BRIEF COMMUNICATION

VEGETATION APPARENTLY RECORDING FORMER EXTENSIONS OF A PALEOSOL

An explanation involving former extensions of a paleosol is proposed for enigmatic vegetation distribution near Whyalla, South Australia, and attention is drawn to expectations that recent land clearing in the area will result in the emergence of more evidence.

We refer to South Australian Geological Atlas 1 mile series map 773 zone 5 (Cultana) showing the Simmens Plateau between Black and Stony Points near Whyalla.[1] The Mumbalo with patches of Wonga pedoderm is the main surface of uplands, flanks and plains.[2] This surface carries mainly treeless saltbush-bluebush shrubland in the region specified. Superimposed on this landscape are more or less parallel elongate tracts of red siliceous sand running NNW-SSE across general contours (Fig. 1a). The Cultana map codes and describes them *Qs*, fixed desert seif dunes and associated sandspread with Kunkar developed as B zones in the soil profile[1]. We think they are equivalent to Holocene aeolian sands over Peebinga paleosol discussed by Firman (p. 95).[3]

Each of these sand patches shows clearly on airphotographs due to matching canopy-cover of *Eucalyptus socialis* mallee, of which the associated shrub flora (e.g. *Cratystylis conocephala, Westringia rigidia, Olearia pimelioides*) is restricted to *Qs* and adjoining coastal fringe *Qe*. Nowhere in the region can seedling or juvenile *E. socialis* presently be found. On the other hand, excepting the enigmatic instance discussed below, the precise restriction of *E. socialis* to *Qs*, in the area, implies that the sands offer the only local situation in which *E. socialis* seedlings can establish, when they do appear.

Interposed in this scene is a further *E. socialis* band with the same NNW-SSE trend but on Mumbalo pedoderm not *Qs*, and thus overtly out of typical habitat (Fig. 1b). It is exceedingly wind-pruned and shrubby, lacks its usual associates, and has lignotubers not markedly elevated.

Our interpretation is that this *E. socialis* patch records the distribution of a former shallow *Qs* tract now removed by wind. The basic idea applying to the region as a whole is that *E. socialis* requires unoccupied *Qs* sand for seedlings, but that once established it copes without further dependence on sand or seedlings, for the lifespan of its lignotubers. There are sound botanical reasons to believe that lignotubers, which carry successive generations of "trees", can live for many centuries, if not indefinitely. Calculations as to the antiquity just of old

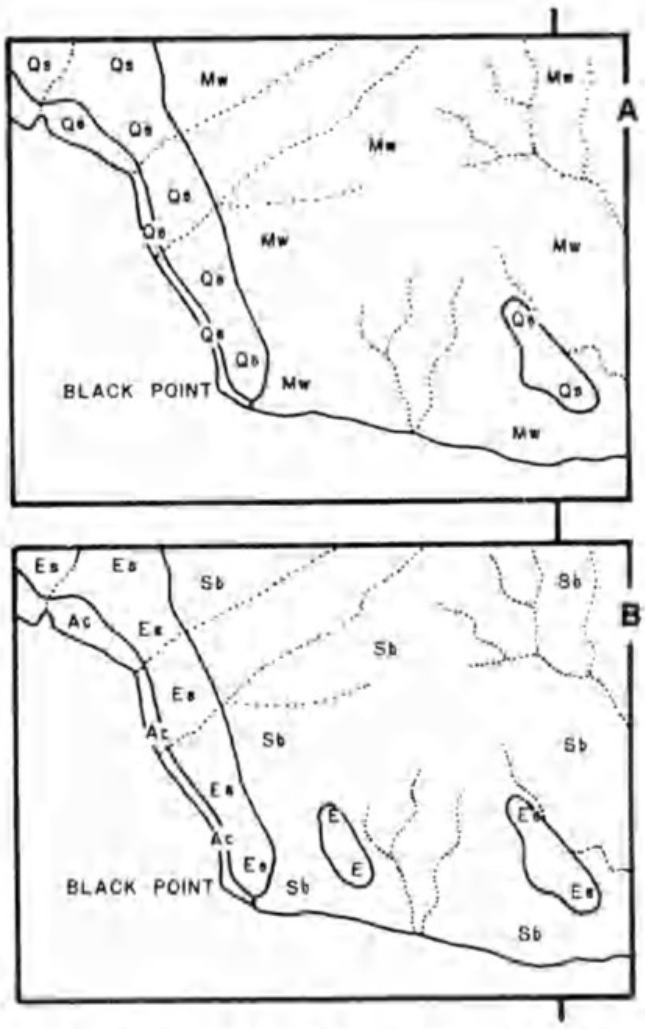

Fig. 1(a) edaphic layout **Qs** = red sand; **Mw** = Mumbalo pedoderm with Wonga patches; **Qe** = emerged beach deposits; (b) vegetation layout **Es** = *E. socialis* mallee with associates, **E** = *E. socialis* mallee without associates; **Sb** = saltbush-bluebush low shrubland; **Ac** = arid coastal scrub. Scale: chartwidth 5 km. Location: vertical checkmarks 137°45'E, lower margin 33°S.

stem scars upon some lignotubers in this area, based on fragmentary data about growth and decay rates, suggest 300 years or more for the stem scars alone; the subtending lignotubers thus are much older by at least the age of present replacement stems. That longevity permits the species to persist, outlining the former extent of its sand seedbed, long after the sand and the opportunity to establish seedlings may have been removed.

An opportunity to learn more about the situation now offers. Late in 1981, an Access Corridor

180 m wide was constructed through the main local *E. socialis* tract, completely devegetating the *Qs* sands in its path. This sets up botanically-important alternative outcomes to be observed as time passes. One is that *E. socialis* seedlings might volunteer on the cleared sand. That would suggest that their absence from existing tracts is due to full adult occupancy. It would also establish that climate allowing original takeover to the *Qs* by *E. socialis*, earlier in the Holocene, need have been no wetter than now. Alternatively, *E. socialis* seedlings might not volunteer on the clearing. That would suggest the original takeover was under climate more pluvial than now, since seed-sources could not be closer than at present. Local trees produce much seed and tests show it is highly viable.

The out-of-context *E. socialis* patch is important because it re-emphasizes that historical not contemporary edaphics explain some current vegetation distributions, and because it shows that adult presence of a species on a particular soil type may not necessarily mean that its seedlings can now volunteer on that soil. There are many enigmatic instances in the Whyalla region of plants out of typical edaphic context, for instance *E. brachycalyx* near Barbours Dam on Middleback Station, in western myall-saltbush-bluebush association. We suspect its explanation is allied to the present case.

[1]**South Australia. Dept. Mines and Energy** (1964). Geological Atlas 1 Mile Series Map No. 773 Zone 5 Cultana.

[2]**Jessup, R. W. & Wright, M. J.** (1971). Geoderma 6, 275-308.

[3]**Firman, J. B.** (1981). S. Aust. Dept. Mines and Energy Rept Bk No. 81/40.

ROBERT T. LANGE and KYM P. NICOLSON, Department of Botany, University of Adelaide, Box 498, G.P.O., Adelaide, S. Aust. 5001.