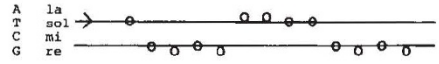
Basically musical

SIR — Recent progress in gene cloning and DNA sequencing techniques has produced an enormous amount of base sequence data. In many cases the initial data, read from autoradiograms of sequencing gels, are handwritten or typed on sheets of paper, then transferred to a computer through keyboards. Handling of lengthy and apparently meaningless successions of often thousands of the characters A, T, G and C is tedious and boring. It also requires re-checking to avoid mistakes inherent in such a procedure. We propose an acoustic method to minimize the distress of handling such information.

We have chosen a tone range of a fifth, since this occurs in daily speech. Avoiding a half-tone, three possible arrangements can be considered; bottom-heavy (do, re, mi, sol), symmetrical (re, mi, sol, la) and top-heavy (mi, sol, la, si). Here, we have picked up the second one because of the symmetry to be explored in future use. Then the pitch-to-base assignment we prefer is "re" for G, "mi" for C, "sol" for T and "la" for A.

Using this system, G + C-rich sequences are low-keyed, while thermally less stable A + T-rich sequences are high-keyed. Purine clusters, which tend to distort DNA structure, are leaping and unsettled, while pyrimidine clusters are even and placid. Sequence-melodies can then be transcribed in a two-line score, which is an abridged version of the five-lined score (taking out the upper three lines). For example, the sequence of kinking DNA upon *Eco*RI binding[1], which sounds quite attractive to us, can be written down as follows (the arrowhead on the left indicates 5′ to 3′ direction).



We can also appreciate the subtlety and delicacy of the variations of consensus sequences like that of the transcription promoters.

One certain advantage of this method is that the sequences are now more easily recognized and memorized. After a few minutes' practice, the longest stretch that we could memorize without difficulty increased at least threefold. In addition, a computer equipped with a sound-generating system can sing back the sequence to facilitate the confirmation by ear. Lastly, this practice may help to bring back some of the pleasure of decoding the mysteries of life from computers.

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1. Frederick, C.A. *et al. Nature* **309**, 327 (1984).

All Greek to me

SIR — I was puzzled by the suggestion that the association of the brain's left hemisphere with interpreting phonetic script — Greek alphabetic in particular — may be connected with reading from left to right (*Nature* **309**, 409; 1984), when there are both ancient and modern counter-examples such as Aramaic, Hebrew and Arabic, which read from right to left. Second, the ideographs of South-East Asia — the *kanji* characters — which are apparently associated with the right hemisphere, traditionally appear in columns rather than rows, requiring a vertical interpretation. Perhaps more curious are some examples of alphabetic inscriptions surviving from the ancient world, which reverse direction on alternate lines (Southern Arabia, first millennium BC). Examples of this *boustrophedon* style are also found in Ionian Greece. One wonders what this did to the divided brain. More artistically, the Viking *futhark* inscriptions — the runes — are sometimes fantastically entwined, while the Egyptian hieroglyphs were rather versatile, running horizontally or vertically, with pictographs facing left or right. Thus it is perhaps difficult to believe that the brilliantly inventive and literate civilizations of the past (Sumer, Egypt, China) found themselves limited in any sense for lack of an alphabet, whichever way it read.

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Abstract policy

SIR — The dialogue among those opposing (M.A. Bray *Nature* **307**, 206; 1984), those considering (J.R. Metcalfe **308**, 222; 1984), and those approving (S.M. Mould, I. McFarlane **308**, 684; 1984) inclusion of abstracts from conference proceedings in comprehensive life science databases, such as the BIOSIS system, has been most informative.

Mould and McFarlane clearly prefer the inclusion of conference abstracts in the database for the values stated by Metcalfe: singular appearance, early notice, awareness of scientific trends. They have no reservations about this practice. In fact, as Ms Mould indicates, the important objective of any such endeavour is to locate and identify *any* published material in a given scientific discipline. We strongly concur in this view.

As you have noted, the ability to discriminate among "full" and "abstract-only" types can be gained by a Boolean search specification "not ABSTRACT". All BIOSIS database entries from the conference literature contain this information.

In our view, it is critical that comprehensive database producers such as BIOSIS should build the most complete archival record possible. To this end, the BIOSIS database will process approximately 90,000 abstract-only items from the conference literature in 1984. The goal of providing awareness of continuing research and fields of scientific concentration should, in our view, take precedence over the format of the contribution record. The number of abstracts which represent papers from refereed journals covered in the BIOSIS database continues to grow and will not be diminished by our policy on "abstracts-only" literature. All primary journals covered by BIOSIS are refereed sources.

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Peer revue

SIR — Clemens recommends establishing a flourishing domestic population of the spider for biological control of flies (*Nature* 31 May, p.394). It is, however, well known that substantial numbers of the human population are arachnidophobes, especially with respect to large and hirsute members of the group.

If Flanders and Swann[1] are to be believed, establishing such a population of spiders might have the unfortunate and unwanted effect of increasing the fly population by means of self-inflicted fatal injury of human arachnidophobes whilst attempting to remove the hirsute arachnid.

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1. Flanders, M. & Swann, D. *The Spider in the Bath.*

Bacterial problems

SIR — Concerning your article (24 May, p.296) regarding Judge Sirica's recent ruling on the use of genetically engineered bacteria, I wish to go on record as indictating that a further detailed consideration of the Lindow experiment led me to file a deposition in the case, which was available and considered by Judge Sirica, that in my opinion there was no reason to block those particular experiments. I do continue to feel — and I believe there is general agreement on this point — that the ecological consequences of experiments of this nature need to be considered carefully now and a consensus needs to be reached on what, if any, regulation is necessary. I fully agree with the conclusion of Mr Stephen Budiansky that it would be extremely unfortunate if Mr Rifkin's tactics, which are, to say the least, unorthodox, led to some valid points being disregarded or not given proper consideration.

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