

RECLAMATION OF TIDAL FLATS

known as indicator plants, and they act in the capacity of a soil chemist. When they start to come in and grow on reclaimed areas it is an indication that the soil is becoming sweeter through the salt content diminishing.

Sea aster (*Aster subulatus*) is the first indicator plant which makes its appearance. It is an annual with quite smooth stems and leaves free from hairs. The plant seldom reaches more than 3ft. in height. The lower leaves may be up to 8in. long and $\frac{3}{4}$ in. wide, slightly fleshy and smooth to the touch, becoming thin when dry. The margins of the leaves may be somewhat wavy, but lack distinct teeth. The upper leaves are shorter and very narrow, widest near the bases. The branched inflorescence is more spreading and open than that of fleabane. The flower heads are purplish in the centre, and the white rays are usually more distinct than in the fleabane. Sea aster will rapidly become general over the reclaimed area as soon as the salt content of the surface soil is slightly reduced. This plant definitely indicates that the salt is commencing to go from the soil, but it is not in a fit condition to prepare for permanent pasture until fleabane (*Erigeron canadensis*) commences growth and begins to replace sea aster.

Fleabane (*Erigeron canadensis*) is an annual, with erect, rather wand-like, finely-grooved, bristly-hairy stems. On good soil it may reach a height of 10ft., but on poor soil may flower when only a few inches high. When cut, it stools freely, assuming a bushy habit. The lower leaves are



Cracking which takes place on sandy loam areas after tide water has been shut off by stopbanking. These areas are easy to drain and are in a condition for grassing 2 to 3 years after stopbanking.

about 3in. long and up to $\frac{3}{4}$ in wide, the widest part being above the middle. They are rough to the touch, owing to the bristle-like hairs, and usually show several distinct, distant teeth along the margins. The upper leaves are much narrower, usually

lacking teeth, and produced in abundance. The flower heads are very small and numerous, more or less clustered on branching stems from among the upper leaves. Small white rays in the flowers can be seen only on very close inspection. Fleabane is often known as horse-weed, butter-weed, fire-weed, or bitter-weed, but is generally known as fleabane. It is rejected by stock, and can be classed as a harmless weed. The leaves are bitter and the plant is objectionable if occurring in any quantity of hay. On reclaimed areas in the process of sweetening it grows on the higher parts, and does not invade the flats till the salt content has considerably decreased. As the sweetening process proceeds fleabane comes in first along the edges of drains, on drain banks and stopbanks, and gradually invades the lower areas. Fleabane does not become general until the land is well enough drained and free from salt to take grass well. When the area reclaimed reaches this stage, and fleabane has practically taken charge, preparation may commence for sowing permanent grass, but it is a mistake to make any attempts at grassing until this stage is reached.

Cultivation

Considerable areas of reclaimed flats have been grassed satisfactorily after surface cultivation. This applies especially to soil types which come under the heading of sand and sandy loams. Even although fairly successful pasture can be established after



Severe cracking which takes place on the heavy clay areas when they begin to dry out. These areas are difficult to cultivate and are not in a condition for grassing until 8 to 10 years after stopbanking and drainage by an underground system.