June 27, 1955

Dear Miss Husted:

If you are going to give every word in the new edition of your dictionary the same scrutiny you have exercised on this series, you will make me retract my critical comments. But the task is so huge that I would press my suggestion of formal advice from a committee of technical advisers. You may be interested in the enclosed copy of my letter to Dr. Glass. Without knowing the likely attitude of your company to such a proposal, I felt it would be inappropriate to mention Saunders by name, but if I can be of any catalytic assistance, please let me know.

My notes are given by number-- there was not enough room on the original sheets and I would as soon retain a copy for my own files. I hope you will appreciate that these terms have often evolved without careful or consistent direction, and that for many of them there has been no terminological analysis before this.

Your mentioning books I might be interested in is rather like setting a child loose in Santa Claus' workshop and I hardly know where it could end. From your recent biological lists, deBobertis' Cytology; Willier-Weiss-Hamburger's Development, and Fulton's Physiology are among those I had thought of purchasing; I have the others you mentioned.

To revert to the previous subject, a good dictionary is precisely what is needed to put some order into biological terminology. None of the current editions commands sufficient confidence or respect to be considered as a lexicographic standard.

Yours sincerely,

Joshua Lederberg
Professor of Genetics

Memorandum
J. Lederberg to Saunders (Miss Husted). June 27, 1955

1. The definition of "haploid" could still be improved. Originally, haploid referred to the set of chromosomes carried by a gamete. More complex situations— "diploid gamates"— require a recasting. It might be better to mention both concepts:

1. having a single set of chromosomes, as normally carried by a gamete.*
2./one complete set of non-homologous chromosomes. Cf. diploid.

and for diploid

2. having two sets of chromosomes, as normally found in somatic cells of higher organisms.

*germ cell is possibly ambiguous; perhaps erroneously it might connote the diploid cells of the germ line. I notice you qualify "mature germ cell" in the def. gamete.

2. other terms all OK as checked. However, Autodiploid is used in the special sense of redoubling of chromosomes of a haploid individual or cell (rather than species). Allodiploid is used only by contrast with allopolyploid. Df: having a diploid chromosome set derived from two parental species, viz., a diploid species hybrid.

3. All terms in -ploid have a correlative -ploidy. Ploidy also stands as an independent word (the status of the chromosome set, e.g., whether haploid, diploid, aneuploid, etc.) So far, not Ploid.

Is it really necessary to give all these pairs. Why not refer to -ploidy,-ploid to show the relationship just once?

4. Polyploid chromosome set is redundant, but the phrase is used, perhaps as reinforcement. I would not attempt a concordant definition.

al species.

5. Ancestral is much better. The matter comes up when one parent/is already alloploid. (Df. alloploid - having any number (two or many) of chromosome sets from different species, and autoploid correspondingly. Derived by contraction from allodiploid and allopolyploid).

6. endopolyploidy. I have to admit the terminology in this area is confused, but I can only cite current usage. Polyploidy does mean many chromosomes; endopolyploidy is not a category, but an extension. Endomitosis was recognized first, in tissues which undergo no further cell division so that the chromosomes did not present themselves to be counted. It was then found that a cell that had gone through one or more cycles of endomitosis might later go through mitosis, and thereby reveal their polyploid chromosome number. Endopolyploidy thus overlaps autopolyploidy.

of chromosomes

Df. Endopolyploidy. Reduplication/..as a result of endomitosis. [If the cell goes through subsequent mitosis, the endopolyploid will be recognized as polyploid. If not, indirect methods, usually cytochemical, furnish the criteria of chromatin reduplication]. Can you make a definition of this[]? Endopolyploidy is def. as the state of having... as well as the process = endomitosis. Polysomaty (more carefully defined than I did before) includes endopolyploidy (chromosome redupl.) plus another process (chromatid reduplication without separation of the strands)(polyteny). The situation is probably more confused than I have written it, but one could probably sum up by saying that

poly

6. Endopolyploidy, etc. These terms are probably the most confused in genetics. They are all intended to convey the idea of increase in chromatin, with or without visible polyploidy, and are all rather vague. They occur too frequently in the literature to be dismissed. I suspect that when the facts are better understood someone will have to make a fresh start.

Df. Endopolyploidy: 1. Endomitosis (the process). 2. Polysomaty (the state). 3. Autopolyploidy resulting from a previous endomitotic cycle. —ploid follows 2,3.

Endomitosis: 1. A process of reduplication of chromatin within an intact nucleus, that is without typical mitosis.

Polysomaty: State of having reduplicated chromatin in the nucleus, including an increase in chromosome number (endopolyploidy,3.) or in the amount of chromatin per chromosome (polyteny).

Polyteny: Reduplication of chromonemata (chromatin strands) in the chromosome without separation into distinct daughter chromosomes.

Thus, endopolyploidy 3 is a category of autopolyploidy distinguished by mode of origin. Endopolyploidy 2 is more general. Autopolyploid applies to individuals and species as well as cells; endopolyploid is applied only to cells and tissues.

This is the best sense I can make of current usages.

7. -trophia is out of fashion currently. Otherwise OK

8. Not quite.-tropism 1. is also used for motile organisms to connote change in the direction of the body axis and thereby of movement. It has come to be used generally for -taxis + -tropism 1.

9. I would think so, admitting it is fundamentally chemical. Compare cytotropism, bacteriotropism. I am only guessing that "biotaxis" has been used this way, but would be willing to bet on it. -tropy generally not used.

10. Cf. applies to 1. only.

11. Yes. You could substitute "genotype" for fundamental.... This is equivalent to what you have in the 22d.

12. Connotation differs— karyotype is the cytogenetic counterpart of genotype. Also, genotypes may be differentiated by point mutations, which may be considered outside the scope of karyotype.

16. lysotype, serotype OK. The taxonomists are arguing about their status; -type is noncommittal. The question is whether a -type is a species or division of a species.

13. I don't like either definition. 2 is misleading and 2 I've never heard. You would have to insert "not necessarily" before"different heredity" I would suggest: Df. the outward, visible expression of the hereditary constitution. ~~of an individual~~. [i.e., nothing more than the total visible quality of an organism. Phenotype + genotype together would be about all we'd know]. I would add, cf. genotype 1.

14. phenocopy, in current usage, does refer to the individual as well as to the simulated effect. Df. 1. an individual whose phenotype mimics that of another genotype, but whose character is determined by the environment and is not hereditary. ("sometimes may be ? transmitted one generation, so prefer "not hereditary").

14. 2. The simulated trait in a phenocopy individual. 3. the simulation of traits.

15. The unabridged dictionaries should suffice for this. what= types or forms if you like.

16z

17. biopoiesis. Most biologists agree that biopoiesis (syn. neobiogenesis) happened at least once. There is a good deal of speculation nowadays just how.

18. If you have any citation for biparasite leave it as D. hyperparasite.

19. "located on a chromosome" is better. Cf. highly desirable. I would actually prefer to omit the basis of inference and Df. chromogene— a gene which is located on a chromosome. Cf. plasmagene Df. plasmagene— a gene which is located elsewhere than on a chromosome, presumably in the cytoplasm. Cf. chromogene.

Under gene, to take care of ambiguity in current usage, I would write. Df. 1. Any unit of heredity. 2. Chromogene.

20. heteroplastic (usually not -plasty). h. transplantation = transplantation between species= heterograft. (contra df. heterograft in 22d.)

homoplastic = ditto, different individuals of the same species. and homograft. I would refer isograft bact to homog. rather than vv.
autoplastic = ditto, different parts of the same individual, and autograft.

21. hologynic. Not strictly comparable to holandric, for the reason that bothered you. The definition is based on 1), which is comparable. But to get hologynic inheritance (in XY-sex determined systems) you have to have the special situation of attached-X. It might be as well to omit part 2) from hologynic, as beyond the scope of a dictionary explanation.

22. lysogen.... I'm sorry I dragged you into the philosophical quibbles of the moment.

lysogenicity and lysogenesis are probably fully synonymous. Lysogeny was coined by Lwoff, who refuses to accept the concept of symbiosis and insists on "potentiality to produce phage". The best solution is probably to define lysogenicity as the currently most used alternative, and the other two as syn.
Df. lysogenicity 1. ability to produce lysins or cause lysis. 2. potentiality of a bacterium to produced phage. 3. symbiosis of a bacterium with a phage.

The distinctions, if any, are based on the personal preferences of different authors who have different viewpoints on the biological nature of lysog...

23. mutagenicity is the property of being able to cause mutations. mutagenic, mutafacient is having the property...

24. I wouldn't bother with preprophage, as I doubt if it will survive one publication. Prophage should be in. Temperate phage, in phage-bacterium interactions, the property of inducing lysogenicity in some infected bacteria. Lytic (phage) ... in phage bacterium interactions, the property of killing every infected bacterium.

25. transgenation. Df. mutation. In your citation, and in earlier literature ('20s-'30s) used synonymously. Nothing to do with transkocation. [I would have wanted to used this term for transduction, but it was preempted, rather needlessly.)

26. I would leave out the parenthesis. The point may be too subtle for a dictionary definition, but there is much more to sex determination than the differential chromosome; you mentioned yourself some confusion from the fact that both male and female have an X chromosome. Some males are XO (one X no Y) rather than XY.

Do you want to give the whole picture? In some fishes and birds the sex-determination picture is reversed, and the male is homogametic (carries two W chromosomes) while the female is heterogametic (W Z).

The two situations are briefly contrasted as "male-heterogametic" (XY) and female-heterogametic (WZ).

27. OK. How about: in cross-pollinated plants, appearance in the endosperm (seed) of dominant characters inherited from the male (pollen) parent. I still wonder about the etymology but have not take time to look up the source. Perhaps Gr. xenia (related to xenos, stranger) is not accurately translated as hospitality, but is closer to "guestship". I would have guessed, from the meaning, that xenia (Eng.) was closer to xenos than to hospitality.