Discussion

The exact function of the pineal gland has been in dispute for many years. Our study indicates a clear relation between the pineal gland and sense of direction and suggests that this is true for both humans and animals. We also feel that our work disproves the theory that pineal gland calcification is "physiological." In all other glands calcification is related to disease (adrenal, thyroid, Cowper's, and so on). Commonly this calcification is the result of infection, infarction, haemorrhage, or tumour formation. Of these, infarction of the pineal gland would seem the most likely aetiological cause as the arterial supply via the arteria pinea magna is known to be precarious.

The exact mechanism by which the pineal gland influences directional sense is obscure. It is known that some birds, bees, bacteria, and dolphins have deposits of magnetite, a magnetic oxide of iron, in their bodies. Workers at Manchester University claim to have identified high concentrations of magnetite in man in the bones at the base of the skull around the sphenoid-ethmoid sinus complex. Perhaps an as yet unidentified neural or humoral pathway involving the pineal gland is interrupted when calcification occurs, thus affecting the magnetite response mechanism.

More recently workers at Sussex University (personal communication to NLB) have been using 1-5 tesla magnetic fields in a nuclear magnetic resonance installation in an attempt to influence the polarity of the pineal-magnetite axis in affected subjects. It seems, however, that they have not been successful so far as all their patients have been lost to follow up.

In conclusion, we think that our project has shown that the pineal gland plays a major part in the cerebral process known as sense of direction. Further work, particularly by neurobiochemical groups, is required to elucidate the precise mechanism of this process. We also think that radiological studies and postmortem examinations on schools of whales that beach themselves may well yield further valuable information about the function of the pineal gland in health and disease.

For further comment see below.

References


Pineal gland calcification and defective sense of direction

Comment by referee

Sir,—I have enjoyed reading this paper which purports to discuss the relation between pineal gland calcification and the sense of direction in man and pigeon.

In the human study the authors raise more questions than they answer. Of the three teenage boys misplaced on Dartmoor, for example, the one whose radiograph is shown has clearly lost his head. The explanation for this is not even raised in the discussion. Surely the absence of a sense of direction in these circumstances is of secondary importance? No attention has been given to the different incidence of pineal calcification in east Africa, and a notable omission from an otherwise commendable bibliography is the detailed study carried out by the German expedition of 1894.1

The homing ability of the pigeon is probably questioned less often than the nocturnal sense of direction of the fancier.2 The interpretation of Morning Star's behaviour is therefore open to serious doubt. To be unable to locate Roundhay is one thing but to be unable to avoid Scargill's Delight sounds like carelessness.

I regret that I cannot recommend immediate publication of this important paper but suggest that it should be reserved for the week of 1 April 1986 and the authors encouraged to be patient.