

the text and numbering the references themselves seriatim according to the order of first mention. However, the kind of articles published by a journal sometimes requires a different standard; uniformity for all journals is not practical. For example, a journal publishing papers with numerous equations usually cites references by authors' names and year of publication, thus avoiding the confusion of a double set of numbers; the list of references is alphabetized by authors' names. Other publications containing review articles with numerous references prefer to arrange references alphabetically, with articles by the same author brought together; then the alphabetized references are numbered so citation within the text by number can be printed less expensively.

2) CBE recommends that references include full titles of articles and inclusive page numbers.

3) Standards for abbreviating journal names have already been endorsed by the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO). These abbreviations may be found in the following publications: (i) *International List of Periodical Title Word Abbreviations* [Standards Committee Z39, American National Standards Institute, New York, 1970 (rules for abbreviating individual words accompanied by lists of abbreviated words)]; (ii) *BIOSIS, 1974, Lists of Serials with Coden, Title Abbreviations, New, Changed and Ceased Titles* [BioSciences Information Service of Biological Abstracts, Philadelphia, Pa., 1974 (title self-explanatory)]; and (iii) *Bibliographic Guide for Editors and Authors* [Chemical Abstracts Service and Engineering Index, Inc., Columbus, Ohio, 1974 (full journal names, abbreviated names, codens, and names of services that abstract each journal; no changed and ceased journal names)].

So far, no national or international standard for the order of components within a reference has been agreed upon, although the CBE Style Manual Committee hopes that such a standard currently in preparation by ANSI will have been adopted by the time the 4th edition of the *CBE Style Manual* goes to press in 1976.

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It is a bit discouraging that Stoldal and Gordon are unaware that the kind of standardized reference system they propose has been in effect for 5 years and observed by some 30 medical journals.

A letter from a medical academician's secretary, cited in a *New England Journal of Medicine* editorial (1), initiated this standardization and is worth reading. Unfortunately, a number of prominent publications, such as the *Journal of Clinical Investigation*—or even *Science* for that matter—have not seen fit to join the movement in spite of its patent advantages.

FRANZ J. INGELFINGER

*New England Journal of Medicine, Boston, Massachusetts 02115*

#### References

1. *N. Engl. J. Med.* **282**, 49 (1970).

#### Cultural Homology

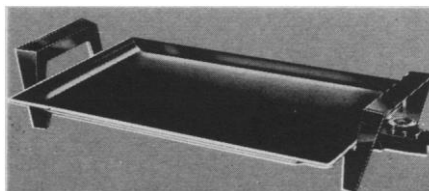
In his lecture "Analogy as a source of knowledge" (19 July 1974, p. 229), delivered on the occasion of his Nobel Prize in Physiology or Medicine, Konrad Z. Lorenz describes the usual morphological homologies and analogies, and, in his view, the equivalent cultural-behavioral homologies and analogies. Comparisons cover the spectrum of animals and man.

Morphological homology is demonstrated by the often-reproduced evidence of Cuvier showing similarities of vertebral anterior limbs, and cultural (technical) homology is demonstrated by the persistence of horse-drawn coach attributes in the development of railway cars. I submit that Lorenz's two homological demonstrations are not comparable.

Lorenz's morphological demonstration is based on the operation of classical Darwinian selection principles—gradual environmental changes, variation within species, and subsequent passage through the sieve of selection. Classical Darwinian theory specifically denies teleology (theological or man-made) in natural selection, that is, denies any plan, direction, or design. However, Lorenz's cultural demonstration is teleological. Those 19th-century mechanical engineers *designed* their railway cars, and, in our own time, they are called design engineers. They waited for no random variations and had no sieve of selection; on the contrary, they had preordained direction.

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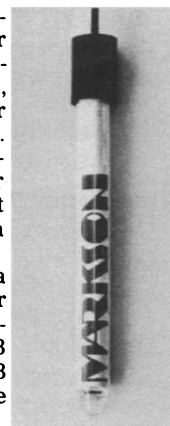
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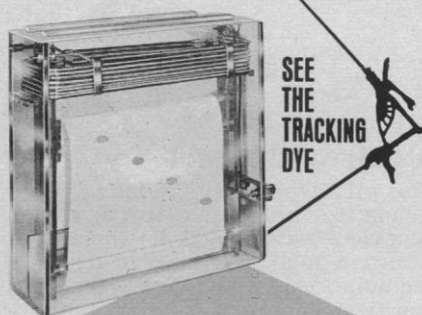
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So, in the first demonstration, Lorenz describes the operation of a fundamental law of nature as stated by classical evolutionists, and in the second case, Lorenz describes the operation of the contriving human mind. The resemblance between demonstrations is superficial.

The superficiality of this resemblance is further enhanced by consideration of the "evolution" of railway cars, as proposed by Lorenz. Railway cars, of course, are not species, and their "evolution" is a product of human endeavor. Their apparent homology, I am led to believe by Lorenz, reflects some sort of homological aspect of human thinking. I maintain that this progression of human thinking, for that is what it is, reflects naught but the learning process of a single species and is totally unrelated to the accepted definition of homology.

Lorenz also contends that morphological analogies are demonstrated by independently evolved shark and dolphin shapes and also by independently evolved octopus and human eyes. Behavioral analogy is demonstrated simply by similar behavior based on survival as defined by Lorenz. "We know for certain," Lorenz writes, "that it was more or less identical survival value which caused jealousy behavior to evolve in birds as well as in man." Lorenz insists that the origin of the behavior is unimportant—whether by a genetically fixed program in geese or by cultural tradition in man—just as long as the behavior is similar.

Surely Lorenz does not mean to imply that cultural tradition in man is transmitted genetically. The obverse is true, for cultural tradition is highly variable and flexible, easily changed within the same generation. The morphological demonstration rejects teleology; the homological demonstration acknowledges design. We cannot assume that the mechanism of the first is duplicated precisely by the teleology of the second. In the first case, selection has helped ensure survival in the environmental hostilities enumerated by Malthus, while in the second case, behavior is wrought by design internal to man and is often without survival value—a fact conceded by Lorenz. "In the complicated interaction of human social behavior," he writes, "there is much that does not have any survival value and never had any."

Long ago, Alfred Russel Wallace told us that man's organic evolution stopped in a single critical moment—

that singular time when mind or intelligence began. Man-made plans and designs entered man's behavior and, as he domesticated animals and plants according to his whims and fancies (and *not* for survival in the hostile environment as defined by classical Darwinism), so he domesticated himself to his whims and fancies. The answer to this 20th-century question of questions concerning man's behavior, I suggest, will not be assayed from an analysis of homologies and analogies. It will be found in those special rules that man has devised to evolve man in his own image, for these rules are also subject to scientific inquiry.

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Cohen has failed to grasp the inferences which are to be drawn from the fact that cultural homologies do indeed exist. He firmly believes in the unfounded doctrine that man's organic evolution came to a stop at a crucial point and that, from then on, his cultural history and his further genetical development have been exclusively governed by man-made plans and deliberate designs. I do not know whether A. R. Wallace has ever uttered this opinion in the unqualified form rendered by Cohen. However, Cohen takes it for gospel and refuses to take cognizance of all the evidence disproving it. The important point is that man, even while endeavoring to plan intelligently and flattering himself that he is a rational being, is still subject to unreflected motivations which force him to commit acts which are obsolete even at the time they are committed. In my book *Die Rückseite des Spiegels*, I contend that this retention of traditional patterns, irrespective of present unadaptiveness, is indispensable in order to render cultural information inheritable at all. Vestigial cultural patterns, such as attaching a whipholder to dashboards of early automobiles, are unadaptive side effects of a generally adaptive mechanism. Cohen's erroneous statement that any demonstration of homology implies teleological ways of thinking can be corrected by reading any modern book on comparative morphology or evolution.

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