist hoch in früheren, niedriger in späteren Entwicklungsstadien; innerhalb eines Stadiums ist sie am Anfang und am Ende (einschliesslich der Hautungsperiode)

gross, in der Zwischenzeit aber gering. 3. Es wurden in hohen Prozentsätzen verschiedene Arten von Modifikationen erhalten, welche spezifisch sind für die Entwicklungsstadien, auf denen die Hitzebehandlung stattfand, und in einigen Fällen auch für die angewandten Temperaturen und Reizzeiten. 4. Der quantitative Unterschied in der Sterblichkeit sowie in der Ausprägung der Modifikationen zwischen den beiden Geschlechtern scheint auf dem Geschlechtsunterschied in der Entwicklungsgeschwindigkeit zu beruhen. 5. Die sensiblen Perioden einiger erhaltener Modifikationen (Die Zahlen geben die Anzahl der Stunden nach dem Eintritt der bezeichneten Stadien an; die unterstrichenen die optimalen Zeitpunkte. E = Embryonales Stadium; LI, II, III = 1.2.bzw.3.Larvenstadium; P = Puppariumbildung): Flügel: (1) Überzahlige Querader, überzahlige Ader und Queraderunterbrechung. Spates LIII-P 30. (2) Ausfallen von Randhärchen. P 10-15-20. (3) Schmalflügelig (selten und asymmetrisch). P 15. (4) Dachförmig (nur nach langer Reizdauer). P 10-30. (5) Abgestutzt. P 10-20-25. (6) Abwärts gekrümmt. P 0-30-45. (7) Aufwärts gekrümmt. P 35-70-85. (8) Gespreizt (stark wenn lang gereizt). Fast im ganzen Vorpuppen- und Puppen-Stadium. (9) Aufgerichtet. P 70-94. (10) Blasenbildung (lang u. stark gereizt). P 30. Augen: (11) Gefurchte Augenoberfläche. Spates LIII-P 15. (12) Unregelmässige Verteilung von Facettenhärchen (rauh). Spates LIII-P 60. Beine: (13) Verkuppelt. E 10-20; LIII 22-P 12. Borsten: (14) Verkleinert, gegabelt und gedreht. LIII-P 30. (15) Verzweigt. P 25-40. (16) Hakenförmig. P 35-50. (17) An der Spitze geknickt, geknopft. P 45-55. (18) Schwach bis ganz entfärbt. P 55-80. Aristae: (19) Härchen querlig verzweigt. P 30-35-40. Thorax: (20) Eingedellt. P 70-94. Scutellum: (21) Hornartige Auswüchse. P 10-20-30. Innere Gewebe: (22) Tumorartige, schwarze Körperchen. LIII.

Muller, William A. Possible sex influence upon the expression of a dominant blister wing.

The mutant blister-like is a dominant located 3.2 units from bw (965 total count). Small counts indicate no extreme chromosomal fragmentation. The character mainly involves wing venation and excess liquid causing a blister. All individuals do not

show a definite blister. Blistering may show a minute thickening of the veins, an absence of veins, or a definite blister of the wing. Usually only one wing has a blister; however, when one wing shows a blister, the other wing always has abnormal venation. In a study on the variation of the trait, individuals were classified as (1) slight; that is, with abnormal venation and no blister; (2) definite; that is, with one or both wings having a blister regardless of the abnormal venation. The expression of the character is usually more marked in the female than in the male. Males - total count: 984; slight 788; definite 196 (80.1%: 19.9%). Females - total count: 773; slight 155; definite 618 (20%: 80%).

Neuhaus, M. Triploid stock in *Drosophila simulans*.

In order to obtain new hybrid combinations between *D. simulans* and *D. melanogaster* it was necessary to have triploid females in *D. simulans*. For this purpose, yw females with attached X's were mated to sn males.

Gray females were looked for in the F¹ generation. 8 gray females were detected among 5380 yw females. Two of them gave the following progeny: One female gave 6 yw ♀♀; 1 y ♀; 3 sn ♀♀; 4+♀♀; 3 yw ♂♂; 1 yw sn ♂; 3 sn ♂; 3+♂; 1 yw ♂; 1 w ♂. The other female gave 4+♀♀ and 1 w ♂. These data indicate the possible triploidy of these females. All gray daughters of the first female proved in further crosses to be diploid. One of the gray daughters of the second female gave 9+♀♀; 14 sn ♀♀; 2+♀♀ and 1 w ♂. It is obvious that this female was triploid. It was noted, simultaneously, that among these gray females there happen females with somewhat thickened scutellars and some other macrochaetae on the thorax, a part of which was forked-like. It was surmized that these females were triploid. This was confirmed in further experiments.

The data show the offspring of females with such bristles. Obtained crosses between females with thickened bristles and sn males - Females: $f = 51$; sn = 64; 3N = 38; y w = 4; w = 1; y = 1; Males: sn = 42; w = 3; y w = 2; $f = 3$; Intersexes $f = 23$; sn = 22. The cytological analysis proved this assumption to hold true. Ovaries of females with thickened bristles were stained with acetocarmine and their study showed the chromosome set to be triploid. Intersexes obtained in *D. simulans* differ but slightly from those in *D. melanogaster*. Triploid *D. simulans* females were mated to *D. melanogaster* sc⁸ wa f B males. The sc⁸ chromosome was selected for the following reasons. It is known that the sc⁸ - chromosome shows the Hw effect, which is manifested both in homo- and heterozygotes by the presence of a group of new microchaetae - mesosternale. Triploid females in *D. melanogaster*, having one sc⁸ - chromosome do not manifest this character. It was therefore, possible to assume that these bristles would not appear in hybrids, having two chromosome sets from *D. simulans* and one set from *D. melanogaster*, which would enable us to detect them from diploid hybrids. Following hybrids were obtained: 5 $f + f$ ♀♀; 4 sn ♀♀; 2 $f + f$ ♂♂; 2 sn ♂♂; 4 $f + f$ ♂♂; 1 ♂. Although the figures obtained are small they nevertheless show that hybrids which have received from *D. simulans* two sets of chromosomes and the cytoplasm, and from *D. melanogaster* one set of chromosomes probably very seldom survive. This fact is in conformance with previous data on hybrids between *D. simulans* and *D. melanogaster*. It is known that hybrid females having the cytoplasm and one X-chromosome from *D. simulans* and the other X-chromosome from *D. melanogaster* have a decreased viability. One case of a hybrid female having the cytoplasm and two sets of chromosomes from *D. simulans* and one set from *D. melanogaster* is, however, described in literature (T. Morgan, C. B. Bridges and J. Schultz 1938). The 5 hybrid intersexes obtained by us were similar to hybrid intersexes which were obtained from 3N *melanogaster* crossed to 2N *simulans* and described by Schultz and Dobzhansky (1933). Such hybrids were also obtained in great number by us.

Pipkin, Sarah Bedichek. Expression of forked in the progeny of triploids.

The degree of forkedness observed in the progeny of homozygous forked triploid females crossed with forked males is found to depend not only upon the dosage of the X-chromosome but also

upon the dosage of the autosomes. Super-males (1X3A) are the most forked; triploid (3X3A) and diploid (2X2A) females next; diploid males (1X2A) less forked; and intersexes (2X3A) least forked of all. Forked haplo-IV diploid males with bristles as slender as those of the super-males nevertheless have a degree of forkedness similar to that found in diploid males. Intersexes, while less forked generally than diploid males, sometimes have patches of extremely forked tissue. Thus the autosomes influence the expression of forked since 1X2A diploid males are less forked than 1X3A super-males, and, furthermore, 2X2A diploid females are more forked than 2X3A intersexes. In X-chromosome aneuploid experiments concerned with studying sex balance, it was found that 3A individuals carrying one complete X containing forked, one complete X with the normal allele of forked, and the left hand X-chromosome fragment of an X-IV translocation broken between the loci of fw and wy, were faintly forked. Ordinary 3X3A triploid females with one dose of the normal allele of forked and two doses of forked appear non-forked. Control intersexes (2X3A) with one normal allele of forked and one forked gene present also appear non-forked. Thus although the number of each autosome remains the same (three of each), the addition of an extra fragment of the X not containing the locus of forked to the $\frac{f}{f}$ 3A complement changes the ex-

pression of forked. Individuals of the composition

2A,

$\frac{f}{f}$

(hyperdiploid females), however, only rarely show one or two bristles faintly forked in comparison with the weak but definite forking in nearly every bristle of practically every individual of the composition $\frac{+}{f}$ 3A. More

data are now being accumulated in an effort to localize the region in the left hand portion of the X-chromosome which appears to be responsible for the weakening of dominance of the normal allele of forked in $\frac{+}{f}$ 3A aneuploids.

Pogossianz, H. E. The gene scute in *D. virilis*.

Among 60,986 F^1 females, 46 scute flies were obtained from the cross of *sc y sc v c* females to normal males, given 4000 r of X-ray treatment. Simultaneously in *melanogaster* only 3 acute mutations occurred among

12, 858 F^1 females. Since the method and dosage in both experiments are the same and the alleles of scute in females used are phenotypically similar, the following conclusion can be drawn: the gene scute in *virilis* mutates more frequently than in *melanogaster*. This is confirmed by the data obtained on *melanogaster* by other authors (Goldat 1936, Glembozky 1936). Among 46 scute mutations 16 were not tested; they were sterile or perished. The remaining 30 flies carried the newly arisen mutations. 18 of which proved to be viable and fertile, 4 sterile in males, and 8 lethals. All these mutations are studied at present both genetically and cytologically. The description of the new scute mutations is given in this issue of *DIS*.

Sirotina, M. I. Cytology of *D. busckii*.

An investigation of metaphase plates in larvae ganglions and in ovaries of a stock of *D. busckii* of Kiev origin showed the presence of only three pairs of chromosomes (instead of four pairs reported by Metz

for the American *D. busckii*). The X-chromosome is rod-like with a satellite on its proximal end. The autosomes are V-shaped, with equal arms; both pairs are alike in length. The Y-chromosome is likewise V-shaped, but one arm is longer than the other. An analysis of salivary gland nuclei revealed the absence of the granular amorphous central mass characteristic for *D. melanogaster*, and the presence of a heavily staining nucleolus. All the elements are connected with this nucleolus by thin threads. The number of elements is 6 in the female and 7 in the male; the extra element in the male is the Y-chromosome (or its part), containing about 14 discs. The satellite of the X-chromosome is likewise represented in salivary nuclei as a free element. The X-chromosome and the satellite are more strongly connected with the nucleolus than all the other elements. A rather detailed map of the salivary chromosomes of this species has been prepared and will appear in the paper which is now being prepared for press.

Serebrovskaja, R. I. X-ray induced mutations in *D. hydei*.

By means of X-rays (3000 and 4000) the following mutations were obtained in *D. hydei*: (1) scute - sex-linked, recessive (2) white - sex-linked, recessive (3) vermilion - sex-linked, recessive (4) forked -

sex-linked, recessive (5) Notch - sex-linked, dominant (lost) (6) orange eyes - sex-linked, recessive (7) red eyes - sex-linked, recessive (8) miniature - sex-linked, recessive (lost) (9) Dichæte-type - autosomal dominant (lost) (10) Spread-type - autosomal dominant (lost). In total, 32751 flies were examined. Both sexes were studied and X-rayed simultaneously. The greatest

attention in our work was paid to the scute mutations. Our allelomorph (scute²) affects a great number of bristles, such as: all the 4 scutellars, the praesuturals, postalars anterior and posterior, supraalars ant. and post., sternopleurals - ant. and post., orbitals 1-3, verticals 2, intraocellars, mesosternals, vibrissae, genals, mentals, coxals 1,2,3, costals dorsal proximal, costals 1 and partly sternitals. When compared to the scute allelomorphs of melanogaster the scute of *D. hydei* is more proximate to the group of scuti longi which reduces the bristles of the B, C and D blocks (see the communications of A. S. Serebrovsky in this issue). It is of interest to note the influence of scute² upon the bristles of the genitalia, a fact never observed in melanogaster, due probably to a different structure of genitalia.

Serebrovsky, A. S. Further study on scute allelomorphs.

A thorough study of a considerably greater number of bristles, controlled by the gene scute, has allowed us to divide all the bristles into four groups (blocks); the A-block, controlled by the achaete allelomorphs, and the B, C and D-blocks, controlled by the scute allelomorphs. Block A: involves the bristles: dorsocentrals, "thoracals", "trapezals", "costals basal", "antennals external", femorals 3 ventral, interocellars, "antennals basal", subcoxals, microchaete sternopleurals, "ciliars", microgenals, frontocentrals, "femorals I, 2 and 4", "annulars", verticals I. Block B: involves the bristles: notopleurals I, praesuturals, "femorals I 1 and 3", mentals, sternopleurals ant. and post., coxals, orbitals, postverticals, ocellars, postalars ant. (?), vibrissae (?), verticals (?). Block C: involves the bristles: scutellars, sternitals, "tergitals", "genitals" (?). Block D: involves the bristles: humerals, postalars post., verticals, supraalars ant. and post., notopleurals - 2. The allelomorphs of scute fall into three groups: scuti brevis, scuti medii and scuti longi. Scuti brevis (sc⁵, sc^{4sh}, sc²) affect in usual laboratory conditions the block C; scuti medii (sc¹, sc⁷, sc⁹, sc^{B1}, sc²⁹, sc^{2sh}, sc¹⁷) the blocks B and C. sc⁶, affecting the block B can also be included in the latter group. Scuti longi (sc¹⁸, sc^{sl}, sc⁴) affect the block B, C and D. The longest, scute³, affects all the blocks (A, B, C and D) simultaneously, thus including both scute and achaete. Finally sc⁴¹ links scute and achaete, affecting the block A and B, as well as sc¹³(sc¹ / ac³). To judge from the data of Pogossianz, Varshaver and Serebrovskaja analogous types of allelomorphs exist in *D. virilis*, *simulans* and *hydei*.

Shapiro, N. I. The rate of spontaneous sterile mutation.

The frequency of sterile mutants, functioning in females, was studied. Recessive steriles, arising in the 2nd chromosome, were registered.

The method used in the experiment

prevented from mixing the newly arisen steriles with those which had been previously in the population. Among 2,841 chromosomes studied, one sterile was detected. In the same experiment 18 newly arisen lethals were detected among 3,132 chromosomes. The data obtained indicate a considerably lower frequency of spontaneous autosomal sterile mutation as compared to the lethal mutation rate.

Steinberg, Arthur G. Growth curve of Bar and wild type eye discs.

Using the technique described by Medvedev the growth curves for Bar and wild type eye discs were measured. Measurements were then taken at twelve hour intervals from thirty-six hours

after hatching until puparium formation. The experiments were run at 27 ± 1° C.

The data show that the Bar eye discs are already smaller than wild at 36 hours after hatching and that the growth rate of both Bar and wild type is the same throughout this period of development. These data are especially interesting in view of the fact that the temperature-effective period is included in this time interval.

Steinberg, Arthur G. The Lobe alleles and the v^+ hormone.

Implantation of eye discs from larvae which are genotypically Lobe, Lobe², Lobe⁴ or Lobe⁵ into vermilion hosts shows that such discs fail to develop wild type pigmentation. Their pigmentation is intermediate

between that of vermilion and wild type. This reaction is similar to that shown by the Bar "alleles".

Steinberg, Arthur G. Facet number of Bar⁴

The facet number of B⁴♂♂ and ♀♀ at 25° C has been determined. The ♂♂ have 560.0 facets and the ♀♀ 558.2.

Timofeeff-Ressovsky, N. W.
Determination of the "radius of activity" of *Drosophila* flies.

For many theoretical considerations the knowledge of the real amount of panmixy or, vice-versa, of isolation within the species-populations is rather important. Without considering some finer mechanisms of physiological and ecological isolation, three

main factors are of importance in this connection: (1) the real distribution of individuals over larger areas within the different parts of the species-population, (2) the "radius of activity" of the individuals within one generation, and (3) the extension of "life-waves" (quantitative fluctuations in time and space) in populations, and of accidental, passive mechanisms of mixture between different parts of a larger population. The relation of the first two factors can show the amount of "active" panmixy, and the knowledge of the third factor can give an idea of the amount of "passive" panmixy. More or less systematical, extensive, and exact studies on the "radius of activity" were so far made only in birds; they showed tremendous dissipation of the brood in each generation in some species (e.g. *Nettion crecca* L.), and extraordinary territorial conservatism in others (e.g. *Sturnus vulgaris* L.). The following simple method can be used in studying the "radius of activity" in *Drosophila*: A ground of the size of about 2 - 5 hectares is divided into equal squares (on the map!) and in the center of each square (10 - 15 m apart) a bottle with food is placed; in the middle of the ground larger amounts of food are placed, and 2000 - 5000 *Drosophila* flies with different (not too deleterious!) mutations (better - combinations of 2 - 3 mutations) as "markers" are let out. During a period of 15 days the food bottles are inspected twice a day (9^h and 18^h), and the "marked" flies are counted, registered, and let out at the same place where they were caught (or collected and killed!). The end-result of a 15 days experiment will show the "dissipation-area", or "radius of activity" of the individuals of one generation of the species in question. Such tests have as far shown that the diameter of the area where "marked" flies are caught (after they were let out in the center of this area) is about 100 - 200 m, differing according to the species and mutations used, and also to the meteorological conditions. *D. funebris* shows, so far, a higher "dissipation" than *melanogaster*. The same type of experiment can be modified: instead of imago-flies, "marked" larvae and pupae can be placed (with a supply of food) in the center of the "experimental field".

Timofeeff-Ressovsky, N.W.,
H. Boehm and G. Gottschowski.
Studies of population-structure
in Drosophila.

For theoretical considerations on the gene-dynamics in free-living populations and on micro-evolutionary processes, we need some knowledge of the real distribution in time and space of the individuals within different parts of the distribution-area of the species.

The following simple method of studying the population-structure in *Drosophila* can be used: A ground about 5 - 15 hectares large is divided into equal squares (on the map!) and in the center of each square (15 - 25 m apart) a bottle with well-fermentating food is placed. The squares and respective bottles are serially numbered on a map. The *Drosophila* flies are counted and registered (according to species and square) 2 - 4 times a day for a period of 3 - 4 days. Such registrations should be repeated every 3 - 4 weeks during the whole season. The result will show the actual distribution of individuals of different species in time and space throughout the season. From time to time countings should be made during 24 hours, day and night, every 2-3 hours; they will show the activity-curve of the flies for 24 hours. Any meteorological, phytosociological, and ecological data should be collected and used in the evaluation of the results. The results so far obtained at three places in this country show that: (1) *D. melanogaster* builds small but dense populations more or less far apart from each other, and does not occur in between; the obscura group of species, as well as such species like *transversa* or *phalerata*, are distributed much more regularly throughout the suitable biotops; the distribution of *funnebris* is more like that of *melanogaster*, but shows more dissipation around the single dense populations (2) The distribution of caught individuals throughout 24 hours shows two marked peaks in the morning (8 - 10^h) and in the evening (18^h), and "dead" periods in the night (0-4^h) and at noon (13 - 14^h) (3) The first flies appearing in spring are those of the obscura group, which then occur regularly throughout the whole season; *funnebris* appears in larger quantities in May-June, and *melanogaster*, *transversa*, and *phalerata* - later, in July (4) The flies of the obscura group show high activity several hours after rainfalls; *melanogaster* disappears (is not caught in the food bottles) in cooler days and weeks.

Tiniakoff, G. G. The "Bar and
 "aristapedia" mutations in *D.*
funnebris.

The dominant sex-linked "Bar" mutation has been obtained in F^1 from X-rayed males with the "mottled" mutation which represents a reciprocal translocation between the Y and the IV chromosomes (See schemat.

cytolog. maps in the work of G. G. Tiniakoff in the Russian Biological Journal, vol. V, 1936, p.754). The phenotype of the bar mutation, similarly to that of *D. melanogaster*, is expressed in a greatly reduced (see Fig. 1), striated eye. The expression is much stronger in males than in females, but a few facets remaining sometimes in the former. Bar males are less viable and fertile as compared with females. According to preliminary data, only about 17 per cent of bar males are obtained from a cross of bar females to normal males. When crossing bar females to bar males, the strain obtained shows poor development, no homozygous bar females being, as it seems, produced. A cross of bar males to normal females gives offspring where all females are bar and all males normal. It was shown cytologically, that this bar strain represented an insertion of a rather large section of the median part of the X-chromosome into the 2 chromosome (See cytolog. maps of G. G. Tiniakoff). The dominant autosomal "aristapedia" mutation was obtained in F^1 by means of X-irradiation of normal males from the "Polivanov" strain of the Moscow district.

The phenotype of the "aristapedia" mutation consists in a gigantic growth of these segments of the antenna on which aristae are disposed. In flies with the above character well expressed, antennae are transformed into legs with a division into segments proper to them (Fig. 2). Large bristles, characteristic of legs, are sometimes seen to grow between the segments (see the extreme right Fig. 2). On the ends of those atavistic legs, well marked aristae are occasionally present. The head of flies with the aristapedia mutation is somewhat elongated, while the eyes are always reduced, flattened, resembling in form the "lobe" mutation in *D. melanogaster*. The manifestation of that character is found to be more pronounced in females than in males. Cytologically this strain has not yet been investigated. Among 120,000 F_1 flies examined, resulting from X-raying males of diverse strains, the bar mutation was obtained only once and the aristapedia mutation only twice, the latter character occurring in both cases in males. The second male did not produce any offspring. As far as we know, the bar mutation and the atavistic mutant aristapedia character in *Drosophila* is a very rare phenomenon and our cases in *D. funebris* seem to be described for the first time. The recessive aristapedia character in *D. melanogaster* was also described in the Institute of Experimental Biology by Balkashina in 1928.

Fig. 1



Norm.



Bar ♀

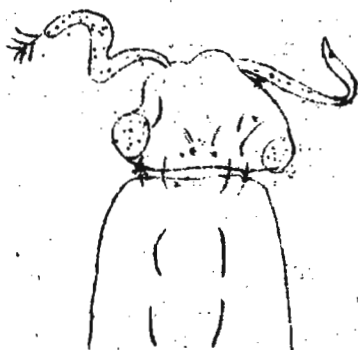


Bar ♂

Fig. 2



Norm.



Aristopedia ♂



Aristopedia ♀

Varshaver, N. B. Mutation rate of y, ac, sc, w and sn in *D. simulans*.

Normal *D. simulans* males were X-rayed (dosage 4000 r) and mated to y w females with attached X-chromosomes. The following frequency of mutation was detected in the loci y, ac, sc, w and sn. Among 94,762 studied F_1 males there were found:

11 yellow (0.116%), 0 achaete, 10 scute (0.0105%), 26 w (0.0274%), 1 mottled

(0.0011%) and 12 singed (0.0126%). Among the 10 scute mutations only 3 proved to be fertile, although showed a very poor viability. One of the latter was lethal in females, just as the sc^3 in melanogaster. None of the allelomorphs studied was connected with a long inversion. The description of scute mutations in simulans showed their high resemblance with the scute in melanogaster.

Technical Notes

Clancy, C. W. Large scale egg collections.

In order to secure large numbers of pupae of known ages it has been necessary to develop special methods for handling the females and for collecting eggs, the details of which may be

of interest to other workers. (A) Pre-feeding of females. The importance of pre-feeding the females for egg-laying was mentioned in a previous issue (W. P. Spencer, DIS-8). The technique adopted here is to start culture bottles of the desired stock with 5 to 10 young females and an equal number of males. Allow the females to lay for 2 to 3 days, then transfer to a new bottle; repeat several times. The females will usually lay well for a week to ten days; it is then best to start bottles with new ones. Dried Brewer's Yeast in rather heavy suspension is added to the culture bottles a day or two after the females have been transferred from them. This ensures maximally fed larvae. When cultured as indicated the flies are large and the females after being counted, mated, and fattened for about two days in regular culture, bottles to which a small amount of water has been added, are in excellent condition for laying. For the ageing, mating, and fattening process, 50 to 70 females are placed in a bottle with 25 to 30 males. These are later transferred without etherization to the egg collecting jars described below. (B) Collection of eggs. Eggs are collected in quart size, wide-mouthed, fruit jars, (Presto, manufactured by Owens-Illinois Glass Company) in small metal trays containing agar-cornmeal-molasses medium. The trays may be purchased at Woolworth's under the name of egg-poaching pans. They are made of aluminum and consist of a pair of small trays 7x7x3 cm. deep, connected by a flat metal bar. A wire handle is attached to the middle of the bar. This is punched out and the connecting piece cut across the middle, giving two pans, each bearing a small tongue that is convenient to use as a handle in transferring to and from jars. Permanent plugs for the jars are made by stuffing heavy gauze or muslin with coarse cotton and tying with heavy thread. They can be autoclaved with dry steam. To ensure a humid egg-laying surface (Spencer, DIS-8), the constant temperature room, in which the egg collections are made, is kept at 70% to 80% relative humidity; the food used in the pans is diluted one-third to reduce the agar content to about 1%; and, finally, 2 to 3 cc. of a watery suspension of live yeast is pipetted on the food surface. Yeast or its fermentation products seem to be important not as a means of eliciting the ovipositing reaction, but rather as a source of something used by the females for continued egg production. Pre-fed females lay well for several days on moist trays without yeast, but their egg production soon drops off, while comparable flies given plenty of yeast usually continue to lay heavily for 10 to 14 days. No experiments have been made to test this observation, but experience indicates that in some way yeast is necessary to maintain high egg production.

DeMarinis, Frank. An apparatus for facilitating direct facet-counting.

A simple and convenient apparatus can be easily constructed which will facilitate direct facet-counting or other somatic examination of *Drosophila*. A smooth steel ball, 2 cms. in diameter fitted on a metallic socket, 1 cm. high, 2 1/2 cms. external

diameter and 1 1/2 cms. internal diameter is all that is required. By placing a very small amount of glue at the top of the ball the specimen can be made to stick conveniently for examination. With a simple rotation of the ball with the fingers the observation may be made at any point in the curvature of the eye or the body, as the case may be.

Dempster, E. R. Shipping flies in cold storage.

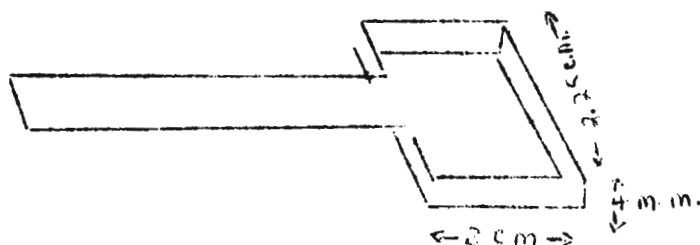
At the suggestion of Dr. W. L. Waterhouse of Sidney, Australis, we made two shipments of several stocks of *Drosophila melanogaster* to Australia in the summers of 1937 and 1938 in the chill room of Matson Line steam-

ers, hoping thus to successfully evade the lethal equatorial temperatures. The Matson Co. has given us the following values as temperature limits: 38° F (3-1/3° C) to 40° F (4-4/9° C). The flies remained in the chill room approximately 4 weeks in each case. The shipment of 1937 was completely successful, that of 1938 a complete failure. In both cases flies were introduced into 1" x 6" test tubes containing approximately 1-1/2" of food and stoppered with extra-tight fitting gauze and cotton stoppers, well wrapped to prevent evaporation and with no holes thru the packages for ventilation. Our experience in general, especially for airplane transfers, has indicated that evaporation is a much more serious hazard than lack of ventilation. The flies were kept at 25° C for approximately 8 days before being placed in the chill room with the hope that some individuals in a relatively resistant stage of development would at least survive. In the 1938 (unsuccessful) shipment the standard cornmeal-molasses formula (Bridges, DIS-6:27), to which was added about .07% Moldex 4, was used. In the 1937 (successful) shipment the medium was approximately the same except that only 1% of agar was used and about .75% of cooked dried yeast added. Very likely the failure in 1938 was due to the use of too dry a medium; probably a very wet medium would be best for such low temperatures.

Sidky, A. R. New spoon for egg counting, and method for seeding.

While studying egg-laying in *Drosophila* a new spoon for egg counting was constructed and used instead of the ice cream paper spoon commonly used. It proved very satisfactory. The spoon is made of aluminium of about 0.5 mm. thick. Its shape and dimensions are shown in the illustration. The width of the spoon is so planned

to be such that the spoon will hold a single egg when it is placed in the spoon.



that it just fits the vials used. The 150 ordered by the Institute were supplied at one penny each. The food is poured into spoons in a liquid state through a funnel fitted with a rubber tube and a clamp. The food takes about one minute to harden. A large number of spoons can be prepared in a very short time so that a few days' supply can be prepared and kept in a refrigerator. This spoon is superior to the paper one in the following respects: (1) The main advantage is that, the surface being level, one can count all the eggs with one focussing and so save much time. (2) The food is of uniform thickness and the edges do not get dry and make counting or collecting the eggs difficult. (3) The food does not stick to the spoon, and when it is to be removed for incubation, etc., it can be lifted completely out of the spoon by merely inserting the point of a blade or a needle. No eggs are lost or crushed in the process. (4) Being made of aluminum it is very durable, stands any amount of boiling and sterilizing, and is very easily cleaned. It does away with the re-coating with paraffin which is necessary with the paper spoons. The counting is done by marking the surface of the food with a needle and so dividing it into two or three rectangular areas according to the field of the binocular, and passing the spoon backwards and forwards while counting. Instead of the usual method of allowing a drop of yeast to fall on the food, which results in the yeast growing into a large lump containing many eggs and so renders the counting difficult, painting the surface of the food with a thin suspension of yeast, using an ordinary small camel hair brush thus providing a uniform thin film of yeast, gave very good results.

Slizynska, Helen. The method for obtaining any number of virgin females.

Since the sex in *Drosophila* can easily be determined at the larval stage, the way of collecting virgin females is based upon the separation of female larvae from the males. The female flies gathered in this way are

beyond any doubt virgin.