

effects of temperature and organic supplements on mixed cultures growing on a sulphate-wood dust containing medium were examined. Both the rate and initiation of sulphate reduction were controlled by the rate of digestion of wood dust and there were different optimum conditions for the two activities. Wood degradation had a higher optimum temperature, for example, while the excessive addition of organic substrates lessened the rate of reduction of sulphate. The latter effect itself is complex; for example, it may result from an inhibition of cellulose breakdown and/or from the stimulation of micro-organisms that compete for nutrients with the sulphate reducers. Although further research is needed to define precisely the conditions which might give a reasonable steady state of sulphate reduction in field conditions, Tuttle's group considers that various waste carbon materials as well as wood dust—for example, sewage, waste paper, agricultural wastes—might be used in the conversion. Then acid pollution control might be combined with solid waste disposal and the recovery of FeS or elemental sulphur.

WHALE TAXONOMY

Beaked Whales Reclassified

NEW diagnoses to help in the identification of the living species of beaked and bottle-nosed whales have now been provided by Dr J. C. Moore, Curator of Mammals in the Field Museum of Natural History, Chicago (*Fieldiana: Zoology*, **53** (4); December 1968). The beaked whale superfamily, usually named Ziphiidae but called Hyperoodontoidea by Dr Moore, is a little known yet interesting group of whales with little or no commercial value. Beaked whales are all comparatively small—the adults range in length from 4.5 to 13 metres—and have a narrow rostrum produced anteriorly like a dolphin's beak. The flippers are small and the dorsal fin is set well back on the body. Other diagnostic features include a single crescentic blow-hole and a stomach divided into as many as nine to fourteen compartments. Young beaked whales appear toothless but, later, one pair (in *Hyperoodon*, *Ziphius* and *Mesoplodon*) or two pairs (in *Berardius*) of large functional teeth appear in the lower jaw of the male. The exception is *Tasmacetus*, the Tasman whale, which, in addition to having one pair of large teeth in the lower jaw, has rows of small functional teeth (about forty-eight pairs) in both upper and lower jaws. Some of the other genera have rows of very small teeth but these are entirely non-functional.

Dr Moore has based his classification, diagnoses and keys of the eighteen living species on the characters of 292 skulls in forty museums all over the world. He has compared the number, position, size and shape of the teeth, the structure of the alveoli of the teeth, the morphology of the premaxillary crest, and the shape of the nasal bones. Because of the scarcity of vertebrae of beaked whales, he has used the closure of the pulp cavity at the base of the tooth as a criterion of adulthood instead of the obliteration of the epiphyseal sutures in the vertebral column as is usually the practice among mammalogists.

In his classification, Dr Moore recognizes several new categories. The tribe Ziphiini includes the genera *Berardius* and *Ziphius*; and the tribe Hyperoodontini

includes the genera *Tasmacetus*, *Indopacetus*, *Hyperoodon*, and *Mesoplodon*. The subtribes Berardiina and Ziphiina contain their respective genera *Berardius* and *Ziphius*; Tasmacetina includes *Tasmacetus*; and Hyperoodontina includes the genera *Hyperoodon* and *Mesoplodon*. The two species of *Hyperoodon* are considered by Dr Moore to be so distinct from one another that he has raised them to subgeneric level, and the name he makes for this is *Hyperoodon* (*Frasercetetus*) *planifrons*. He also presents a preliminary classification for *Mesoplodon* in which the species *pacificus* is removed from *Mesoplodon* and is renamed *Indopacetus*, a new genus with subtribal status to indicate the degree of its distinction from Hyperoodontina. He thus disagrees with other opinions that the species, known only from one specimen, is a female *Hyperoodon planifrons*.

PHARMACOLOGY

Transmitters and Antagonists

from a Correspondent

PHARMACOLOGY is not a precisely defined field: the communications at the meeting of the British Pharmacological Society in London last week came from very diverse sources, including departments of pharmacology, physiology and psychology. Not surprisingly, quality varied—from highly stimulating, when disciplines had been successfully fused, to pedestrian. Most of the demonstrations had been carefully prepared, and it was good to see several "live" as well as cardboard displays.

Several of the main streams of pharmacology were represented: for example, the study of naturally occurring compounds, particularly substances which may act as transmitters in the central nervous system. J. F. Mitchell, M. J. Neal and V. Srinivasan (University of Cambridge) have studied a group of amino-acids in this context. They loaded slices of cerebral cortex with tritiated amino-acid, and determined the effect of electrical stimulation on the efflux of each amino-acid; the two which were most affected—both were increased—were glutamic acid and γ -amino-butyric acid (GABA). These are respectively the most potent excitatory and inhibitory amino-acids as judged by their electrophysiological effects.

Another important question concerns the removal of transmitters from their site of action. L. L. Iversen and Neal showed recently that there is an uptake mechanism in cortex slices for tritiated GABA (reminiscent of the re-uptake mechanism for catecholamines in peripheral tissues). In the spinal cord there are many indications that glycine may be an inhibitory transmitter, and Neal described results concerning an uptake mechanism for glycine by slices of rat spinal cord, which suggest that here also re-uptake might be important in terminating transmitter action. Iversen and Neal described elegant density gradient centrifugation experiments which showed that exogenous GABA, once taken up, has the same subcellular distribution as endogenous GABA. About 40 per cent was present in a synaptosome fraction (more was present originally, some being lost in the preparative process). Further, glutamic decarboxylase activity was also associated with the synaptosomes, suggesting that synthesis might be associated with the same function involved in storage.