eukaryotes than within the genomes of asexually reproducing prokaryotes. The experimental evidence is consistent with this prediction.

Other theoretical studies[3-5] have incorporated negative selection into models of selfish DNA and, recently, such a model[6] was applied explicitly to the case of transposable P elements in *Drosophila*. P elements have a demonstrable negative effect on host fitness, yet they have spread rapidly within natural populations[7].

In conclusion, I believe that the remarks of Evans[1] are very pertinent to the question of parasitic DNA in some genomes but the situation is less restrictive than he describes for the case of the higher eukaryotes. I would say that parasitic DNA is not only possible but highly probable in these latter organisms. The evolutionary pressures on this DNA would indeed be of the type outlined by Doolittle *et al.*[8].

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1. Evans, R.V. *Nature* **310**, 456 (1984).
2. Hickey, D.A. *Genetics* **101**, 519-531 (1982).
3. Ohta, T. *Genet. Res.* **41**, 1-15 (1983).
4. Charlesworth, B & Charlesworth, D. *Genet. Res.* **42**, 1-28 (1983).
5. Langley, C.H., Brookfield, J.F.Y. & Kaplan, N. *Genetics* **104**, 457-471 (1983).
6. Ginsburg, L.R., Bingham, P.M. & Yoo, S. *Genetcs* **107**, 331-341 (1984).
7. Kidwell, M. *Proc. natn. Acad. Sci. U.S.A.* **80** 1655-1659 (1983).
8. Doolittle, W.F. Kirwood, T.B.L. & Dempster, M.A.H. *Nature* **307**, 501 (1984).

Primroses and self-fertilization

SIR — Bodmer's recent letter[1] concerning homostyle primroses raises some scientific issues on which we would like to comment. First, he suggests that it is important to explain why the self-fertile homostyle variant is confined to a few English populations; his model of a low rate of self-fertilization and a small viability disadvantage to homostyles[1,2] is intended to provide such an explanation in view of the absence of evidence for the large viability disadvantage of homozygous homostyles postulated by Crosby[3]. There is, however, no direct evidence that the primrose populations containing homostyles are tending towards a stable polymorphic equilibrium, as Crosby and Bodmer assume. As was previously pointed out[4], the polymorphism for homostyles in *Primula vulgaris* is a highly exceptional situation; most species of *Primula* are, of course, distylous and self-incompatible, but there are many in which homostyly has become fixed[5,6]. The same is true of other groups of distylous plants[7,8]. It is thus entirely possible that *P. vulgaris* is merely in a state of transient polymorphism, and that the homostyle variant is on its way to fixation, at least locally[4]. The model of a conflict between the advantage of fertility assurance of a self-fertile form and the disadvantage of inbreeding depression to its progeny can explain why homostyles become established only in some species or in some geographical areas of a species[4,9]; the biogeographic data on the distribution of homostyly are consistent with this model[4,6,8].

Second, Bodmer suggests that the selfing rate of homostyles may vary in time and space, so that our estimate[9] of a value of 0.92 for a single population in 1982 is not necessarily representative. We certainly agree with this, but would like to point out that there are two other independent estimates of the selfing rate for natural populations which give values of 0.93 (refs 10, 11); within the limits of sampling error, these estimates agree. Richards[12] has made clear the difficulties in interpreting Bodmer's low selfing rate estimate[2,13] for garden material, and in extrapolating this to natural populations. (As noted by Crosby[10], this estimate excluded data from a year (1955) in which the selfing rate was apparently unity). The weight of the empirical evidence is, we feel, in favour of a high selfing rate for homostyle primroses in nature.

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1. Bodmer, W.F. *Nature* **310**, 731 (1984).
2. Bodmer, W.F. *Phil. Trans. R. Soc.* B **242**, 517-549 (1960).
3. Crosby, J.L. *Evolution* **3**, 212-230 (1949).
4. Charlesworth, B. & Charlesworth, D. *Am. Nat.* **114**, 499-513 (1979).
5. Ernst, A. *Oesterr. Bot. Z.* **100**, 235-255 (1953).
6. Ernst, A. *Genetica* **27**, 391-448 (1955).
7. Ray, P.M. & Chisaki, H.F. *Am. J. Bot.* **44**, 537-544 (1957).
8. Baker, H.G. *Evolution* **20**, 517-549 (1966).
9. Piper, J.G., Charlesworth, B. & Charlesworth, D. *Nature* **310**, 50-51 (1984).
10. Crosby, J.L. *Heredity*, **13**, 127-131 (1959).
11. Curtis, C.F. Jones & D.A. Curtis, J. *Heredity* (submitted).
12. Richards, A.J. *Nature* **310**, 12-13 (1984).
13. Bodmer, W.F. *Heredity* **12**, 363-370 (1958).

Herpes simplex transforming fragments

SIR — In the past twelve months, the subject of viral genes involved in immortalization and tumorigenic transformation has been reviewed at least three times in the News and Views section of *Nature*. Every time when reference was made to DNA tumour viruses, it was stated that genetically distinct functions for immortalization and malignant transformation have been demonstrated for two DNA viruses, polyoma virus and adenovirus. Mention was never made of the separable immortalizing and tumorigenic functions that have been identified in the genome of the human DNA virus herpes simplex type 2 (HSV-2).

The first report of escape from senescence and neoplastic transformation of early passage, nonestablished Syrian hamster embryo cells by a defined subgenomic fragment of HSV-2 DNA appeared in the spring of 1980[1]. Last autumn evidence was published[2] for the existence of two separate genetic functions within this defined fragment. One subfragment derived from the 64% left-hand end was shown to cause immortalization, whereas the other subfragment from the 36% right-hand end was demonstrated to cooperate with the left-hand subfragment in mediating tumorigenic transformation. What makes the HSV-2 data especially interesting is that the immortalizing DNA segment contains a region that exhibits homology to an interspersed middle-repetitive DNA sequence in mammalian cells[2,3]. I should like to bring these reports to the attention of *Nature* and its readers.

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1. Jariwalla, F. J., Aurelian, L. & Ts'o, P.O.P. *Proc. natn. Acad. Sci. U.S.A.* **77**, 2279 (1980).
2. Jariwalla, R. J., Aurelian, L. & Ts'o, P.O.P. *Proc. natn. Acad. Sci. U.S.A.* **80**, 5902 (1983).
3. Peden, K., Mounts, P. & Hayward, G. S. *Cell* **31**, 71 (1982).

Chinese sources no guide to Geminga

SIR — Pannekoek, in his study of Ptolemy[1], remarks "In studying the history of astronomy we are not learning something about the stars, but something about the astronomers". This statement is true for the Chinese records as well. The Chinese records are notorious for their inaccuracy and unreliability[2], and modern astronomers have been too keen to identify new sources with ancient recorded phenomena. Kukarkin *et al.*[3] list a good many identifications of ancient Chinese "nova" recordings with modern counterparts, and note that the vast majority of these is unfounded, and many (notably radiosources) are demonstrably wrong.

The reality of a phenomenon chronicled by the Chinese often has to be doubted[2], and the position is always uncertain (a famous example is the wrong position for the Crab nebula[4]). Rather than contribute to the spread of spurious identifications in the literature — once in existence, they die hard — Editors of scientific journals[5] would do well to show more restraint in publicizing such identifications. Bignami *et al.*[6] are justified in mentioning the Chinese record of AD 437; but its identification with Geminga can only be accepted if in addition to the positional coincidence (of necessity inaccurate) a much more precise temporal coincidence is established.

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1. Pannekoek, *Vistas in Astronomy* **1**, 65 (1960).
2. Needham, J. *Science and Civilisation in China* Vol.3, 419 (1959).
3. Kukarkin B.V. *et al. General Catalogue of Variable Stars*, 3rd edn., III, 54-73, Moscow (1971).
4. Duyvendak, J.J.L., Mayall, M.U. & Oort, J.H. *PASP* **54**, 91-104 (1942).
5. Maddox, J. *Nature* **310**, 447 (1984).
6. Bignami, G.F., Caraveo, P.A. & Paul, J.A. *Nature* **310**, 464-469.