Finally, the verges may act as 'corridors' for animals to pass from one small patch of remnant vegetation to another. Many of the remnants seem to be too small to maintain self-sustaining, viable populations of vertebrates. Migration through corridors allows some mixing, and so prevents stagnation of an isolated small gene pool.

A survey of roadside verges by Dr Graeme Arnold, working with Dr Hobbs, and Dr David Algar of the University of Western Australia has shown that, while many non-native animal species use the verges, our native echidnas, western grey kangaroos, and euros do too, presumably to move between the fragmented reserves. Further studies, using radio-tracking, are planned to confirm this.

The scientists' observations so far suggest that, apart from their possible use as corridors, narrow verges are too small to be of use *per se* in the conservation of small native mammals, but they do have considerable value for small birds. The researchers recorded a total of 41 species of birds in the verges over a 6-week period, although many of these were seen only once or twice in one or two sites.

The verges' importance to birds lies in providing shelter for the smaller ones and also, when native plants are flowering, a food source for many species. Dr Denis Saunders, also of the Division, is carrying out further work to assess the extent of the use of roadside vegetation by birds moving from one reserve to another.

One of the main aims in studying patches of remnant vegetation is to enable us to better manage them as conservation areas. If we can find out more about why some communities are more 'invasible' than others, we may be able to implement ideas that will help in the preservation of the native flora, which in turn will be important for the survival of the West's native animals.

Roger Beckmann

The effect of disturbance and nutrient addition on native and introduced annuals in plant communities in the Western Australian wheatbelt. R.J. Hobbs and L. Atkins. *Australian Journal of Ecology*, 1987 (in press).

What size electrostatic precipitator?

Electrostatic precipitators allow power stations to burn coal while emitting scarcely any fly-ash out of their chimneys. Modern units can catch more than 99% of the fly-ash as they electrically charge the particles and pull them out of the smoke stream towards earthed metal plates.

A problem, though, that has perplexed designers of electrostatic precipitators for many years is to know how big to build the unit. If it's too small, statutory emission limits are violated; too big, and unnecessary cost (we're talking millions of dollars) is incurred.

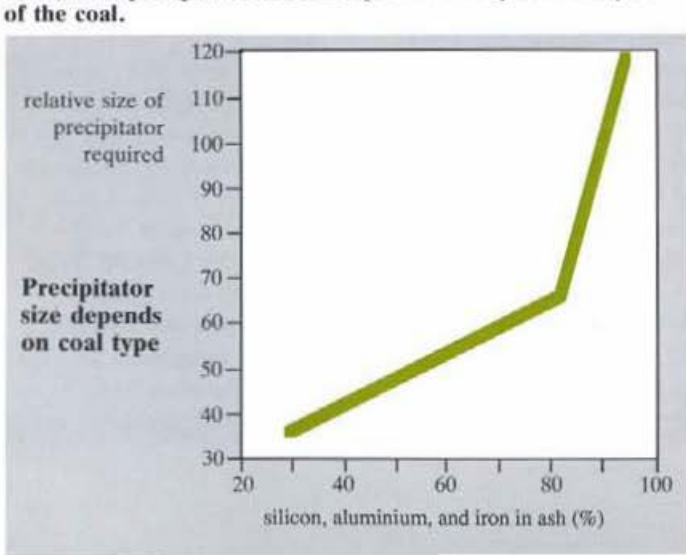
The difficulty relates to the many variables involved in the operational efficiency of an electrostatic precipitator. It all depends on the chemical and physical properties of the fly-ash, its amount, and the degree of removal required. For identical performance, units may differ in size by a factor of seven to accommodate different kinds of coal.

Precipitator designers have often had to rely on a more-or-less satisfactory blend of past experience and intuition. Fortunately, they have been helped by research at the CSIRO Division of Fossil Fuels, where Dr Edmund Potter and colleagues have investigated the principles governing precipitator performance. And, since 1969, the researchers have used a combustion rig at the Division to measure the ease of precipitating fly-ash from different types of coal.

Now the researchers have discovered that they can make the task of sizing a precipitator much easier. After burning some 33 eastern Australian steam coals in the test rig, they have found a simple formula that relates the size requirement of a precipitator to readily measured constituents of the coal.

As the graph shows, the size of the precipitator required depends very closely on the total quantity of silicon, aluminium, and iron present in the ash — figures that can be obtained by routine chemical analysis. The correlation is sufficiently good that calculations based on it yield precipitator sizes accurate to within 10 per cent — quite adequate for practical use, bearing in mind the operational fluctuations that all precipitators experience.

The two straight lines, derived from tests on dozens of steam coals, allow precipitator size to be specified solely from analysis of the coal.



Fly-ash particles under the microscope.

The correlation holds for all coals tested in which up to 90 per cent of their ash consisted of silicon, aluminium, and iron. For a few of the 33 coals, where these three elements were present in unusually high percentages, the correlation faltered, presumably because the electrical resistance of their ashes was so high that a phenomenon called 'back corona' occurred. In these cases, there is no substitute for combustion rig trials, a technique that has gained international acceptance.

The now largely superseded rig trials required, for each coal, 1–2 months of work for best results. Where the new-found correlation can be employed, the required information can be obtained in a fraction of the time and at much reduced cost.

Andrew Bell

Correlation of some readily measured parameters of coal and fly-ash with electrostatic precipitator performance. C.A.J. Paulson, E.C. Potter, and J.S. Vale. *Proceedings, Seventh World Clean Air Congress, Sydney, August 1986.*