NOTES AND NEWS

Nomenclature

D. R. Charles Translocations In glancing again over Muller's "Rearrangements" note in DIS:2, I can not help feeling that his symbols are a bit too compact, at least for people who are not working a good deal of the time with translocations. But some symbology is certainly needed and Kaliss and I are using a basis for nomenclature which is pretty well shown by the symbol for T,3-4c: 3L•cu; 3R cu•4. (a) where more than one chromosome is involved in the rearrangement, the resulting elements are arranged in order of the spindle fiber to which they are attached - here 3L•cu has the third sf, 3R cu•4, the fourth; (b) as with Muller, the dot indicates a rearrangement point and where possible, in each part of the broken chromosome is shown the known locus (in that part) which is nearest the rearrangement point; (c) no cumbersome and confusing arrows are needed: had, for instance the right end of the 3 been attached to 4 in T3,4 it would have been written •cu 3R•4. Here are examples: Dobzhansky's (1932) Genetics 17: 369-92 translocation would be: 2R vg•B 1R; 2L cu•f 1L; Van Atta's (1932 Genetics 17:637-59) Dilute-1 would be: •pr 2R•2L b, which says "this chromosome starts to the left of pr, goes to the right end of 2, continues thru the left end of 2 to b." ClB would be: 1L ec•sy bi•fu 1R.

H. J. Muller Nomenclature of alleles. It is evident that the nomenclature proposed for alleles, involving the date of discovery, too cumbersome ordinarily to be used in formulae, and that in practice, after the first definition, an abbreviation would be employed so that the first abbreviation would have purposes only of reference. This being the case, the abbreviational character of the first symbol becomes of minor importance. Since there seems no interest in itself attaching to the exact date of discovery of a mutation, and even the record of that may, for this reason, not have been kept, different investigators having different methods of work and laying emphasis on different aspects of their investigations, it may be questioned whether it would not be better to let each investigator, or group of investigators, list their own mutations: for example, numbering them as they wish, and giving them the name of the investigator or group. The latter name can usually be abbreviated to one or two letters. In this way it would be more easily evident to whom a person interested in a given allelomorph should turn, if he wishes more information concerning it, and the abbreviation might well be kept within reasonable limits of size in most cases. In proposing this, however, we do not wish to give the impression that we consider it important to know who the original finder of a given mutatuion was. The finding may have been made as a purely routine matter or an assigned problem, by a technical assistant or a student. The planning of the tests of the mutation (localization, etc.) and the interpretation of the results may have been the work of a second person, and the actual manipulations may have been carried out by a third, or even by several in cooperation if the case were complicated, while still another might have made up the final stock. In such cases, names have little meaning, except in so far as it may at some time be useful to be able to consult the director or directors of such work.

Research Notes

L. C. Dunn Retardation effect of minutes

Retardation effect associated with Mw, M33j25, Mh, Mz, and M12 confined to egg-larval stage. M6 and M12 tested also for retardation in egg stage alone. These do not retard growth of embryos. Order of retardation effect at 25 degrees from most extreme (larval period three days longer than normal) to least extreme (larval period three days longer than normal) = Mw, M33j25, Mh = Mz, M12. None of these retard development of pupae. Mw and M33j25 also act as pronounced minus modifiers of Lx and L4 heterozygotes; M12 as slight minus modifier.

S. Gershenson Mechanism of chromosome conjugation.

The following conclusions were obtained in a preliminary study concerning the mechanism of chromosome conjugation in flies heterozygous for an X-chromosome containing a long inversion (In y^4-w^a, y-sc^4 8 sc^8-w^a studied).(1) Double crossing-over is approximately normal; (2) Primary exceptions among females are rare, but nevertheless somewhat more often than normally; (3) Primary exceptions among males are frequent (≠1.5-2%); nearly all of them probably result through the loss of the maternal X due to crossing-over; (4) Heterozygous females produce a large percentage of perishing eggs, indicating a high (perhaps nearly normal) percentage of single crossing-over; (5) Secondary exceptions are significantly more frequent than usually (≠9-13%), indicating a marked decrease of synaptic affinity between the non-inverted and inverted X's.

H. Kikkawa A dominant eye color mutant in D.virilis.

It is assumed that dominant eye color mutant found in D.melanogaster are usually correlated with chromosome rearrangements except Henna described by Van Atta (Muller 1930, Van Atta 1932, Glass 1933, Schultz and Dobshansky 1934). But it seems that no attention has been paid to the dominant eye color mutant Garnet (3-108.5, homo viable) discovered formerly in D.virilis (Metz, Moses, Mason 1923, p.39). To test whether or not any chromosomal aberration is associated with this gene, females of the constitution sv/cn G and sv/cn were mated to sv (short-veins 3-90.0) cn (cinnabar 3-107.0) males respectively. But the result was negative (the difference of recombination percentage for sv-cn region in the two experiments is only 1.6 times the probable error). The former experiment: (0) 595(sv) ♂ 601(cn G), (1) 92♂ 60, (2) 7♂16, Total 1371; R_1=11.2%, R_2=1.6%. The latter experiment: (0) 461(sv) ♂ 414(cn), (1) 56♂71, Total 1002; R_1=13.7%.

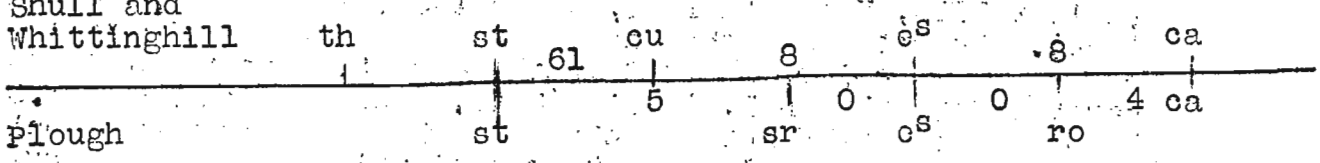
D.E. Lancefield L inkage in pseudo-obscura.

Some linkage crosses involving compressed[2] and short D.pseudo-obscura Race A are suggestive that more than fifty per cent of recombination may be obtained between these two loci. Further tests are being made to see if this result can be confirmed.

H.J. Muller Balancing chromosome 1 with scute^{sl} A rather extreme scute allel, found by Sinitskaya in March 1934, analyzed genetically by Muller and cytologically by Prokofyeva, includes a long inversion having its left break close to the right of scute and right break in inert region, and also a small inversion, somewhat smaller than delta 49, and having the positions of both its breaks included within the positions of the two breaks of the latter. No crossovers were found between sc^{sl} and normal chromosomes in a count of 700. Homozygous sc^{sl} females are sterile and have rather low viability; males are fertile and with fair viability. This therefore provides a very convenient balancing chromosome for many sex-linked genes, etc.

H.H. Plough Crossing over in male D.melanogaster following heat. At the meeting of the Genetics Society at Woods Hole in August 1934, I reported finding 6 cases of crossing over in chromosome 3 following exposure of 5 day old larvae to 36.5° for 18 hours. Although it was unknown to me at the time, Shull and Whittinghill had reported in July 1934 (Science 80:103-4) 77 cases in the same chromosome, of which 32 were all of the same type and derived from a single male. While neither investigaion is complete it is of interest to summarize these two series of tests up to this point.

Crossovers in Males heterozygous for genes in Chromosome 3.



My results do not show correspondence with those of Shull and Whittinghill in the ratio of crossovers in the st-cu-sr region and this fact suggests perhaps that their irregular group of 32 may need to be reinterpreted. In any case the distribution of the whole series indicates that crossing over in the male may take place in any region of chromosme 3 following exposure to heat.

N.W. Timoféef-Ressovsky Experiments on intraspecific evolution in Drosophila. Ecological and physiological experiments with different Drosophila-species are of importance in connection with the genetic analysis of evolutionary and zoogeographical problems. A good method of testing "adaptations" is the determination of the "relative viability" of different mutants and biotypes under different envi onmental conditions (see my paper in Z.Ind.Abst.Vererb.,66:319-344,1933). Some difficulties arise when geographically different normal populations of a species should be compared in respect to their "relative viabilities", since they can not be distinguished phaenotypically, and hence the methods of backcrosses or of counting flies in overcrowded bottles containing equal numbers of eggs of the two types to be compared can not be used. In these cases another simple method can be applied. Different populations of one species can be compared, in

respect to their "relative viabilities" under certain conditions, with a pure-bred, standard stock of another species, using the method of overcrowded bottles with equal numbers of eggs of the two types (see my paper in Arch.f.Naturgesch., 2: 285-290,1933). This method was applied in studying the "relative viabilities" of geographically different populations of Drosophila melangaster and Drosophila funebris under different environmental conditions (food, moisture, temperature), using a standard inbr ed melanogaster-stock for testing different funebris-populations, and a standard inbred funebris-stock for testing different melangoaster-populations. In small culture-vials with food (yielding normally about 100-120 flies) were put 150 (or 200) eggs of the standard stocks of one of the species and the same number of eggs of the population of the other species to be tested; the number of hatching flies of each species were counted, and the tests were repeated until large enough numbers of flies were obtained. The different popu lations of one species could so be compared inter se, using as a scale their differences from the same standard stock of the other species. These experiments are not yet completed; but the results already obtained show that many of the geographically different wild population, although morphologically indistinguishable, can show remarkable hereditary differences in their physiological properties, a part of these differences being clearly of the type of ecological adaptations. At the same time, experiments of Muller and of myself showed that mutations producing only slight deviations from the "normal relative viability" are produced by x-rays at a rate about twice as high as that of the lethals (Muller's paper read at the 4.Intern.Radiol. Congress and my paper in Strahlentherapie,v.51). Such "slight physiological mutations" are probably also the most common type of spontaneous mutation. These mutations are probably used by natural selection in order to differentiate the species into biotypes and races, adapted to different geographical environments.

Technical Notes

Margaret E. Hoover
Transportation of Drosophila cultures

For mailing Drosophila, we have been using 7 x 2cm. shell vials. The vials contain a small amount of the usual corn-meal-agar prepared food, innoculated with yeast, and a strip of paper is inserted to prevent the food from running onto the sides of the vial. From one to seven vials will easily fit into corrugated paper boxes (8 1/2 x 6 3/4 x 6 3/4cm) If the vials are wrapped in paper and tightly packed on all sides by cotton, there is no danger of breakage. We have found this to be a very satisfactory method for transporting stocks. Both Drosophila melanogaster and virilis cultures have been satisfactorily shipped as far as Japan. The mailing costs are low. The packages may be sent third class in the United States and as small packets or samples to foreign countries. A full package will usually not weigh in excess of six ounces.

J.C. Li Isolation of larvae

In the Yenching Laboratory we have developed a technic by which not only eggs but also larvae of D.melanogaster can be isolated within one hour of their hatching. It is essentially the same technic developed by Li (see Li '27 appendix p.55-57). The

eggs are allowed to hatch and the newly hatched larvae can then be removed from the food with a tiny dissecting knife. By means of this technic it is possible to analyze more exactly the critical period when a certain gene operates during the larval period. It is now also possible to study the embryology of Drosophila more exactly under controlled conditions.

H.J.Muller Labelling of stock cultures. In place of the usual practice of Drosophila laboratories of pasting a label on each stock culture and writing the name of the stock anew at each transfer, I have for many years found it much quicker and less subject to error, if the designation of the stock is written once for all in ink or India ink on both sides of a cardboard tag which is affixed thru its string to a rubber band that passes around the neck of the culture vessel. This tag is transferred to the new vessel when the flies are transferred, and it is best to have a separate tag for each culture vessel.

H. J. Muller Fly morgue. In place of the usual method of having a jar of alcohol or other volatile fluid into which the flies to be discarded are dropped thru a narrow slit, it is much more convenient to have a broad dish containing a non-volatile oil. The used oil from automobiles affords a conveniently obtained medium. The opening may be protected by a wide-mesh wire grating. The flies do not have to be brushed off in any exact manner, but may be merely jarred off by knocking the porcelain plate against the screen with one motion of one hand. Renewal is seldom necessary and there are no disturbing odors. This method was used independently in Texas and in the USSR.

H.J. Muller Seeding with yeast. In place of the usual method of allowing drops of yeast to fall into the bottle from a pipette of sprinkling crumbs of yeast, it saves time and ensures more even distribution if one makes up a very thin suspension of the yeast in water, and then sprays this through a simple atomiser, such as is used for spraying fixative on charcoal drawings. In this way a great number of cultures may be seeded at once en masse.

H.J. Muller Supplying vials with paper. When numerous small vials have to be handled it is time-consuming to prepare and insert paper for each one, although the presence of paper is helpful. For this purpose it is convenient to use white confetti, which can be purchased already prepared in considerable quantities. This is sifted between the fingers into the cultures en masse, as they stand still uncovered after having been seeded with yeast.

C.A. Offermann and I.K. Schmidt Culture media for Drosophila. With the development of the Drosophila technique, not only a certain amount of sterilization of the culture medium during its preparation became necessary, but also an adaptation of it ot different requirements. Productivity and duration of the media are the two main factors to be considered for our purpose, and they are to a certain degree

in inverse relationship. By productivity we mean the quantity of flies produced in a given time. By means of overcrowding a certain food can yield a higher number of flies which are small in size, but this higher yield will be usually cancelled by a serious loss in the speed of development (in strongly overcrowded bottles in fact the cycle has proved to be as much as twice the usual length). Three functional types of media may be distinguished: 1) for the maintenance of parent flies, 2) for the maintenance of lines of stock cultures, 3) for the attainment of high productivity. 1)This type has proven to be extremely useful for the current work where we have to keep alive the flies from the moment we obtain them until the moment of their use. In this case offspring are not desired. Flies have been kept on such a medium for over a month (some over two months) at room temperature, without a transfer. The same vial or bottle can be used over again until the surface dries out, and etherized flies will not stick to its surface:- Water 90cc., agar 2gr., syrup 7gr., Nipagin .15gr. 2)Suitable media serving this purpose, such as the banana agar and the cornmeal syrup media, are already in use in all Drosophila laboratories and will not be described here. 3)The main characteristics of this type are: production of large quantity of flies, short cycle of development, and low selective level (preservation of individuals of low viability).

The addition of killed yeast in large quantities to the ordinary food formulae was introduced a few years ago by Muller (in 1928), giving surprisingly good results. These media had, however, the inconvenience of requiring a constant supply of fresh ingredients. Dry yeast was used in place of fresh yeast by Winchester and by Gershenson. The authors have recently experimented with a systematic series of modifications of the Russian food mixture with the addition of dry or fresh yeast. Fifty different modifications have been tried, approximately twenty vials being employed for each trial and counts of the offspring made. Each ingredient was tested in different concentrations. As a result the following formulae have been found the best for obtaining high productivity. (A.with dry yeast) - Water 80cc., Agar 1.5gr., Dry yeast 1.5gr., Raisins 4 gr., Syrup 5 gr., cornmeal 5gr., Nipagin .15gr. The agar is dissolved by bringing the water slowly to the boiling point, dry yeast (that has been disintegrated in a small part of water) is added and the mass is kept boiling for another ten minutes, so as to make sure that all the yeast cells are killed. Then the mashed raisins, syrup and cornmeal are added with continuous stirring, and the food will be ready for distribution. The addition to the liquid mass of "Nipagin T" Nachmittelfabrik Julius Penner A.G. Berlin Schoeneberg as found in Dr. Nachtsheim's laboratory, is important for cultures which contain few larvae or develop slowly.

The layer of food should be somewhat deeper than 1/2 inch and its surface seeded with pure live yeast (fresh or dried). Adding paper and making the suface appetizing with fruit juice did not increase the yield in our case. 200 flies per vial and 1000 per half pint bottle should be considered a good average. This means that a vial can be employed where formerly a bottle was required, and a bottle can take the place of a group of bottles. Not only the number, but the size of flies is considerably increased. When fresh yeast is easily available it

can be employed advantageously by substituting 15 grams fresh yeast for 1.5 grams of dry yeast in our formula.

The preceding formulae enable us to prepare food of each of the three types by the use of ingredients which will not spoil. A laboratory can thus provide itself with a year's supply at once, avoiding further trouble in this connection.

We desire to call special attention to the convenience offered by the new type of medium here described: the "syrup-agar" for the preservation of the P flies, for the great elasticity it introduces in current laboratory work.

E.E. Shipman Bottle for Drosophila culture. Due to the high cost of transportation of the bottles designed by Bridges and manufactured by the Owens-Illinois Pacific Coast Company at San Francisco, it was necessary to find a substitute bottle manufactured nearer home. The writer has found a Urine Specimen Bottle, No.820, manufactured by the Glasco Products Company, Chicago, Illinois quite satisfactory. The bottle is made of the same type of glass as milk bottles, has straight sloping sides, the inside top diameter is about 1/4 inch less than the inside bottom diameter, and has a milk bottle type opening so that paper caps may be used if desired. The writer handled three gross of them this summer with an average of about 35 offspring per bottle and had only four cases where the food cake shook completely loose, daily removals were made so that the danger of loose food cakes was much greater than in routine stock work.