helps to produce extinction and an ACTH-induced increment in arousal might therefore be expected to shorten extinction of a positively reinforced response while prolonging the extinction of avoidance behaviour.

Dr Gray has provided further evidence that ACTH attenuates the emotional responsiveness of an animal as measured by positively reinforced responses. Tranquillisers such as sodium amylobarbitone seem to produce the same behavioural effects during the extinction of these responses as exogenous ACTH. Furthermore, Dr Gray has shown that the ACTH 4-10 fragment increases the threshold for driving a specific electrical rhythm of the hippocampus (the theta rhythm) from the septum in the same manner as sodium amylobarbitone. Previous Oxford work has implicated this system in the mediation of the behavioural effects of nonreward.

A second pituitary hormone with interesting behavioural effects is vasopressin. The Utrecht group has shown that this neuropeptide and its analogues without antidiuretic or pressor action have effects similar to those of ACTH on avoidance behaviour. They differ from ACTH in having an influence which lasts longer than their presence in the body. Dr Bohus suggested that vasopressin influences memory processes by affecting the consolidation or retrieval of learned responses. Using a passive avoidance task in which rats learned to suppress a response in one trial, he reported that animals with a lack of vasopressin through hereditary hypothalamic diabetes insipidus showed good retention if tested immediately after training but not if testing was delayed for three or twenty-four hours. If registration and storage-retrieval processes really can be distinguished using this neuropeptide, it may provide a powerful tool in the analysis of learning and memory.

In the study of the pituitary neuropeptides, psychological theory meets fruitfully with the other neurosciences. The effects of exogenous ACTH on the performance of learned tasks, effects which do not fit easily into the current behavioural analyses of these tasks, provide an important guide for revising both behavioural theories and concepts about the sites and modes of action of neuropeptides in the CNS.

Chilling statistics on Cyprus

from Peter J. Smith

THE sheeted diabase unit of the Troodos complex in Cyprus is a complicated geological feature whose stratigraphically central section is formed completely of dykes intruding other dykes. The unit as a whole has an exposure in the east–west direction of more than 70 km, although the individual dykes, which generally strike north–south, range in width from a few metres to only a few centimetres. The periods between dyke injections were apparently sufficient to allow the previous dykes to cool, so that each new dyke was chilled against those into which it was intruded and thus has finer-grained or cryptocrystalline margins. But as many of the dykes are intruded by later ones, they may have been split several times, forming apparently marginless dykes which are in reality merely the central parts of once complete intrusions. And if that is not enough to cause confusion, some dykes intruded up the margins of previous dykes, so that the later dykes were chilled against the chilled margins of the earlier ones.

What is the origin of this remarkable structure? The answer to that question would be interesting enough if the diabase unit were only of purely local significance. But the Troodos complex is, of course, an ophiolite suite comprising ultramafics, gabbro, sheeted dykes, pillow lavas and deep sea sediments—a feature widely believed to represent ancient ocean floor. If the origin of the diabase unit could be determined, the result would give by implication the origin of the whole interrelated complex; and geologists would be sure at last whether or not they could claim access to ocean floor without the need for deep ocean diving.

The answer most geologists would welcome would be proof that the diabase dykes were injected at, or close to, an oceanic spreading axis. But as Kidd and Cann (*Earth planet. Sci. Lett.*, **24**, 151; 1974) point out, a structure composed entirely of dykes could be produced in two other ways—by random injection throughout the whole structure (that is, with a zone of intrusion much wider than that implied by seafloor spreading) or by the coalescence of dyke swarms from individual volcanoes.

Fortunately, however, the three models do not predict the same detailed dyke swarm structure. Consider the case of ideal seafloor spreading, in which the width of the zone of intrusion is infinitely small and in which each new dyke intrudes up the centre of the preceding one. On either side of the intrusion zone the oceanic crust will comprise entirely half-dykes, each having a chilled margin on the side away from the intrusion zone. In other words, on each side of the intrusion zone the magnetic vectors within the chilled margins will all lie in the same direction (they will be all 'one way') and the degree of 'one way chilling' will be 100%.

A hundred years ago

THE *Kölnische Zeitung* of Feb. 7 contains an abstract of a paper read by M. G. Wex, at the Geographical Society of Vienna, on the decrease of water in rivers and sources. The author states that the results of his observations tend to show the constant decrease of the rivers of Germany and the increase of seas. It appears from them that the levels of the German rivers are now much lower than they were fifty years ago; viz., the Elbe 17 in., the Rhine 24.8 in., the Oder 17 in., the Vistula 26 in., the Danube 55 in. As a reason for this decrease, the author gives the progressing devastation of forests, which causes a decrease in the atmospheric moisture they attract and convey to the soil and thence to sources.
from *Nature*, **11**, 314; February 18, 1875

In any real spreading system, complete 'one-way chilling' will never be achieved because the intrusion zone will have a finite width and the splitting of previous dykes will not be as regular as in the ideal case. Nevertheless, as long as the intrusion zone is not too wide, some of the dykes will have been intruded close enough to the centre of injection for them to have been split by subsequent injections; and in such a case the degree of one way chilling, though far from 100%, should be significantly greater than zero. It is this statistical point which should enable the seafloor spreading model to be differentiated from the other two. Where intrusion takes place throughout the whole dyke region or where it is derived from several discrete volcanic centres, there is no single effective centre of injection and thus presumably no bias in the chilled margin directions.

Kidd and Cann have now applied these ideas by taking a number of well exposed and widely scattered sections within the Troodos dyke unit and measuring the directions of chilling of an odd number of margins within each section. Because the number of chilled margins within each section is always odd, there is bound to be an excess of margins in one direction or the other (east or west in this case because the margins trend north–south). But whereas the seafloor spreading model would predict a significantly greater number of sections with an excess in one direction rather than the other (the one direction being that away from the spreading centre), the two other models would predict no such imbalance.