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EDITORIAL.

A MAGNETIC SENSE ORGAN IN DOLPHINS ?

The suggestion that migrating animals (e.g. pigeons) may use the earth's magnetic field as an aid to navigation was made already a century ago (VIGUIER, Rev. Phil. 14: 1; 1882). Attempts to prove this suggestion were unsuccessful for a long time; only during the last decade evidence in favour accumulated rapidly. Meanwhile the nature of the receptor remained unknown. Seminal findings were published by BLAKEMORE (Science 190: 377; 1975), who found that certain "magnetotaxic" bacteria (moving in a preferred direction in weak magnetic fields) contain an iron combination, which, later on, proved to be magnetite ($FeO.Fe_2O_3$). Presumably, it serves the organisms in vertical orientation. The same substance was located in honey bees (GOULD c.s., Science 201: 1026, 1978) and it was made very plausible that it has a sensory function in these insects. The detection of the magnetic receptor in the pigeon, the behaviourly best studied species, followed soon after (WALCOTT c.s., Science 205: 1027; 1979). The organ consists of a small (1 - 2 mm) pocket of tissue, rich in nerves and containing a host of elongated magnetite particles. It is located unilaterally between the dura mater and the skull.
According to a report of the Spring Meeting of the American Geophysical Union (Eos 61: 538, 1980) the dolphin can now be added to the list.
M. FULLER, J. DUNN and J. ZOEGER presented a paper announcing that they had found magnetic material in four out of five dolphin heads (the fifth was in too bad condition for successful dissection). Following a technique which was also used in the earlier studies on bees and pigeons, the researchers placed sections of the heads in a magnetometer, an instrument widely used by geologists and sensitive enough to detect very weak magnetic fields. The source of magnetism could be accurately located by repeatedly subsampling the sections. With some variation among individuals the site was unilateral, to the left and slightly caudal of the centre of the skull. The material, at least partly magnetite, appeared to be present in a thin sheet of about 1 mm^2 in the dura mater. The latter was highly innervated in this region.
Contrary to pigeons, there are no indications, nor experiments suggesting that the dolphin is able to sense the geomagnetic field. However, the similarity of the supposed receptor in both species is appealing. (It should be added that alternative or additional receptors have been found in migrating birds by PRESTI and PETTIGREW, Nature 285: 99; 1980). The next step should be to test the dolphin's sensitivity to a magnetic field. Such experiments are promising. In birds this sense has proved to be amazingly sensitive and till now there is no reason why in dolphins, if it is present at all, its capacity would be less. Moreover, as explained by MOORE (Nature 285: 69; 1980), the earth's magnetic fiels contains directional *and* positional information; there are indications that the latter supplies a "map" to migrating birds. Such an acquisition seems highly usesul also for dolphins.

-A.D./ed.