technical view of their profession and their role in the world that no one knows they are there. Increased esteem will require broader involvement in a myriad of policy issues—social, economic, and political—that are passing engineering by.

The basic issue raised in the editorial was whether industry and government consider it important that Americans continue to have a dominant role in American engineering. If that is important, then there is no alternative to paying the price through support of new educational approaches that will ensure this outcome.

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The Decline of Systematics: Clarifying the Causes

The present crisis in numbers of modern entomologists or other systematists (Research News, 10 Nov., p. 754) should disturb all concerned for the welfare of our planet. The inadequacy of support for all aspects of population and community-level biology, "fundamental" or "applied," is ominous. Thus it is distressing when the efforts of a leading spokesperson, such as Paul Ehrlich, to warn society of this problem are potentially impeded by misinformed remarks from within our profession. A letter from J. R. Grehan (19 Jan., p. 270) quotes an anecdote from David Hull (*1*) to suggest that Ehrlich's views of taxonomy, early in his career, may have somehow contributed directly to the decline of systematic entomology. The anecdote is factually incorrect, and thus the letter does our common concern a grave disservice.

Hull recounts a strident exchange in 1957 between Ehrlich, as an advocate of numerical morphometrics and systematics, and a "classical" systematist, but mistakenly describes it as an attack by Ehrlich on the scientific value of systematics, rather than what it actually was: a debate over how best to pursue the practice of systematics. Hull then extends misunderstanding by saying, "When he [Ehrlich] was hired years later at Stanford University, he put his own preachings into practice by getting rid of its huge collection of butterflies and moths." In fact, Stanford harbored no "huge" collection of Lepidoptera at Ehrlich's arrival in 1959: the major holdings of the Division of Systematic Biology were the Dudley Herbarium and the David Starr Jordan collection of fish and herpetological specimens; what insects were present were in poor condition because of a chronic shortage of curatorial resources. When persons high in the Stanford administration (by an astoundingly short-sighted policy) further restricted the financial and space resources of the division, this was *fiercely protested* by Ehrlich and his colleagues in biology, but to no avail. The only sensible thing left to do was what was done: the housing of the division's collections was transferred to the California Academy of Sciences, where they could be curated adequately. The efforts of Stanford faculty, including Ehrlich, in evolutionary and ecological biology have been inconvenienced ever since.

I suspect strongly that much of the decline of systematics and of "classical organism biology" in general is due to precisely that resistance to new ideas and approaches that Ehrlich was trying to correct in 1957. All too often, practitioners of older biological subdisciplines wrap themselves in the mantle of their own antiquity, proclaiming that newer workers are not "true" marine biologists, or entomologists, or whatever, if they deploy new techniques or conceptual approaches in the study of their material. It is essential that old learning be maintained, but this must often take place in new contexts. As Alfred North Whitehead once remarked, "Knowledge does not keep any better than fish" (*2*). Our challenges as evolutionary, ecological, or systematic biologists are to reilluminate old facts with new insights, as well as to make new discoveries. Only then will we convince our colleagues in genetic engineering or other "new biologies" of the dynamism of our science.

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Genetic and Physical Mapping of the Human Genome

The proposal by M. Olson *et al.* (Perspective, 29 Sept., p. 1434) to standardize genetic mapping vocabularies is advantageous because it would make uniform all physical mapping efforts by bringing them to the same scale—the DNA sequence. It would also allow investigators to be independent of concerns about noncomparable databases. The proposal is based on the use of short tracts of single-copy DNA sequence as landmarks that define position on the physical map of the genome. Recovery of the "sequence tagged sites" (STSs) delimited by these short sequences allows them to be used as primers in a polymerase chain reaction (PCR). One can extend this proposal by focusing on genomic regions that manifest wide genetic diversity in a way that will simultaneously generate a parallel genetic map of the human genome. Microsatellites, of which poly(TG) is the most abundant representative (*1*), seem to be widely scattered throughout the genome and have been shown to be associated with polymorphic loci (*2–6*). Recent studies indicate that most microsatellite motifs (*5*) exhibit highly variable length polymorphisms detectable by the PCR method, while the markers so uncovered bear a high polymorphic information content (*3–6*).

If microsatellite islets are randomly distributed throughout the genome, then they would occur every 30 to 100 kilobases. A significant proportion of them should be adjacent to single-copy DNA sequences. Such single-copy sequences, including the microsatellite motif itself, could serve as highly informative genetic and physical markers for PCR amplification with appropriately selected oligonucleotide primers.

The advantage of this strategy is worth emphasizing: the abundance, informativeness, and apparently wide genomic dispersion of microsatellite islets suggest (*4, 6*) that such genetic markers might be located within short "walking distance" of any gene of interest. Moreover, since microsatellites appear to be ubiquitous and to share similar flexibility in all species, the same principle could be used to speed up the generation of maps for other mammalian species as well.

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Erratum: In the table shown in the Briefing "Who leads the (Ivy) League in " 'citation impact' ?" (9 Mar., p. 1183), the figures shown in the columns for "Citations" and "Citation impact" for Cornell University were incorrect. They should have been "523,878" and "16.53," respectively. The ranking was correct.