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"CLAYPANS" IN THE NORTH-WEST SPINIFEX AREAS

Their Origin and Reclamation

By H. SUIJDENDORP, B.Sc. (Agric.), Agricultural Adviser.

C"LAYPANS" are common in the spinifex areas of our North-West, particularly on stations near the coast. Many are increasing in area owing to wind erosion but some reclamation is possible by suitable furrowing and surface roughening. In this article the term "claypans" is used in referring to areas where the topsoil has been blown away and the bare subsoil is left. In many cases this subsoil contains a considerable percentage of clay.

Overgrazing or droughts, or possibly a combination of these factors originally caused denudation of useful grassy plains in the North-West. Wherever invading masses of cold air from the ocean meet the masses of hot air over the land, small whirlwinds (so called "willy-willies") are formed which travel along the cold front. These willy-willies blow away the topsoil on the denuded areas and the first small claypans make their appearance. Successive willy-willies cause the claypans to increase in size so that they often join up with one another and this process persists until eventually claypans up to 25 square

miles in area are encountered. Once a claypan has spread over a few hundred acres it is big enough to heat the air mass above it and the heated air will produce willy-willies where it meets the surrounding cooler air so that the erosion continues with ever-increasing rapidity.

Most claypans are impervious to water, and any rain that falls on them must either run off or evaporate from the surface. In the first case, where the land is sloping, extensive gully erosion will result. In the second case, salts deposited by the rain are left behind when the water evaporates and these salts accumulate

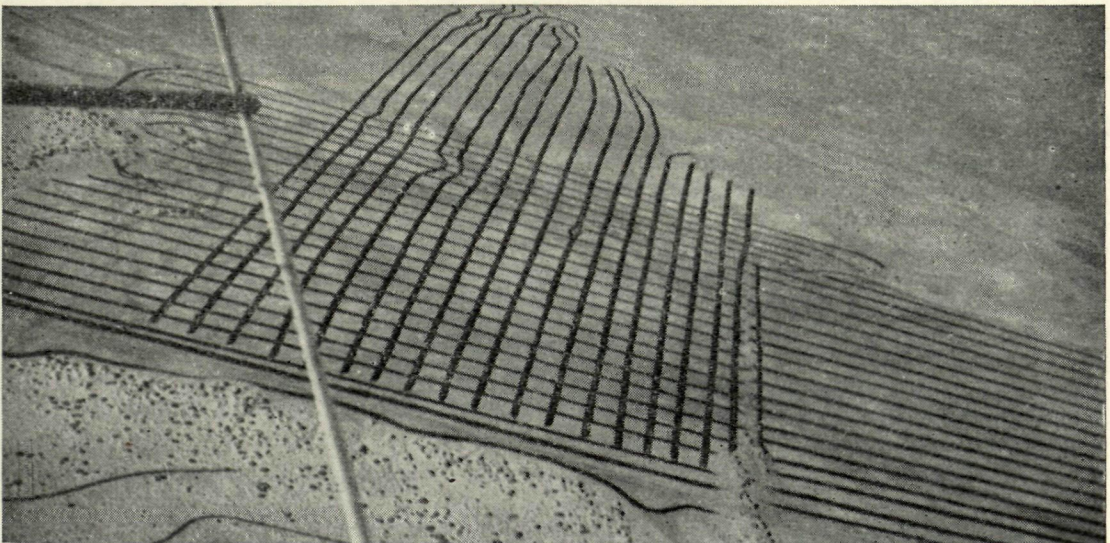


Fig. 1.—An aerial photograph showing checkerboard furrows on claypan country at Mundabullangana Station.

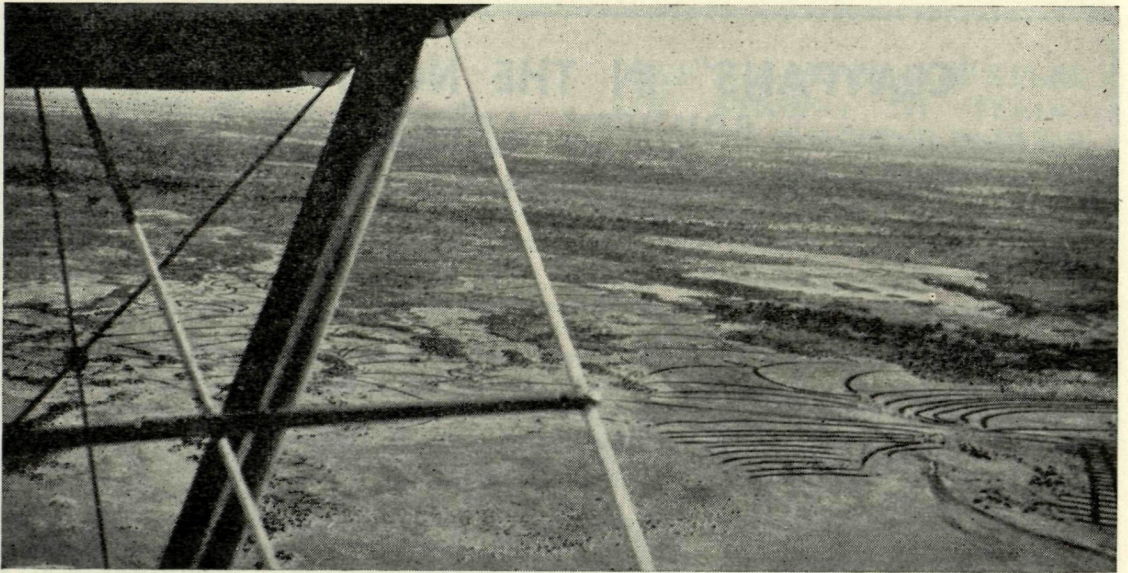


Fig. 2.—Contour furrows on sloping country.

year after year. Some soil samples from the claypans contained as much as 3 per cent. of total salts, two-thirds of which was sodium chloride (common salt). When it is realised that 0.25 per cent. of salt in the surface layers of the soil is toxic to the growth of many plants, the disastrous nature of this tendency is readily apparent.

RECLAMATION

It has often been asked whether reclamation is either necessary or economical where such large areas of land with a low carrying capacity are involved.

It must be remembered that the claypans often appear in the best tracts of country, i.e., the grassy plains, as spinifex* is more resistant to overgrazing. Also, holding paddocks near shearing sheds often suffer from the development of claypans as overgrazing is more likely to occur there. As available forage diminishes in quantity, overgrazing increases and claypan formation is speeded up. Soon the property becomes unmanageable with bare holding paddocks, and eventually the entire property will be affected. There is evidence that some claypans are being re-

claimed voluntarily by buffel grass (*Cenchrus ciliaris*). It emerges from the spinifex on the banks of the claypans and builds up new topsoil by catching and stabilising windblown soil among the tussocks. This process is very slow however and some assistance by mechanical means is necessary.

SURFACE ROUGHENING IMPORTANT

In principle all the reclamation methods aim to achieve one purpose. The object is to slow down wind velocity at the surface and so induce windborne soil and seed to settle. Consequently, the rougher and more uneven the surface is left the better it will achieve this purpose.

Ploughing up the entire area involved would seem to be the logical answer but, due to the large acreages carrying claypans, such a remedy would be too time-consuming and expensive. A compromise method is to treat the surface by breaking it up in a checkerboard pattern leaving a considerable portion of the surface untreated. Where the surface slopes, a system of contour furrows would be more suitable.

IMPLEMENTS TO USE

In 1952 and 1953 reclamation was attempted at Mundabullangana Station using both Departmental and Station

*The various species of *Triodia*, which are generally called "spinifex," are actually grasses, speaking botanically, but in general parlance are generally considered distinct because of their growth habit and spiny nature.

plant. In 1953, Departmental plant was also used to treat some 200 acres at Muccan Station.

Systems of checkerboard and contour furrows were put in using different implements. Each implement has its merits under different conditions.

The implements used are listed here—under together with remarks as to their suitability under different conditions.

1. **A three-furrow mouldboard plough** was used in double runs (in opposite directions). This throws up a fair-sized bank with a furrow at either side. This practice is useful on salty soils as the salts leach out and eventually grasses become established.

2. **A single-furrow mouldboard plough** on single runs only. This seems to be the most useful general purpose implement but is not so suitable for coping with salty conditions.

3. **A tyne cultivator.**—This implement is very useful in the initial stages of claypan formation as it covers a much larger area than other implements in the same operating time. It is less satisfactory where soil is flooded during wet weather as the furrows wash out easily.

4. **A single-tyned ripper.** This implement is very useful on hard soils and

leaves the soil in a desirable, rough, cloddy condition. Furrows fill up easily however and flatten out wherever water runs.

CONCLUSIONS

Work done with the three-furrow and single-furrow mouldboard ploughs will usually stand up to several wet seasons without washing out particularly, but spectacular results should not be expected in one season.

On old-established claypans, four stages of reclamation can be recognised:—

(a) Leaching of salts from banks. Little vegetation.

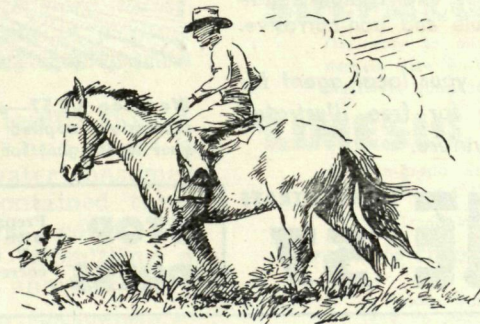
(b) Establishment of annuals, mainly Button grass (*Dactyloctenium radulans*).

(c) Establishment of perennials, mainly Buffel grass (*Cenchrus ciliaris*).

(d) Spreading of perennials from banks and furrows, build up topsoil in the process.

Each of these stages may take one or more years depending on the seasons. On the other hand, on newly formed claypans, some stages do not show up or are combined.

Work already undertaken indicates that the reclamation of claypans is well within the limits of practicability.





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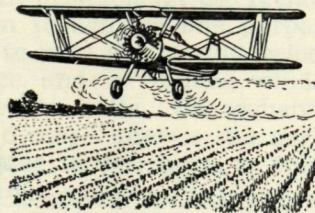
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