
## A hundred years ago

MR. CASELLA, the well-known scientific instrument-maker, has sent us a specimen of a compass which will be a great boon to the many who are ignorant of the difference between the magnetic and the geographical poles, and of the fact that an ordinary compass points to the former and not to the latter, the difference in this country at present being about 19°. The great advantage of Mr. Casella's "unmistakable true north compass," is that it points to the true or geographical north, being corrected for use in the United Kingdom, and capable of adaptation to any locality in any part of the world. It is a card compass of beautiful workmanship, swings with perfect ease, and by means of a black cone on a white ground, the merest tyro can read it. It is made in various sizes, and sold at various prices, and deserves to come into extensive use.

from *Nature*, **13**, 135; October 16, 1875

spread distribution within the disturbed forest.

A recently published pollen diagram from eastern Finland by Hicks (*Commentat. Biol.*, **80**, 1; 1975) is of considerable interest in this debate. It shows an expansion of *Picea* at about 3,000 BC yet evidence of agriculture does not occur until a level dated at about 300 years ago. This is consistent with historic records of the invasion of the area by Finnish farmers during the 17th century. Previously northern Finland had been occupied by herding and hunting Lapps. There is still the possibility that some forest management, such as burning, could have been practised, however; perhaps the pollen type *Melampyrum* in Hicks' diagrams are indicative of this.

In Britain we have been spared these problems because *Picea* has never reached these islands during the present interglacial. An equally enigmatic problem, however, is posed by the marked decline in pine, *Pinus sylvestris*, since 5,000 BC and particularly in the last 4,000 years. This has affected the species in Ireland (Pilcher, *New Phytol.*, **72**, 681; 1973) where Bronze Age peoples may have been involved in the clearance of pine forests. Pennington (CBA Rept. No. 11, 74; 1975) has described a similar process from the uplands of the Lake District, though there the process began in Neolithic times. Birks (*Phil. Trans. R. Soc. Lond.*, **B270**, 181; 1975) has found that most of the pine stumps in the blanket peats of Scotland predate 4,000 b.p., but here death was frequently found to be due to rising water tables, possibly a consequence of minor climatic fluctuations. In none of the cases examined was it possible to blame man for the death of the trees. In the southern Pennines, on the other hand, Tallis (*Nature*, **256**, 482; 1975) regards the death of at least some of the trees preserved as stumps in the peat to be the result of human forest clearance.

In the case of both spruce and pine it is difficult to unravel the interacting influences of climatic changes and human clearance. It is evident, however, that man's involvement with these needle-bearing conifers began long before the yule log became a component of his culture. □

# Does the Earth's field reverse?

*from Peter J. Smith*

THE magnetic properties of natural lodestone have been familiar for a long time; indeed, the ancient Greeks knew at least 2,000 years ago that lodestone would attract pieces of iron, and by the first century AD the Chinese had invented the compass in the form of a lodestone spoon rotating upon a smooth board. In recent years, however, it has become apparent that even quite common rocks may exhibit magnetic characteristics. The fact that some eruptive rocks possess a natural magnetism much larger than can be acquired in the present geomagnetic field was reported by Arnim (*Ann. Physik*, **5**, 384; 1800) and confirmed by Locke (*Trans. Amer. Phil. Soc.*, **9**, 283; 1846). Fournet (*Ann. Sci. Phys. Nat.*, **11**, 134; 1848) has suggested that such a phenomenon is possible because of the presence in the rocks of magnetite. Unfortunately, this idea does little to explain how rocks can acquire an ordered magnetism; and the role, if any, played by the Earth's magnetic field remains obscure.

The mystery has now deepened with the publication of an article by Broun (*Geol. Rep. R. Soc. Lond. Trans. Sect.*, 24; 1860), who concludes that the direction of magnetism in some rocks may be quite different from that of the geomagnetic field. The rocks in question come from Moocoonoomalley, a granite hill which rises some 800 feet above sea level near Trevandrum in India. Broun has taken several samples from the hill, having previously marked their positions with respect to the geographic coordinates, and has measured their effect on a freely suspended magnet at various orientations.

All the samples studied have determinate magnetic axes with north and south poles at opposing faces. And the magnetic axes are always aligned roughly geographic north-south, suggesting that the magnetism owes more to the effect of the Earth's magnetic field than to any natural divisions or 'lines of crystallisation' in the rocks themselves. But whereas in most of the samples the north magnetic poles were directed towards the true north as expected, in some the north poles pointed south. Broun concludes that in the latter cases "we cannot suppose that the magnetism of the small magnets has been due to the inducing action of the earth in their present position or since the rock mass became solid". There is a clear implication here that these rocks acquired a permanent magnetism before, or as, they cooled from their molten state, presumably under the influence of the Earth's magnetic field.

But could this possibly mean that at some time in the past the Earth's magnetic field pointed in the direction opposite to the present direction, giving rise somehow to rocks with 'reversed' magnetism? Broun is not so bold as to suggest any such thing him-

*de Castro : first discoverer of reversed magnetism?*