Letters

The Genome Project: Pro and Con

Daniel E. Koshland, Jr.'s editorial "Sequences and consequences of the human genome" (13 Oct., p. 189) tarnishes the discussion of the human genome project. Discourse is not served by impugning the judgment of opponents ("the sky is falling" group) or attributing to them outlandish fears they have not raised ("a Hitler . . . engineering . . . Jews into Aryans").

Koshland's enthusiasm for the use of human genome mapping in social policy is especially troublesome. He may believe, as did Ronald Reagan, that many of the homeless are mentally ill. Most of our homeless are on the street because they are unemployed, underemployed, or victims of the post-1981 cuts in housing subsidies. The human genome project does not, nor should it be expected to, address these social and political problems.

Koshland sees arising from this effort "a great new technology to aid the poor, the infirm, and the underprivileged." Some readers may have missed the hidden assumption in this statement. In context, it presupposes a genetic basis for poverty in our society. This concept, advanced previously by demagogic political leaders and misguided scientists, has been amply discredited and only harms efforts to lessen socially determined racial and class tensions in our country.

Where do ideas of this sort lead? If Koshland believes that there is a genetic basis for poverty, what then? Would carriers be counseled to avoid having children? Or would they be asked to wait until they could be transformed by a genetic determinant of "prosperity"?

There are legitimate concerns about the usefulness and uses of the human genome project. This editorial sets dangerous precedents and frustrates responsible debate.

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Response: The amount of money that the richest nation in the world allocates to its poorest and most helpless citizens is a disgrace. That deficiency does not justify attacking arguments for basic research because they might provide an excuse for those who don't want to do more in the political and economic arenas. Arguments in favor of the genome project that point out how it will help the physical and mental health of our citizens are precisely the arguments that biological scientists make in testifying before Congress about how current National Institutes of Health and National Science Foundation programs will contribute to treatments of mental and physical diseases. I am slightly bewildered by the extrapolation of my rather routine support of basic research to a position of forced genetic engineering, forced abortion, or neglect of those who suffer from economic difficulties. I had no such thoughts. I pointed out that the genome project had potentials for abuse but that, on balance, it was a cost-efficient approach that would benefit many, among whom were that fraction of the homeless who suffer from mental problems.

—DANIEL E. KOSHLAND, JR.

S. E. Luria (Letters, 17 Nov. p. 873) seems to feel that the human genome project should not proceed at this time. He cites the lack of stated goals and the lack of stated benefits to be derived from the project in terms of science, medicine, and public health. Also the possibility of malevolent eugenic applications of genetic technology is mentioned.

It is impossible to accept this thesis. One might similarly have argued against the possible value of Mendeleev's Periodic Table for chemical and physical science. In more recent years, Luria's own work on lysogeny is a shining example of the usefulness of basic knowledge in biology. Just as Mount Everest had to be climbed because it was there, the human genome must be analyzed and studied. Even if the benefits of this work cannot be precisely defined, there is obviously an excellent chance of great rewards.

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The Decline of Systematics

In Constance Holden's account of problems that beset the future of entomology (Research News, 10 Nov., p. 754), systematics is described as a discipline in "long-term decline," while people trained in insect classification are needed more urgently than ever to catalog tropical species threatened by habitat destruction. In a preceding paragraph Paul Ehrlich is quoted as saying that disciplines crucial to the "battle" on environmental problems were being edged out by the "new biology," such as genetic engineering. Ehrlich may not have been referring expressly to systematics, but in the context of Holden's article his historical role in the development or decline of systematics warrants acknowledgement. In a recent book by David Hull (*1*), Ehrlich's philosophy of systematics was recorded as follows:

> In a paper published in 1961, Ehrlich. . . made what he knew would be unpopular predictions for systematics in 1970: electronic data processing equipment would be the systematist's most important tool, nomenclature would be deemphasized, and traditional taxonomic monographs would largely be replaced by computer printouts of data matrices. At the St. Louis meeting, when one taxonomist asked indignantly, "You mean to tell me that taxonomists can be replaced by computers?" Ehrlich responded, "no, some of you can be replaced by an abacus." Thereafter, Ehrlich did not consider the give-and-take after a paper truly successful unless he brought at least one taxonomist to the point of tears. When he 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.

Perhaps Ehrlich no longer holds this view of entomology and systematics. The irony of his position lies in its similarity to the current negative impact of the "new biology." One negative philosophy has been replaced by another, but entomology and systematics (and thereby the larger issues) remain the consistent loser.

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REFERENCES

1. D. Hull, *Science as a Process* (Univ. of Chicago Press, Chicago, IL, 1988), p. 121.

Cone Loss of the Week

As a medical student I occasionally suffered from the well-known "disease of the week syndrome." This malady occurs when a student starts identifying in himself or herself the symptoms of the disease they are studying. I briefly relived this experience when reading the lead item on blue cone monochromacy in the 25 August 1989 This Week in *Science*, (p. 803). I realized that the usual friendly blue page of that section had changed to cruel gray. Yipe! I quickly looked around for something blue to confirm that I had not suddenly spontaneously lost my red and green cones. I am

happy to report that I had not and that *Science* has not lost its subtle sense of humor.

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Elephant Appropriation

I saw the News Briefing in the 24 November issue entitled "Bonfire to save the rhino" (p. 1001) and, whilst delighted you were able to cover the news conference, I am concerned about the emphasis. Rather than chiding Senators Bob Kasten (R–WI) and Patrick Leahy (D–VT), I, in fact, congratulated them for their endeavors to get help. What I did say was that we in Kenya were doing our part, and this made it easier for me to urge others to help even further. The $2-million appropriation for the African Elephant Program is a most worthwhile commitment for which we are all grateful.

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Erratum: In the Research Article "The cholinergic neuronal differentiation factor from heart cells is identical to leukemia inhibitory factor" by T. Yamamori *et al.* (15 Dec., p. 1412), figure 2 (p. 1414) was printed incorrectly. The correct figure appears below.

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rlif ATGAAGGTCTTGGCCGCAGGGATTGTGCCCCTACTGCTC---ATTCTGCAC 48
mlif ATGAAGGTCTTGGCCGCAGGGATTGTGCCCT       GCTGG
RLIF                                LeuLeuLeu---IleLeuHis -7
MLIF MetLysValLeuAlaAlaGlyIleValPro          LeuVal
HLIF                        Val              ---Val

                          +1
rlif TGGAAACACGGGGCAGGGAGCCCCCTTCCCATCACCCCTGTAAATGCCACC 99
mlif                         T
RLIF TrpLysHisGlyAlaGlySerProLeuProIleThrProValAsnAlaThr 11
MLIF
HLIF

rlif TGCGCCATACGCCACCCGTGTCACGGCAACCTCATGAACCAGATCAAGAGT 150
mlif  T              A  C                              A
RLIF CysAlaIleArgHisProCysHisGlyAsnLeuMetAsnGlnIleLysSer 28
MLIF                                                   Asn
HLIF                           Asn                  ArgSer

rlif CAACTGGCTCAACTCAACGGCAGTGCCAATGCCCTCTTTATTTCCTATTAC 201
mlif        A  G     T     C        T     C
RLIF GlnLeuAlaGlnLeuAsnGlySerAlaAsnAlaLeuPheIleSerTyrTyr 45
MLIF
HLIF                                          Leu

rlif ACAGCTCAAGGGGAACCATTTCCCAACAACGTGGATAAGCTATGTGCGCCA 252
mlif           A  G  G                 A               T
RLIF ThrAlaGlnGlyGluProPheProAsnAsnValAspLysLeuCysAlaPro 62
MLIF                                  Glu
HLIF                                Leu            Gly

rlif AACATGACGGATTTCCCACCTTTCCATGCCAATGGGACAGAGAAGACCAAG 303
mlif        A  C      T        G   C
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MLIF                  Ser      Gly
HLIF   Val                                       Ala

rlif TTGGTCGAGCTGTATCGGATGGTCGCGTACCTGGGAGCCTCCCTGACCAAC 354
mlif     G                   A      A C              T
RLIF LeuValGluLeuTyrArgMetValAlaTyrLeuGlyAlaSerLeuThrAsn 96
MLIF                                 Ser
HLIF                  Ile   Val          Thr      Gly

rlif ATCACCTGGGATCAGAAAAACCTCAACCCCACTGCCGTGAGCCTCCAGATC 405
mlif       C    C     GGT   G                          G
RLIF IleThrTrpAspGlnLysAsnLeuAsnProThrAlaValSerLeuGlnIle 113
MLIF       Arg          Val                             Val
HLIF       Arg          Ile          Ser   Leu      HisSer

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mlif  G        T    T                C     C     T
RLIF LysLeuAsnAlaThrThrAspValMetArgGlyLeuLeuSerAsnValLeu 130
MLIF               Ile
HLIF               Ala   IleLeu

rlif TGCCGTCTGTGCAACAAGTACCATGTGGGCCATGTGGATGTGCCCTGTGTC 507
mlif                      G         C           ACC
RLIF CysArgLeuCysAsnLysTyrHisValGlyHisValAspValProCysVal 147
MLIF                     Arg                     Pro
HLIF             Ser                          ThrTyrGly

rlif CCCGACAACTCTAGCAAAGAAGCCTTCCAAAGGAAGAAGTTGGGCTGCCAG 558
mlif       C     GA                      A        T
RLIF ProAspAsnSerSerLysGluAlaPheGlnArgLysLysLeuGlyCysGln 164
MLIF       His   Asp
HLIF       Thr   Gly   AspVal      Lys

rlif CTCCTGGGGACATACAAGCAAGTCATAAGTGTGTTGGCCCAGGCCTTCTAG 609
mlif  T                  GTCATAAGTGTGGTGGTCCAGGCCTTCTAG
RLIF LeuLeuGlyThrTyrLysGln                          180
MLIF                     ValIleSerValValValGlnAlaPheTER
HLIF          Lys        Ile   Ala   LeuAla         TER
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