

The Pliocene Forest

www.geosuffolk.co.uk
Suffolk Coast and Heaths AONB



Background

The 'Pliocene Forest' project here at Rockhall Wood Coralline Crag SSSI, also known as Sutton Knoll, began in the spring of 2009 and is an exciting addition to the ongoing management of this unique locality by GeoSuffolk members. **The nearby Site Information Panel gives additional information regarding the special character of these sedimentary deposits and the role played by GeoSuffolk.** It is inspired by a fossil pollen analysis by R. Andrew and R.G. West, first published in 1977, from the Coralline Crag at Orford just a few miles to the north-east. The slope leading down to this panel into which the 'Forest' is planted is very free draining but makes a good soil when modified. The project has the full support of the landowner and Natural England plus crucial financial aid from the Curry Fund of the Geologists' Association for the protective deer fencing.

The fossil pollen shows us a complex flora of evergreen and deciduous trees representative of several different habitats, including giant redwoods, Japanese umbrella pine and cypress, growing nearby with oaks, elms, birch and hornbeam at a time, some 4 million years ago, just prior to a period of climate cooling and localised plant extinctions. The project aims to reproduce this original plant mix using modern representative species and genera, the over-riding rule being that the modern pollen must match that from the Orford record.

A modern interpretation

Fossil pollen morphology does, however, have limitations in that only a few trees can be identified confidently at species level, most are generic with one at family level, Cupressaceae i.e. Cypress. Therefore, to add interest, scientific, educational and conservation value generally, an effort has been made to choose available species that possess additional qualities such as *Pinus coulteri* with the largest cones, marked variation in form and habit in the same genus e.g. *Atriplex halimus*, tree purslane, and *Atriplex hortensis* 'Rubra', Orache, and also disease resistance as in the complex elm hybrid *Ulmus* Lutece. Plants under threat in their native habitats are also favoured such as *Picea omorika* from Serbia and *Athrotaxis cupressoides*, Pencil Pine, from Tasmania.

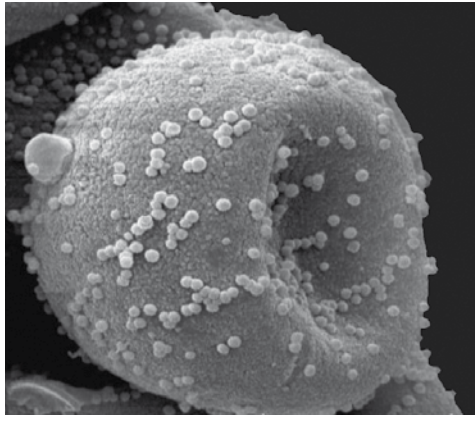
Initially, the emphasis has been on establishing a background and framework of the slower growing specimens, mostly trees. In time the perspective will subtly change as they begin to 'paint the sky' and from looking their best close to they move to looking their best mid-distance to ultimately looking their best from afar. Other plants soon to be added will include heathers, grasses/sedges, ferns and, as a test of horticultural expertise, the bog myrtle *Myrica gale*. All planting, site management and research work is voluntary by GeoSuffolk members but plant sponsorship and project donations will be the key to its future survival. If you feel you can help please visit www.geosuffolk.co.uk, for additional information.

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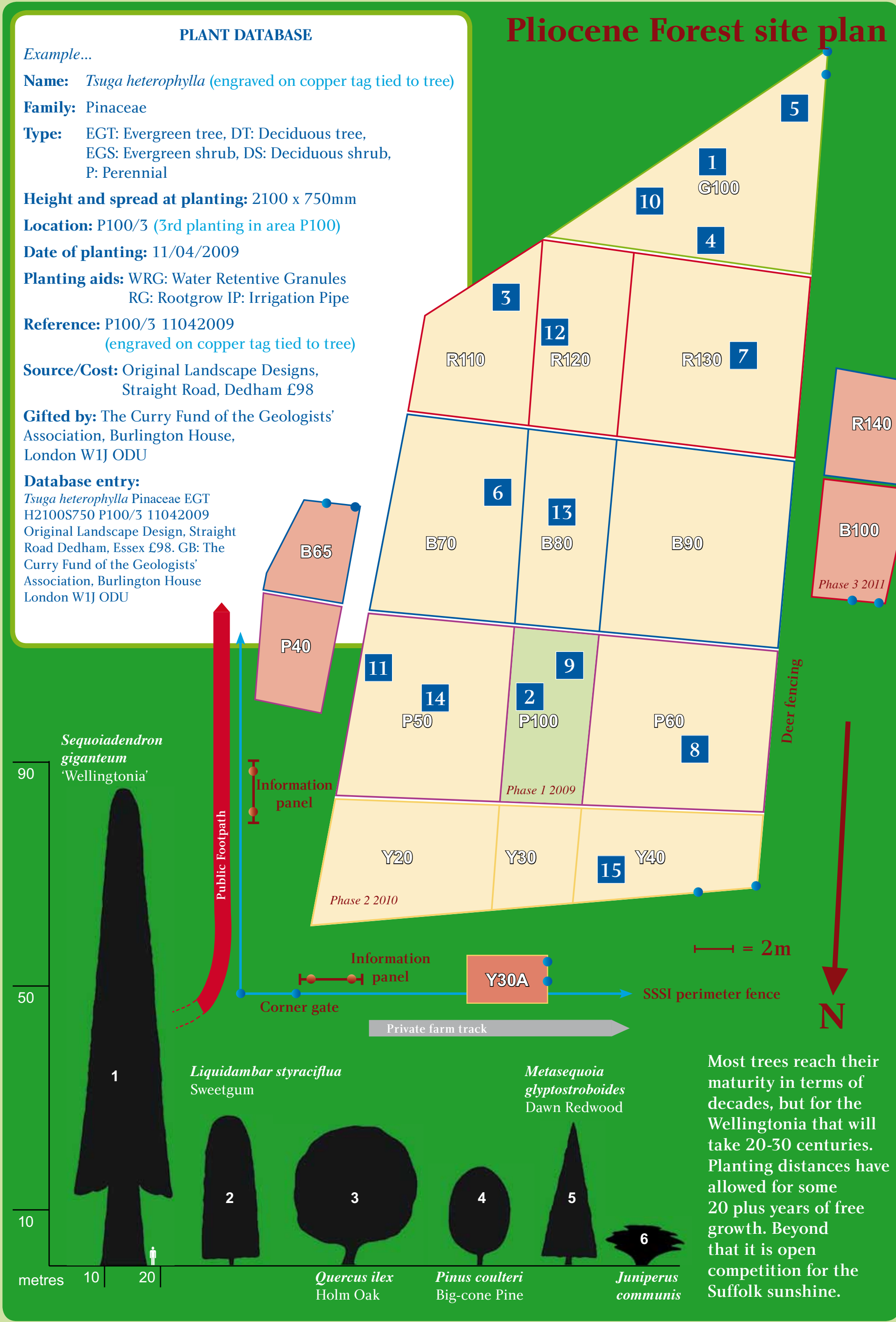
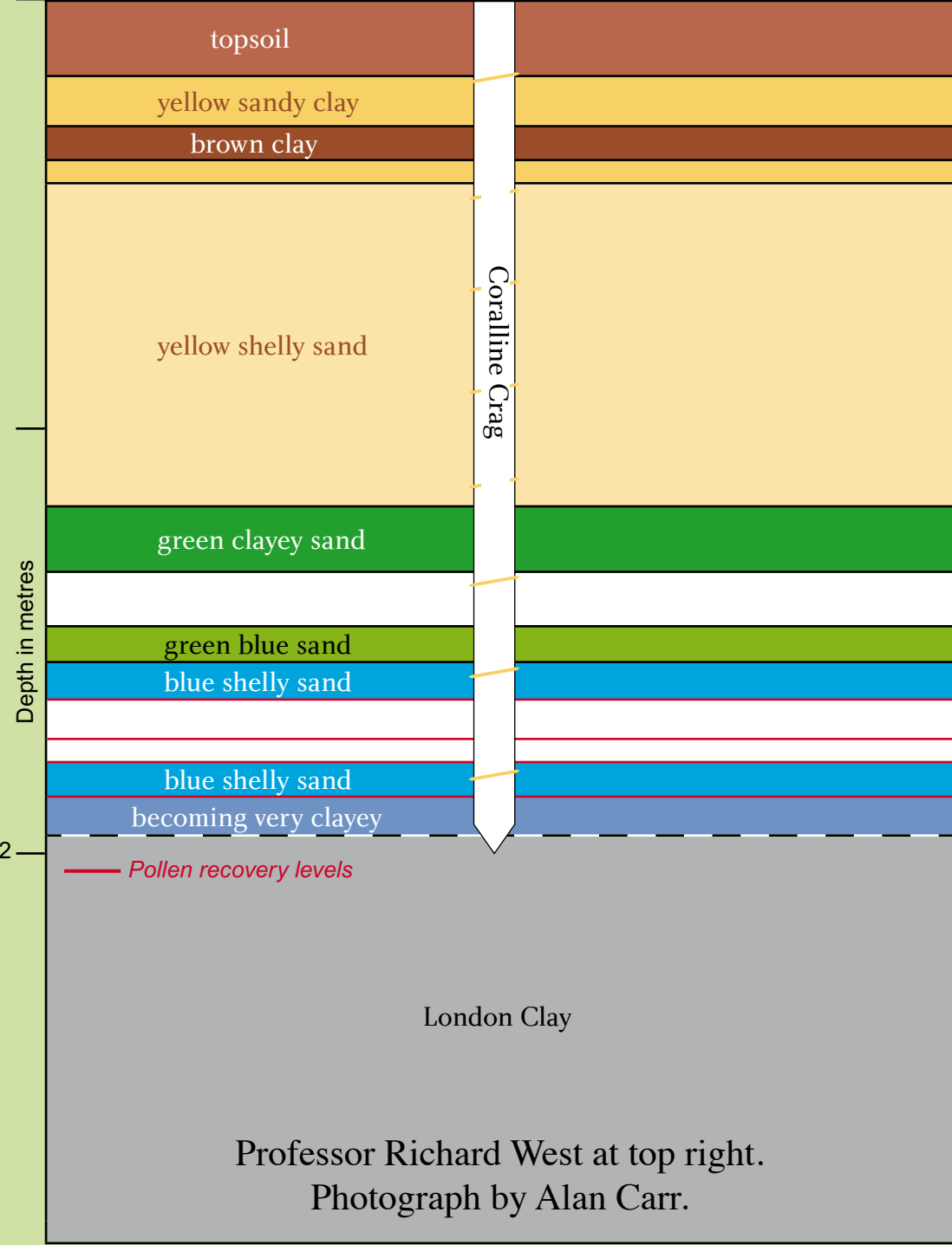
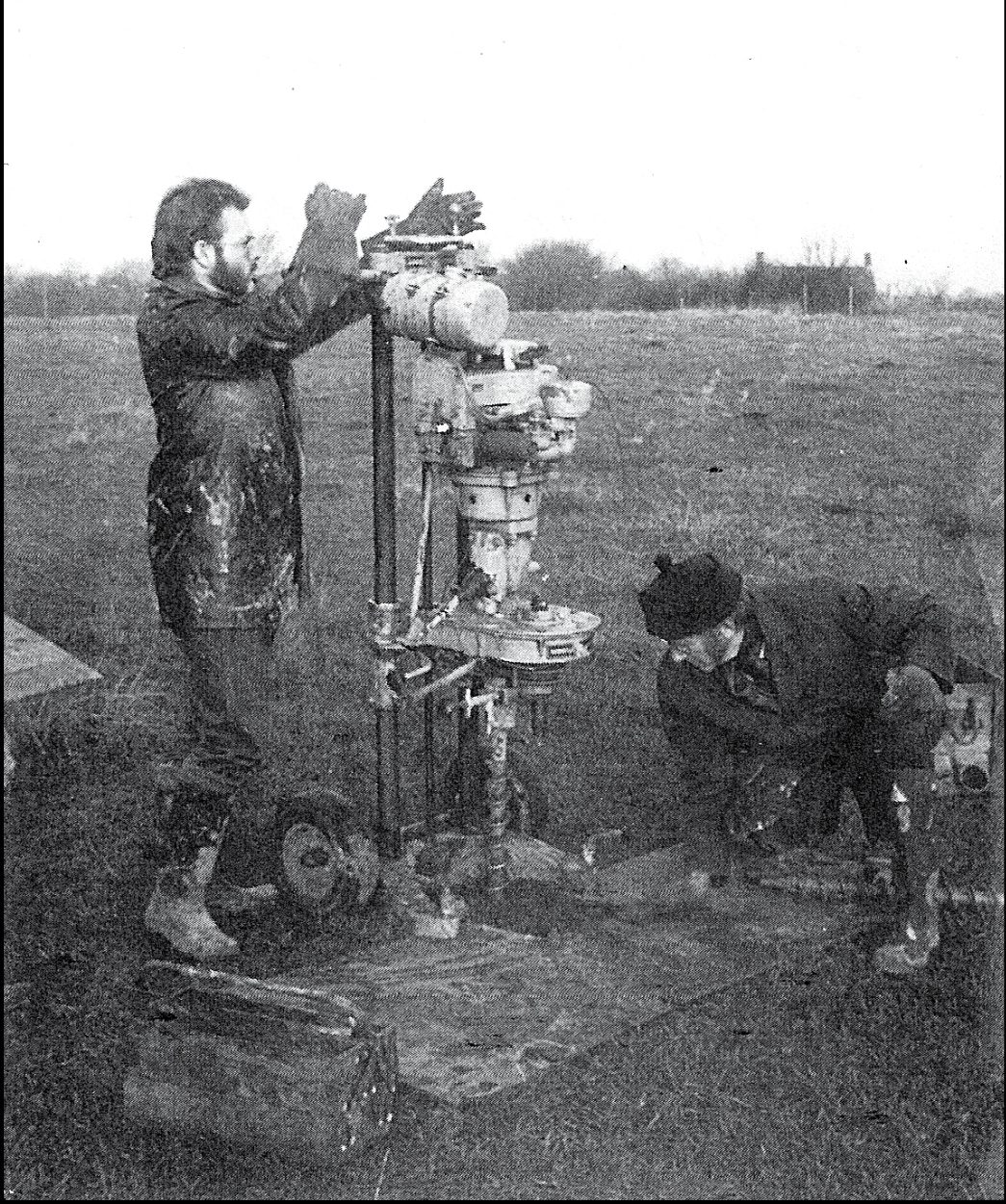
A Cypress Pollen Grain

A scanning micrograph of a *Cupressus arizonica* pollen grain 24 µm (24/1000mm) in diameter. Pollen grains are sealed within a double-layered wall. Its outer layer, the exine, is extremely resistant to enzymatic and chemical degradation.

13 *Cupressus arizonica*
Arizona Cypress



On a cold spring day in 1968 the auger penetrates some 12 metres of sands, silts and clays before encountering the underlying Eocene London Clay. At four levels fossil pollen was discovered in the overlying Pliocene sediments.



The conifers in this photograph, mostly *Tsuga heterophylla*, Western Hemlock, and *Pseudotsuga menziesii*, Douglas Fir, were planted in Northumberland in the 1860s. Notice how close together some of the trunks are. These trees have lost their lower branches to shade and only exhibit a high crown to the light, although those on the edge of the forest will be clothed with leaves right down to any animal grazing level. In the small clearing in the centre a host of tiny fir seedlings spring to life and some may live to be 1,000 years of age. The Douglas fir comes from Western North America but has naturalised itself here. This may well be how the Pliocene Forest will look at Sutton in the summer of 2160.

If the secret of a long life is always having something to look forward to then the planting of a Pliocene Forest surely fits the bill to perfection.

Local Pliocene Environments: The sediment analysed is a marine sand with a varying content of clay-silt. It is believed to have been deposited during formation of off-shore sandbanks in a shallow sea and, since it contains relatively abundant pollen, it is likely to have originated in a coastal region on the western margin of the Pliocene sea.

The pollen flora will then have originated from a variety of plant communities, both coastal and inland, and probably from both upland drier situations and lowland swamp situations with forest being regionally dominant. We have elements of flora from relatively dry soils such as *Pinus*, *Picea*, *Abies*, *Tsuga*, *Betula*, *Ulmus*, *Quercus*, *Liquidambar*, *Carpinus*, *Pterocarya*, *Platycarya*, *Acer*, *Ilex*, and taxa possibly associated with lowland mires such as *Sequoia*, *Sciadopitys*, *Taxodium*-*Glyptostrobus*, Cupressaceae, *Alnus* and *Myrica*. Chenopodiaceae pollen frequencies are characteristic of near shore environments and include salt tolerant plants such as Sea Beet, *Beta vulgaris*, common Orache, *Atriplex patula*, and Tree Purslane, *Atriplex halimus*.

The pollen provides the only evidence of the immediate Pliocene flora in Britain, before subsequently being depleted by the severe climatic changes associated with the Pleistocene and contains a substantial representation of exotic taxa of Eastern Asian/North American affinity.

