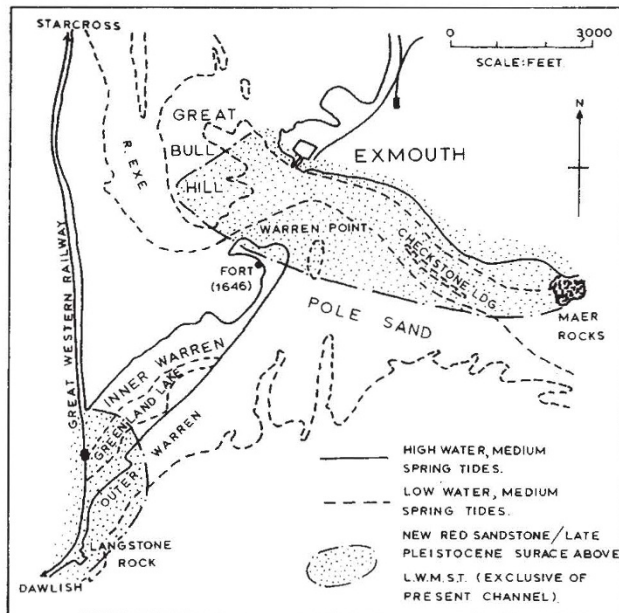


Dawlish Warren

from a Correspondent

DAWLISH WARREN at the mouth of the River Exe in South Devon is one of several places on the coast of Britain which is being seriously eroded. The Warren is a structure which extends from the western shore and runs eastwards across the mouth of the Exe, and it consists of two ridges of low sand hills, known as the Inner and Outer Warrens which are separated by a dry low-lying area called the Greenland Lake. Periodically, however, the line of the Outer or seaward Warren is broken, such occasions occurring when a high spring tide coincides with a south-easterly gale. Since 1787 much of the Outer Warren has been removed by erosion. A considerable area formerly covered by the Outer Warren is still, however, represented by a great expanse of sandbanks which extend for some 300 m (1,000 ft.) to the seaward of the present-day high-water level. These sandbanks link to the east with an even more extensive bank known as the Pole Sand. Similarly, on the landward side of the Warren the course of



The extent of Dawlish Warren and the area of New Red Sandstone breccia and Late Pleistocene gravels above the level of low water of medium spring tides.

the River Exe is restricted by banks of mud, sand and gravel, the largest of which is the Great Bull Hill. There have been several theories as to the sedimentary history of the Warren. E. M. Durrance of the Department of Geology, University of Exeter, has done some detailed seismic studies on the thickness of recent sediments infilling the buried channel of the Exe on both the Warren and the intertidal banks. The results of the survey indicate that Dawlish Warren is a far more complex structure than has previously been thought, and they provide clues both to its origin and to its future history. A platform of New Red Sandstone breccia slopes from its outcrop at low-water level in the south-west to a depth of -23 m (-75 ft) in the north-east, and is deeply cut down to -45 m (-150 ft)

by a number of channels running north-west to south-east across it. These channels have been later infilled with Late Pleistocene (Middle Weichselian) gravels and re-channelled to depths about -30 m (-100 ft). The surface of the subsequent composite New Red Sandstone breccia and Late Pleistocene gravel was then inundated by the Flandrian transgression and was submerged to various depths. In the west, near Langstone Rock, and in the east, in an area extending from Warren Point to Exmouth, this surface is at a level above low water of ordinary spring tides and it appears to have acted as a trap for a coarse pebble layer soon after its submerging. On rising above high-water level, possibly as a result of deposition during periods of high flood water, this pebble layer appears in turn to have acted as a trap for wind-blown sand. Durrance thinks, therefore, that the growth of the Warren began from these two nuclei simply by the accretion of pebbles and wind-blown sand, with possibly very little net lateral movement of sediment taking place.

Between the two high level areas of Langstone Rock and Warren Point, the intervening New Red Sandstone-Late Pleistocene surface is at a depth, exclusive of channels, of -14 m (-45 ft). During historical times this area seems to have been occupied by the main channel of the River Exe. Exmouth fort, dated 1646 and marked by the Ordnance Survey as being situated on the south-west shore of Warren Point, would have been in an ideal position for the command of a channel opening to the west of the present mouth of the Exe.

The present course of the Exe between Warren Point and Exmouth occupied a channel cut through the New Red Sandstone-Late Pleistocene surface, both divisions outcropping above low-water level of ordinary spring tides in the Pole Sand and Checkstone Ledge, and covered by only a thin veneer of dry wind-blown sand on the Exmouth shore. This suggests to Dr Durrance that the present channel, with an average depth of only 4 m (12 ft) at low water of ordinary spring tides, occupies an unstable position and of very recent origin. This agrees with R. Polwhele's observation in 1797 (*The History of Devonshire*).

Well-bred Animals

THE Laboratory Animals Centre at Carshalton, Surrey, has as healthy a set of animals as anybody could hope to find. The centre has a record to be proud of; not only does it have the largest collection of inbred strains in the world, but it was also the first centre of its kind to be established.

The twenty or so species of animals at present held in the centre include rats, mice, cats, Libyan gerbils, Chinese hamsters, sheep and goats. These are invaluable in experiments conducted both in Great Britain and abroad (*Nature*, 218, 519). Within the foreseeable future it is expected that reptiles, amphibia and fish will be added to the list as their experimental use grows.

The concept of having to use stray animals in experiments is now just about as obsolete as the earlier practice of stealing cadavers from graveyards for anatomical investigations. As Mr J. Bleby, director of the centre, pointed out, it is mainly the hospitals and universities that continue to use stray animals for their experiments, claiming that they cannot afford