

scour is greatest. At this point, therefore, special precautions in design have to be taken.

With regard to the determination of the height of groynes, their purpose and situation have to be carefully studied. The classic instance of defence of a low-lying sea frontage is that of Romney Marsh. From points of vantage in the town of Rye, the vast expanse of this marsh, dotted with cattle and sheep, may be realized. The low-lying area is about 60,000 acres, much of it 10 or 11 feet below high water. The severest seas strike from the south-east, as Dungeness affords shelter from the south-west. The marsh includes some of the fattest pasturage in England, and measures for defending it go back to Roman days. About a hundred years ago, Sir John Rennie advised on a system of groyning carried out with brushwood held in position by hop poles. Thereafter the bank appears to have been neglected and left very much to chance conditions.

At the commencement of the Victorian era, a new *régime* of defence was inaugurated, the sea slopes being paved with stone pitching laid on concrete, the lower slopes at a gradient of 1 in 9, the upper at 1 in 7. As far as practicable, the stonework was flushed with cement. This system was followed by pronounced erosion, heavy storms in 1859 and 1869 tearing out great areas of the stone pitching, an effect induced by the action of underwater scour, set up by the recoil from the paved foreshore, or that described by Captain Calver as "scavenging".

During the next twenty years, a sum of nearly £70,000 was expended on patching the foreshore, but on the appointment of the late Mr. Case as expeditor its condition had grown serious, as in the year of his appointment areas of over 8 acres of stone pitching were scoured out. Heavy groyning was recommended, but Mr. Case eventually carried through a complete system of low groyning. The timber scantlings he adopted, though of an unusually flimsy description, proved effective. He embedded the groyne uprights in concrete pits sunk in the foreshore. He thus built 420 groynes, and sometimes completed a groyne in the day. The result of the system he adopted has been the preservation of this dangerous coast-line, and the accumulation