wanted, and poorly cared for children will be greatly ameliorated and the now acute problem of too rapid population growth will be reduced to manageable proportions.

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Homology: A Definition

I regret the error in citation (the journal name was given as *Nature*, rather than *Science*), which crept in among the 462 references of the review (*1*) to which Winter, Walsh, and Neurath take exception (Letters, 27 Dec.). In that review, the term *homologous* was taken to imply, in parallel to universal biological usage, "that the genes coding for the polypeptide chains considered, in all the species carrying these proteins, had at one time a common ancestral gene," and we stated that when this concept is not intended "it would be best to use any of the numerous synonyms of 'similar' and 'similarity' and not appear to be prejudging the issue of evolutionary relations." The "pointed and specific criticism" followed, and was entirely contained in the sentence: "Other definitions may cause confusion and are unlikely to supplant well established biological usages." The "other definitions" referred to the article by Neurath, Walsh, and Winter (*2*), in which they state, "The term homology as applied to proteins refers to similarity in amino acid sequence," and later, that comparisons of protein structures "must be interpreted on a statistical basis lest we misinterpret random similarities."

On this last score there is no argument. Winter, Walsh, and Neurath will surely agree that in this field erroneous conclusions are likely to arise from the lack of an appropriate statistical distinction between random similarities and similarities of structure greater than can result from random phenomena. An excellent method of performing just such a distinction was published by Fitch (*3*), and although Neurath, Walsh, and Winter acknowledge it in their article (*2*), they do not use any acceptable statistical techniques in their comparisons of proteases. Thus, even by their own definition they fail to show "homology."

Homology, in any biological evolutionary context has a generally understood and well-defined meaning, namely the one we have adopted for use in protein primary structure comparisons. One cannot argue that such comparisons represent an area of knowledge separate from evolutionary biology, and that therefore one may use the same words for other meanings, since such protein studies obtain their interest largely in terms of evolutionary concepts and have their major impact in the taxonomic-evolutionary field. Winter, Walsh, and Neurath justify their novel definition of "homology" by maintaining that, without fossil remains, it is not possible to decide whether the structural genes corresponding to a set of present-day proteins are or are not ancestrally related. Apart from the inherent danger of assuming that a problem is insoluble, it may be pointed out that six pages after the definition of "homology," the paper (*1*) reviewed a statistical method for demonstrating just such ancestral homology. One requires enough primary structures to derive a "statistical phylogenetic tree," as has been possible in the case of cytochrome *c* (*4*). From such a tree a simple statistical calculation permits one to approximate the number of residues in a set of proteins that will remain invariant, because of biological necessity, no matter how many species are examined (*5*). If, in the comparison of any two proteins of this set, the number of identical residues is substantially in excess of the number that remain invariant in the entire set of proteins, then clearly this excess cannot result from functional convergence from different phylogenetic origins, a process yielding *analogous* structures, and, therefore, it can only be attributed to ancestral homology. In such a procedure, the assumption of the constancy of the genetic code has replaced the fossils of the morphological evolutionist.

Even if one does not accept the validity of such a demonstration, it is difficult to understand why there is an insistence on using the word "homology" for "similarities of protein primary structure greater than random." Any of the over 30 synonyms of "similarity" (*6*) or a variety of elegant neologisms would do, and prevent an insidious misunderstanding likely to arise in biological literature. Rather than take Alice in her confused trip in Wonderland as a model for logical scientific nomenclature, I prefer to follow the 17th-century poet reacting against a form of debasement of the language then prevalent, and "call a cat a cat" (*7*).

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4. W. M. Fitch and E. Margoliash, *Science* **155**, 279 (1967).
5. W. M. Fitch and E. Margoliash, *Biochem. Genet.* **1**, 65 (1967).
6. *Roget's Thesaurus* (St. Martin's Press, New York, 1965).
7. N. Boileau, *Satires I*, line 52 (1660). *"J'appelle un chat un chat, et Rolet un fripon."*

Teaching's Third Dimension

Pitzer's article ("University integrity," 11 Oct., p. 228) focuses in part on the critical dimension of student-faculty relationships. The faculty role is depicted as composed of two factors—teaching and research, not necessarily in that order of importance. I would like to emphasize a third equally important charge of the faculty member—that is, the role of personal and educational counselor and adviser to the student. Any professor who is reasonably accessible personally and geographically will attest to the frequent, almost continuous, and apparently very important student-to-professor counseling sessions on every subject from personal problems to specialized career planning.

This third dimension is so much a part of the professional job that it is hard to question its appropriateness. Those who do, even in the glaring light of the present student unrest, should be reminded that advocates of good educational practices have long stressed the importance of interpersonal relationships as the basis for meaningful behavioral change—a basic goal of education. Even some of the more ardent proponents of technological aids to instruction [for example, Skinner (*1*)], support their positions with the observation that these aids will free the teacher to increase the personal component which no device, save the human, can accomplish. These interpersonal relationships have the greatest impact on the emotional concerns of the student and also support the cognitive or intellectual change we expect. Even the