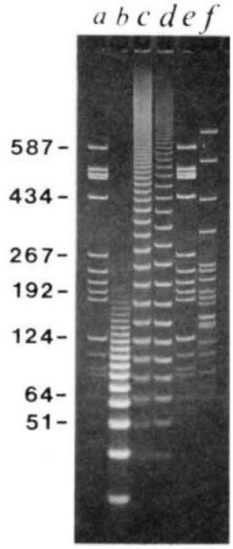

Fig. 1 Demonstration of the anomalous electrophoretic behaviour of certain repeating-block copolymers of DNA. Lane *b* contains polymers of the form $[G_3TCGAC_3]_N$ where $2 < N < 25$. The electrophoretic mobilities of all members of this set are normal *c*, $[G_2A_3T_3C_2]_N$; *d*, $[GA_4T_4C]_N$. The members of the latter two series show distinctly abnormal electrophoretic mobilities for $N > 5$. Lanes *a* and *e* contain DNA molecules derived from pBR322 by *Hae*III digestion; *f*, *Hpa*II digest of pBR322.

Methods. Representative fragment sizes are specified to the left of the gel. All gels used for this study were 12% polyacrylamide (37:1 monomer/bis) and were run at 24±2 °C (running buffer: 40 mM Tris-acetate, 20 mM sodium acetate, 1 mM Na-EDTA, *p*H 7.9). Polymers of varying *N* were constructed from synthetic decamers by phosphorylation and subsequent ligation (with T_4 DNA ligase in 0.5 mM ATP, 50 mM Tris-HCl, 10 mM $MgCl_2$ *p*H 8.0, at 12–15 °C). Ligase concentrations and reaction times were varied in order to produce informative gels; the gel patterns do not represent maximum extents of polymerization. Ligation reactions were stopped by adding Na-EDTA to a final concentration of 20 mM, followed by extraction with phenol/ether. Oligodeoxynucleotides were synthesized manually using the phosphite triester chemistry of Caruthers[15,16]. Oligomer sequences were verified by (1) using the chemical sequencing technique of Maxam and Gilbert[17], with minor modifications for short oligomers, and (2) complete digestion of the polymerized decamers with the appropriate restriction endonucleases.

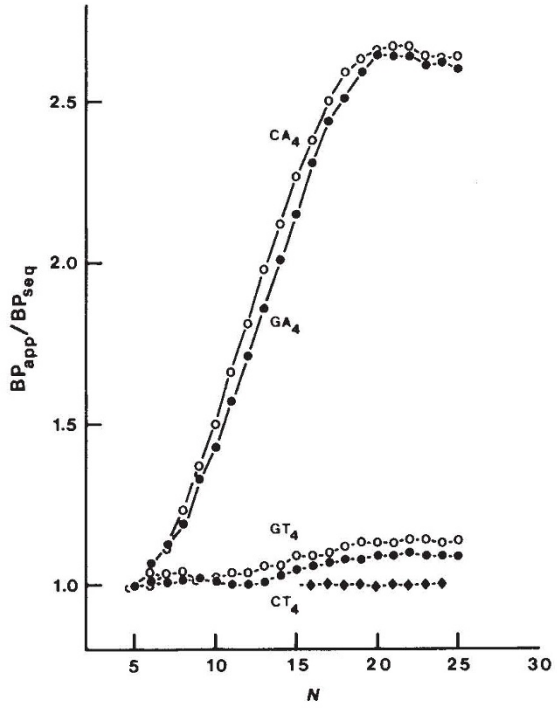

Fig. 2 Gel electrophoretic behaviours of duplex polymers having a repeating decamer motif. CA_4, $[CA_4T_4G]_N$; GA_4, $[GA_4T_4C]_N$; GT_4, $[GT_4A_4C]_N$; CT_4, $[CT_4A_4G]_N$. Mobilities of the various polymers, represented as the ratio of the apparent number of base pairs (BP_{app}) to the true number of base pairs (BP_{seq}), are plotted as a function of the degree of polymerization, *N*. The two curves plotted with solid circles represent sequence inversions of one another; the same applies to the two curves with open circles. ◆, $[G_3TCGAC_3]_N$ (lane *b* of Fig. 1, displaying a normal electrophoretic pattern for a decamer-based series).

sequences, when propagated approximately in-phase with the helix repeat, give rise to significant macroscopic curvature of the helix axis. That study exploited the fact that curved molecules migrate more slowly through polyacrylamide gels than do their linear counterparts (Fig. 1). Figure 2 compares the behaviour of the polymer series 5′-$[GA_4T_4C]_N$-3′ with its counterpart 5′-$[GT_4A_4C]_N$-3′. As the only difference between these polymers is the polarity of the A-T block, they would have to display identical electrophoretic behaviour if ApA/TpT dinucleotide wedges were determining the contour of the helix axis; clearly, this is not the case, as the 5′-T_4A_4-3′-containing polymers display nearly normal electrophoretic behaviour, in stark contrast to the 5′-A_4T_4-3′-containing species. This analysis does not rule out any participation of wedge-like deformations in generating curvature; however, such wedges, if present, do not determine curvature. Hence, it is incorrect to relate macroscopic curvature to an apparent ApA wedge angle. Note that the G and C residues flanking the A-T runs do not appear to influence the degree of curvature, since interchange of these residues (Fig. 2) has essentially no effect on the relative electrophoretic mobilities.

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1. Ross, W., Shulman, M. & Landy, A. *J. molec. Biol.* **156,** 505–529 (1982).
2. Stellwagen, N. C. *Biochemistry* **22,** 6186–6193 (1983).
3. Bossi, L. & Smith, D. M. *Cell* **39,** 643–652 (1984).
4. Zahn, K. & Blattner, F. R. *Nature* **317,** 451–453 (1985).
5. Simpson, L. *Proc. natn. Acad. Sci. U.S.A.* **76,** 1585–1588 (1979).
6. Challberg, S. S. & England, P. T. *J. molec. Biol.* **138,** 447–472 (1980).
7. Kidane, G. Z., Hughes, D. & Simpson, L. *Gene* **27,** 265–277 (1984).
8. Wu, H.-M. & Crothers, D. M. *Nature* **308,** 509–513 (1984).
9. Hagerman, P. J. *Proc. natn. Acad. Sci. U.S.A.* **81,** 4632–4636 (1984).
10. Hagerman, P. J. *Biochemistry* **24,** 7033–7037 (1985).
11. Trifonov, E. N. & Sussman, J. L. *Proc. natn. Acad. Sci. U.S.A.* **77,** 3816–3820 (1980).
12. Marini, J. C., Levene, S. D., Crothers, D. M. & Englund, P. T. *Proc. natn. Acad. Sci. U.S.A.* **79,** 7664–7668 (1982).
13. Levene, S. D. & Crothers, D. M. *J. biomolec. Struct. Dyn.* **1,** 429–435 (1983).
14. Ulanovsky, L., Bodner, M., Trifonov, E. N. & Choder, M. *Proc. natn. Acad. Sci. U.S.A.* **83,** 862–866 (1986).
15. Caruthers, M. H. *et al. Cold Spring Harb. Symp. quant. Biol.* **47,** 411–418 (1982).
16. Sproat, B. S. & Gait, M. J. in *Oligonucleotide Synthesis, A Practical Approach* (ed. Gait, M. J.) 83–114 (IRL, Washington, DC, 1984).
17. Maxam, A. M. & Gilbert, W. *Meth. Enzym.* **65,** 499–560 (1980).

Errata

Danish Basin subsidence by Triassic rifting on a lithosphere cooling background

K. Sørensen

Nature **319,** 660–663 (1986)

ON page 662, Figures 2 and 3 have been transposed. The figure legends are correct.

An *Agrobacterium* transformation in the evolution of the genus *Nicotiana*

I. J. Furner *et al.*

Nature **319,** 422–427 (1986)

ON pages 424 and 425, the figures and their legends were labelled incorrectly: Figure 3 should be Figure 4 and vice versa.