NOTES AND NEWS

Nomenclature

C. B. Bridges On naming alleles. It is suggested that as new alleles arise they be named with the numerical sequence system (L, L^2, L^4) or the more precise dating system ($w^{3\frac{1}{4}}$) in which the locus name is an integral part of the mutant name. It is proposed that the few alleles which at present have special names (eosin, sooty) be brought into line with the above system by prefixing the locus name to the allel name (white-eosin, ebony-sooty, vestigial-Depillato). This alteration will make the names correspond to the symbols (w^e, e^s, vg^D) and will maintain the same order in lists of names as in lists of symbols. The hyphen may be used to connect the two halves of the name since the fraction bar / has supplanted the hyphen in denoting the two chromosomes of a pair. The abbreviated forms w-eosin, e-sooty and vg-Depillate could be used as equivalent to the full names.

H. J. Muller Inversions. As the number of inversions is outrunning the alphabet, and arbitrary letters newly assigned to them are both hard to remember and confusable with the symbols for gene mutations, we find it preferable to stick to the admittedly imperfect method of representing inversions by means of the "mutational" changes that accompany them, or, when these were not evident, by the arbitrary lettering originally given, with the reservation that more care should be taken to give simple designations to those hereafter arising. In designating combinations having the left part of one inverted chromosome and the right part of another, we have found it convenient simply to add the capital letters L and R, for left and right, to the symbols for the inversions, so that, for example, y sc^{4L} sc^{8R} represents a crossover chromosome having the left part of the scute 4 chromosome, including its left point of rearrangement (breakage and reattachment) and the right part of the scute 8 chromosome, including its right point of rearrangement, together with any genes that may perforce be included, which latter it may or may not be desirable to represent, as the occasion demands. Where there is danger of confusion between the loci themselves, which are designated by the symbols, and the chromosome arrangement in question, a dot is placed next to the symbol or, preferably, below it, to show that it is the point of rearrangement together with what goes therewith, that is being referred to. Thus, in the case given, sc^{8R} happens to include the scute-8 gene itself (which could be represented in addition, when desirable), whereas sc^{8L} would not include the scute-8 gene itself, and would, where accuracy was required, be represented with a dot under it.

H. J. Muller Attached X's. For the symbolization of attached X-chromosomes, we prefer to make a line (where possible, a downwardly curved line) above the symbols of the contained genes, rather than below them, since we often use the latter mark to denote heterozygosis, and if one of the chromosomes is normal it is not always convenient

to have to put the + sign underneath. Again, the line underneath is sometimes desired to represent the chromosome itself.

(Editors' remark: Underlining to designate attached X's is used in the DIS circular because this sign is available on our typewriter. To type a line over a symbol requires handshifting of the roller, which is both a cumbersome and a slow process, especially with single spacing of the lines).

H. J. Muller Rearrangements in general. No very simple system is possible for a complete and practicable representation of all possible chromosome rearrangements, but one of the least complicated, though admittedly applicable only to well-analyzed cases in which it is desired really to show the details, is illustrated by the following example of brown-Variegated 4, based on data of Glass, -px+. st+:- ; :-sp+. .3at- Here each independent dot (period) represents a point of rearrangement. To the left of the dot is placed the designation of the chromosome (where necessary) and of the first chromosome locus know to be to the left of the break in question, and to the right of the dot the corresponding items for the latter region. In the designation of the locus, either the locus symbol, such as px, or the locus number (in this case 2,100.5) may be used, but several considerations make the letter symbol ordinarily preferable. Where it is desired to show that the genes, as represented, lie in an inverted order, an arrow pointing backwards may be used and will sometimes obviate locus designations; for typing, an arrow may be shown as a colon followed by a dash. Where it is desired to represent the locus of attachment of the spindle fibre, "at" is used, and for a free (or originally free) chromosome terminus, "tm"; the latter symbol may, however, be understood when there is a blank space to the right or left of a dash or arrow. Pieces attached to the side of the chromosome are shown in parenthesis between the loci bounding the region of their attachment (e.g., Pale is 2(px-)⁻; 3e (.px -)ro).

H. J. Muller Deficiency. As a logical and practical extension of the system of using one basic symbol for all genes of a given original locus, with exponents in the form of letters or numbers for different mutant allels (a system which I developed while in the Drosophila laboratory at Columbia University), and with the exponent + (plus) for a normal allel (as I have done for some years at Texas, and explained in a letter of about 1931 to Stern, and as was recommended in the first "Information Service"), it will often be found convenient to use the exponent - (minus) in cases of small deficiencies, and in general wherever it is desired to designate the absence of loci that might otherwise be expected to be present. Thus, Notch 8 can be indicated as w⁻ fa⁻ A⁻ or, more correctly yet, as (w⁻A)⁻; Notch "172b", which seems to include the originally free end ("tm"= terminus) and extends beyond echinus on the right, would, similarly, be (tm-ec)⁻, or (-ec)⁻.

J. T. Patterson Symbols for Translocations. We are adopting the D.I.S. symbol T for translocations, and in addition are using a subletter A (eg. T_A) to indicate that the translocation was obtained in the Austin laboratory. We would suggest the adoption of some such system as this in order to avoid confusion.

W. P. Spencer Symbols (1) I favor using the date of discovery in the symbol for the following reasons:

a. This furnishes an accurate record of the total number of recurrent mutations at a locus, whereas by methods now in vogue many apparently identical allelomorphs arising by remutation are probably not put on record.

b. It gives a simple objective symbol with a standard meaning. This avoids the confusion now arising from the diverse symbols used in different laboratories.

c. It focuses attention on the time at which mutations are occurring in different laboratories. My own experience indicates that the distribution of total natural mutations in time is not random.

Research Notes

H. J. Muller Balancing of deleted X-chromosome. This may be done conveniently in cases where males having the deleted X are fertile, by crossing attached-X females containing the deleted X to scute-19 males heterozygous for Curly. Curly sons have their scute deficiency covered by the deleted X and by nothing else, and when they are crossed to ordinary females with attached X's, they immediately form a balanced stock, from which the deleted X cannot be lost except through some chromosome rearrangement.

H. J. Muller Triploids Following the construction by Miss Sarah Bedichek of the University of Texas of an improved stock of triploids, from the point of view both of recognition and of partial balancing, I have by a further modification constructed a completely balanced stock. Miss Bedichek's stock contained attached X's homozygous for yellow, and a detached X having the scute-8 inversion together with singed and apricot. Our present stock has the same kind of detached X, but its attached X's are homozygous for the delta 49 inversion and the genes white and spectacled. Diploid females with attached X's are therefore sterile because of spectacled, and those with detached X's are sterile because of singed. Crossovers appear very rarely. It is well, however, to add extra males. A useful mark which I have noted for the recognization of triploids consists in the reduction of the "ventral" bristles (between the bases of the first and second pairs of legs); the great majority of triploids have at least one of these absent, while in diploids (normal for scute) they are practically always present.

H. J. Muller Extension of third chromosome. A translocation recently studied, known by the name of the mutant character "scute^{J4}", involved in it, has shown that the third chromosome extends at least several units (4?) to the left of roughoid, since this much crossing-over occurs between the attached piece of the X-chromosome (containing y and scute^{J4}) and the locus of roughoid, while the locus of hairy remains with that of roughoid during this crossing over. Stock is available containing scute^{J4}, roughoid and hairy in the same chromosome, and having yellow in all the X-chromosomes (attached X's of females and detached X of male) so that yellow may here be used as if it were a marker for the left end of chromosome 3.

N. Timoféeff-Ressovsky Temperature-experiments with Drosophila melanogaster. The finding of Muller and Altenburg (1919) and of Muller (1928) that the spontaneous rate of mutation follows the Vant'Hoff's rule was confirmed: the rate of sex-linked mutations is in 25°C about 3 times as high as in 15°C, the difference being statistically significant (Diff/m diff=5,8).

Temperature-shocks (15-24 hours in 35° - 37 C) were applied at different developmental stages in males (adult, 3-6 days old larvae), using the "ClB"-method and the "attached X"-method for detection of sex-linked lethals and visibles; the results of these experiments (started in October 1927) showed only a slight, if any, increase of the rate of mutation: a.11:2993 as compared with 4:1862 lethals in the controls ("ClB" experiments) and b.13:65997 sex-linked visibles as compared with 6:58453 in the controls ("attached X"-experiments).

N. Timoféeff-Ressovsky A comparison of the mutation-inducing effects of X-rays and Gamma-rays. The dosages (in r-units) of Gamma-rays of Ra published in the last papers of Hanson and Heys suggested (according to the mutation-rates induced by these dosages) that Gamma-rays are about 3 times less effective than X-rays in inducing mutations (0,78% sex-linked lethals per 1000r Ra in Hanson's experiments, as compared with about 2,5% per 1000r X-rays). Since there are no theoretical means to admit the existance of such a pronounced difference, and the measurement of Ra-rays in r-units offers some difficulties, and exact comparison of the mutation-inducing effects of equivalent dosages of Gamma- and X-rays was made (using the "ClB"-methos and raying adult males). Different dosages were applied and the mean rates of sex-linked mutations per 1000r were; 2,48% mutations per1000r Gamma-rays of Ra and 2,43% mutations per 1000r X-rays, the difference being insignificant.

Technical Notes

M. Demerec — Flexible chromosome maps

For preparing chromosome maps on which single items can readily be changed and order or position of different items shifted, we are using "Kardex wall panels for tubes", with tubes 6 inches long and 3/16 inches wide. A 20 inch panel holds 90 tubes which is enough for the map of melanogaster X-chromosome. Since the space for each item is 6 inches long it gives room enough for: locus, symbol, full name and KX. By inserting differently colored transparent markers in tubes we designate loci which are carried in our stocks, which have been lost, etc. The material may be ordered from Remington Rand Inc., 205 East 42 Street, New York. The price is $3.00 per panel.

B. H. Glass — Control of mold and mites.

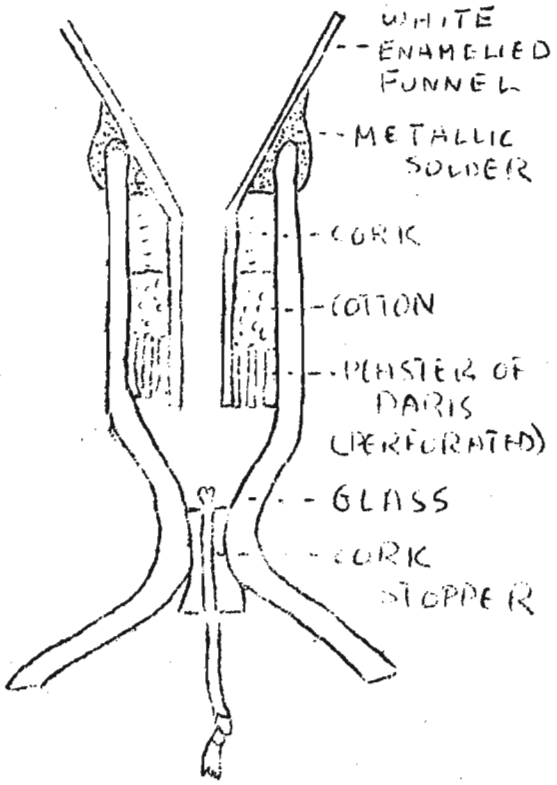
In combatting a severe infection of mold in Drosophila cultures, it has been found helpful to hold individuals for two or three days in vials of food containing 0.2% formaldehyde, added when the food is prepared. Flies can live for several weeks in such vials, inoculated in the usual manner with yeast; but larvae do not develop after hatching; and mold growth is inhibited. These vials are also very useful for holding individuals to be mated at some future time. Before transferring to fresh food, the flies are given a bath in a watch-glass of 70% alcohol for 2 to 3 minutes; then dried on filter-paper. Flies will stand a considerable immersion in alcohol with no permanent ill effects. They may be handled readily with brush and forceps. The alcohol bath treatment is also effective in freeing flies from mites. Larvae are especially easily cleaned in this way, the mites coming off at once; whereupon the larvae may be touched on filter-paper, and transferred at once to the food, using a long-handled needle, to which they gently adhere.

M. Demerec — Control of mites.

As a preventive measure against the spread of mites we are keeping stock-cultures (and also all other culture bottles which are used during a long period) standing in a weak solution of creosote. For this purpose shallow (2 inches or 5 cm high) galvanized iron trays are used. These are made to order to fit our shelves (usually 12 x 36 x 2 inches). In case any of the cultures is infected with mites creosote solution prevents their spread to adjacent cultures and keeps the infection under control. Some of our trays have been in use for over five years without any sign of wear. The initial cost for trays, therefore, is spread over a long period. Mites can also be controlled effectively by avoiding accumulation of old culture bottles and by wiping frequently, shelves and tables, with carbon tetrachloride.

Technical Notes

M. Demerec Etherising bottle.



The following drawing represents an actual size cross section of the etherising bottle used in our laboratory. The design is a slight modification of an early Bridge's design. Ether is poured in thru the bottom hole. A few drops suffice for one hour's work. Specifications: Funnel: White enamaled 1/8 quart improved funnel manufactured by the Vollrath Co., Sheboygan, Wis., obtainable in hardware stores or could be ordered thru a hardware store. Top cut off to fit the culture bottle and bottom cut off to fit the glass vessel. Cost 30-40 cents. Glass vessel: Can be made by any glass-blower. We order it from Eck & Krebs, 131 West, 24 Street, New York, at 50 cents a piece.

H. J. Muller Etherising bottle.

The type which I have found most practical all round (and at the same time the easiest to construct, repair and clean) consists of a glass containing-vessel (whose shape may be chosen according to the convenience of the operator), into the neck of which is firmly fitted, preferably through the mediation of a hollowed-out cork, a funnel, preferably of metal, with an upper end wide enough to fit against the mouth of the widest-mouthed culture vessel used. To the narrow end of the funnel, below, a large gelatine capsule of the same diameter, and containing numerous fine needle-holes, is glued on. In the space between the bottom of the suspended capsule and the bottom of the containing vessel is packed a mass of dense cotton, (which must not touch the capsule). Flies go in and out through the same opening, without manipulation of any stoppers being necessary and are quickly etherised by the diffusing ether. The ether used need usually be added to the bottle but once a day, as a minimum is lost (an advantage both economically and physiologically). If desired, glass can of course be substituted for the gelatine, but the latter has considerable durability and the ether can be poured in directly through the gelatine sieve. The latter is later wiped quite dry with a paint brush.

Technical Notes

H. J. Muller Stock lists. There can be no universally satisfactory order for listing or arranging stocks. We feel that the arrangement should usually be a functional one, it being more useful for the purpose of some laboratories to put together all stocks with a certain kind of inversion, regardless of their alphabetical place, and more useful for others to group them according, for example, to the alphabetical location of the leftmost gene mutation or chromosome abnormality contained, but where, for instance, there are many inversions which change the order of the genes, it is confusing to let the arrangement of stocks be altered by the latter. A system we have found useful has been to separate stocks with single mutations from those with more, and these again from all cases of chromosome abnormality, but all needs can be filled fairly well at the expense of a longer list, by having various simultaneous methods of classification in one general cross-index. We give an illustration of this, at least so far as the sex chromosomes are concerned (the other group being too small to require such treatment), in the stock list we are submitting. (This list is, however, admittedly very incomplete for chromosome abnormalities, since we notice that in general these are not being listed by other laboratories.) As an aid to flexibility in listing, I have found the "Cardex Visible Index" useful, such as is used in posting names of registrants at a convention, but if an ordinary list is made in the form of a single, instead of double, column of stocks, it can easily be cut and pasted together behind, for the insertion and deletion of stocks.

H. J. Muller Concerning acknowledgements. It is difficult to understand the rationale of the announcement on the cover of the circular that "material presented in this circular must not be used in publications without the specific permission of the author", as the obvious purpose of the circular is to furnish useful information for Drosophila workers for researches that they will publish. Every contributor must take it for granted that the data or suggestions which he allows to be distributed in the circular may be put to use. Surely the latter are not merely for the inner edification of the readers. Therefore it should be as unnecessary as it is impossibly cumbersome for every user of the material in the circular to have to write to every contributor involved every time he intends putting a bit of the material to use. To be sure, the injunction on the cover implies that the contributor's consent need be obtained only when the information is used "in publications". If, however, it should be obligatory for the user of the communicated material to obtain the consent of the author of the latter in mentioning it (presumably with acknowledgements) in a publication, it must surely be even more obligatory for the user not to secretly take the information given and use it without acknowledgements, in the obtaining of further data or conclusions which he then presents in a publication, for in the latter case the prerogative due the original contribution would be even more infringed upon. Clearly then such information used in work that reaches publication requires acknowledgement, but since, by the system proposed on the cover, all acknowledgements in publications require the consent of the first author, it would then become necessary for the consent of the author to be obtained for each occasion in which his material is used.

It would appear then that the actual ethics of the matter should be almost the opposite of that which seems to have been proposed in the announcement. That is, it should be assumed, firstly, that the information or suggestions in the circular should be used as freely as possible, without obtaining the consent of the contributor, as the latter gave them freely. It should be assumed, secondly, that exactly because the material was not presented in copyrighted form in an official publication, wherein the general scientific public could plainly see its source, it is incumbent upon him who uses it to acknowledge his use of it and the source from whom he obtained it when he publishes material of his own, in the development of which the use of the first mentioned material was involved. This matter, in other words, must be upon the same footing as in the case of material (data, conclusions or suggestions) passed on by word of mouth or by letter, where of course it is the most obvious and elementary principle of ethics that acknowledgement of the source must be made if the scientific material is put to published use. Of course it is not to be expected that acknowledgements need be made

in respect to the use of minutiae of technique etc. that the author would not think worth mentioning anyway, even in case he had originated them himself, not are acknowledgements to be expected where the material made use of and its source have already become generally known in some way, not where the points involved would be generally recognized as being quite obvious. Where on the other hand a method or result that would generally not be regarded as obvious, has been originated independently by a given worker, but parallels similar work or suggestions that have later become known to him through public or private, direct or indirect communications of another investigator, it is obvious that the former, in publishing his work, need not acknowledge assistance from the latter, but is nevertheless in duty bound to mention the fact that his method, conclusion or suggestion, though independent, is the same as that which he knows the other worker has also arrived at. Thirdly, far from the consent of the original author being required for acknowledgements, his consent should rather be required in case it is desired not to make mention of a communication of his which has played a role in work that the other author is publishing, and this requirement has much more pertinence in a case like that under consideration, where the communication was not made in an official publication, than where it was so made, since in the latter case the original author has, after all, a certain amount of protection in the words themselves. Only on such an understanding can contributors to the circular be expected to continue to furnish contributions, just as they would only (by word of mouth or letter), so long as such a standard of conduct was observed. Experience has shown that it is unfortunately only too true that such overt understandings must be reached beforehand, even in the case of scientists, in order that real cooperation may be possible.

H. J. Muller Concerning material to be published. It is not always possible to know at the time of sending in a contribution just whether or not the material will be published, or, if published, when, but it would seem wise to send it in to the circular anyway (supposing the policy on acknowledgements above outlined is accepted), provided the information or suggestions sent in might be of considerable use to the readers between the time of appearance of the circular and of the official publication. This would apply especially in cases where actual publication is only doubtful, or might be long delayed. In other words, it would seem wise not to limit the material in the circular in the manner stated, to material which is "not ordinarily suitable for publication", or to material, the publication of which is not expected at all. Certainly a good deal of the material in the last circular would be worth eventual publication.

M. Demerec Drosophila stock center at Cold Spring Harbor. Under cooperation of the Carnegie Institution of Washington, the Rockefeller Foundation and the A merican Society of Naturalists a stock keeping center has been established at Cold Spring Harbor for supplying stocks for research purposes to laboratories located in the eastern section of the United States and in Europe, and for serving as a connecting link for shipments to European laboratories. This center is cooperating with the Pasadena Drosophila laboratory in keeping valuable stocks at both places and thus insure against their loss.

At present a complete set of melanogaster loci representing X-chromosome, RK1 to RK3 mutants of autosomes and a set of complete stocks representing most useful combinations are available. Also an almost complex set of virilis stocks is being kept here.

The Carnegie Institution of Washington made an arrangement with the U. S. Department of Agriculture, Bureau of Entomology by which the Carnegie Institution and its cooperating agencies are authorized to import and move interstate, living material of various forms of Drosophila under stated conditions. This arrangement covers shipments between the Cold Spring Harbor and the Pasadena stock centers and the laboratories cooperating in the DIS project.