purple body", and elsewhere Neville enthused about the "exquisite eutectic" of $AuAl_2$ with another Au–Al phase (a eutectic is an intimately mixed microstructure of two distinct crystal types). At the turn of the century, Neville published the first overview[11] of intermetallic compounds, almost all discovered in the 1890s; for many, he demonstrated melting temperatures much higher than for the constituent elements.

An intriguing aspect of the use of $AuAl_2$ and $PtAl_2$ as precious stones is the fact that they seem to be much less difficult to synthesize than artificial opal, emerald, sapphire and ruby, and they are not used in single-crystal form, unlike those gems; but the new stones differ from those familiar gems in that they each contain a scarce constituent, while the gems are made up of elements such as silicon, oxygen and aluminium.

Perhaps we shall see a growing interest in jewellery incorporating intermetallic compounds containing rare metals. Meantime, although $PtAl_2$ has been dubbed 'platigem', $AuAl_2$ used for such purposes does not yet have a common name — why not 'Purple glory'? □

Robert W. Cahn is in the Department of Materials Science and Metallurgy, University of Cambridge, Pembroke Street, Cambridge CB2 3QZ, UK.
e-mail: rwc12@cam.ac.uk

1. www.mintek.co.za
2. Rapson, W. S. & Groenewald, T. *Gold Usage* 293 (Academic, London, 1978).
3. Raymond, T. *Semicond. Int.* **12,** 152 (1989).
4. Hunter, W. R. *et al. Appl. Opt.* **11,** 1594 (1972).
5. Cahn, R. W. & Greer, A. L. in *Physical Metallurgy* (eds Cahn, R. W. & Haasen, P.) 1807–1808 (Elsevier, Amsterdam, 1996).
6. Büchler, H. & Range, K.-J. *J. Less-Common Metals* **160,** 143–152 (1990).
7. Saeger, K. E. & Rodies, J. *Gold Bull.* **10,** 10–14 (1977).
8. Chen, L.-Y. & Lynch, D. W. *Phys. Status Solidi B* **148,** 387–394 (1988).
9. Roberts-Austen, W. C. *Proc. R. Soc. Lond.* **50,** 367–368 (1892).
10. Heycock, C. T. & Neville, F. H. *Proc. R. Soc. Lond.* **66,** 20–21 (1899).
11. Neville, F. H. *Rep. Bradford Mtg Br. Assoc., Sect. B* 1–20 (1900).

Biophysics

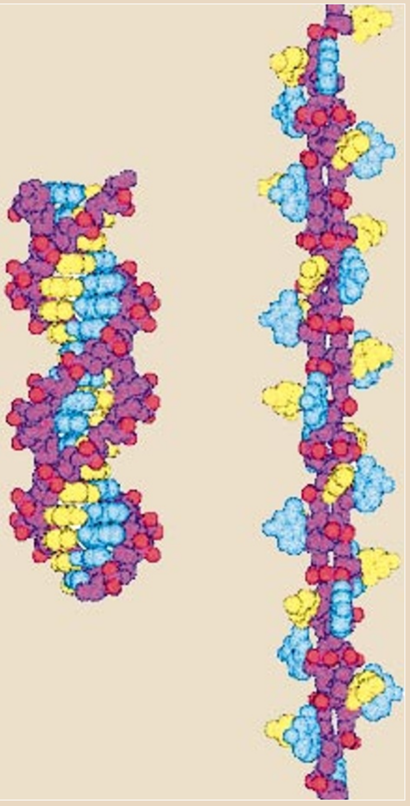
The A to Z of DNA

DNA is remarkably supple — it can be bent, twisted, stretched or squashed into any number of different shapes. The classical, right-handed double helix (pictured right), with 10.4 bases per turn and a phosphate–phosphate distance of roughly 7 Å, is known as B-form DNA. Other stable DNA variants include the A-form structure, in which the distance between phosphate groups is nearer to 5.9 Å, and Z-form DNA, which has a left-handed conformation.

Reporting in *Proceedings of the National Academy of Sciences* (95, 14152–14157; 1998), Jean-François Allemand and colleagues now describe how, through a clever piece of molecular yoga, they have identified another stable DNA conformation. Christened P-form DNA (far right), this new structure is 75% longer than the B form, with just 2.62 bases per turn. Most surprisingly, the phosphate backbone (purple) — which, in B-form DNA wraps around the bases (yellow and blue) — is on the inside.

Allemand *et al.* attached one end of a DNA strand to a flat surface, and the other to a magnetic bead. Then, using magnets to control the position of the bead, they stretched and twisted the DNA. When a force of 3 pN was applied to a positively supercoiled molecule, some of the DNA adopted the new, P-form structure. Such a structure may form *in vivo* too, as the authors believe that these conditions could be re-created during replication and transcription.

A P-DNA-like structure has been found in the genome of the Pf1 virus. Moreover, just a few months before Watson and Crick published their famous description of DNA, Linus Pauling and Robert B. Corey proposed another structure for nucleic acids (*Proc. Natl Acad. Sci.* 39, 84–97; 1953). Like Allemand *et al.*, Pauling and Corey believed that the "core of the molecule is probably formed of [the] phosphate groups". But although we now know DNA inside-out, it is unlikely that this will be the last new conformation to be discovered. **Alison Mitchell**



Daedalus

Vegetable electricity

Electricity seems to be mainly an animal invention. Animals generate it for internal use — crucially in their nerves. Many fish deploy it externally for navigation, and even as a weapon. But plants, which have no nerves, also generate detectable potentials. Tomato plants may even propagate their internal 'wound response' electrically. And while many plants release chemicals which affect others of their species — to prevent local overcrowding, or to 'warn' neighbours of an insect attack — claims have also been made that they can signal electrically.

If so, says Daedalus, the place to look for it is in the sea. It is only the conductivity of the water which allows electric fish to deploy their shocking powers. Seaweeds, like all plants, certainly defend themselves against herbivores. These defences have hitherto been taken as chemical — polyphenols, haloterpenoids and so on, to discourage grazing fish and sea-urchins. But maybe some plants, starting from a fairly feeble electrocommunication ability, have developed it into an effective electrical defence? Intrepid DREADCO botanists with volt-meters and rubber gloves are now trawling the ranks of the seaweeds in search of such powers.

As a first step, they are studying the plant communities which grow on and around undersea electric cables. A weed which senses electricity, or which uses it for terrain-marking or signalling, might well concentrate near such cables. If such a plant is found, the team will scrutinize its related species, hoping to find a seaweed whose voltaic powers are strong enough to stun, or at least discourage, marine herbivores. Even if only mildly electric plants exist in nature, selective breeding could develop serious performers.

An electric plant, of course, would be a revolutionary discovery. It would be the ultimate natural solar energy converter. Small-scale applications would probably develop first. A little tank of water-weed, with each plant connected to a lead and a common counter-electrode in the water itself, might in an isolated community be an ideal self-maintaining 'battery' for a lamp, a radio, a computer, or a mobile telephone. Scale-up to larger 'power ponds' could come later. Daedalus even has visions of glass-bottomed ships propelled by the sunlight shining down through the glass onto its weed coating, and vast lagoons of wired-up seaweed feeding power into the grid.

David Jones