

SOUTH AFRICA, HUMPTY DUMPTY AND AIR POLLUTION

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In this article I wish to take two concepts which most well informed South Africans should be well used to, turn the concepts upside down and link them to the issue of air pollution. In doing this my object is not to pose detailed problems or to offer detailed answers, instead I only want to stimulate thought from fresh angles.

ENERGY-RELATED ATMOSPHERIC POLLUTION

What we have to gain

In the near future South Africa will see accelerating population growth, urbanization and an increasing demand for industrial employment. South Africa is blessed with rich natural resources of coal and minerals which give us the opportunity to create the jobs which will be needed (Ref 1). Most South Africans are used to the positive side of this accident of Nature, but may not have considered all the implications.

It is a hard fact that jobs will be created at the cost of simultaneous pollution. Mining, ore refining, and further metal processing will raise the power consumption and energy related pollution. In addition, these industrial processes will also directly produce their own share of pollution. While the country counts its blessings in the form of mineral reserves, it is sobering to consider that if we possess half the world's supply of, say, chromium, and if we aspire to fully exploit that resource, we must then accept responsibility for half the world's chromium-related air pollution. Thus South Africa now has 6 ferrochrome smelters making it a leading producer. This reciprocal relationship between benefit and responsibility must be stressed in South Africa. Full exploitation is an elastic term but I intend to mean that we should add as much value as possible to the product. The energy producing industry, especially electricity generation, is an obvious target for air pollution controls. However, I regard energy production rather as a barometer of the industrial activity which, as a whole, produces pollution. By producing power for industry Escom shoulders the responsibility for pollution which many other separate industries would otherwise have to bear. We, as a society, must face up to the problems of this pollution and balance them against our need to use our natural resources to provide jobs.

What we have to lose

Many South Africans are at least vaguely aware of our country's botanical richness, but may not have fully realized what this means. Among the general public talk of "Acid Rain" conjures up images of dying forests in Europe or North America. Whatever the true causes of damage finally turn out to be, it is worth pointing out that South Africa has in some ways much more to lose than either Europe or North America. One possible measure of the possible damage

to vegetation in an area would be the ratio "Plant species/Unit area" (Ref 2). The attached Table 1, shows that this measure of species richness is highest for South Africa when large land masses of the world are considered. In South Africa the ratio is 81 species/10 000 km² compared with 11 in Europe and 14 in East North America. The interacting effects of pollution, diseases and land use are only now beginning to be elucidated in the northern hemisphere with its limited range of species. In South Africa the effects of pollution on our indigenous plants is a topic so far barely touched. As the Table shows we have much more at stake than other parts of the world. The loss of species in South Africa would not merely harm our nature reserves, it would be a loss to the world's inheritance of biological diversity.

Only 12% of South Africa's land is arable and suitable for dry-land crop production. In years of good rainfall South Africa is a net exporter of food but has to import food in poor years. If pollution were shown to reduce crop yields even by a few percent this would be a loss the country could ill afford in the face of a rising population. This clash of interests may prove to be inevitable because the availability of coal and water favours power generation in the midst of a major agricultural region.

The first possible signs of pollution damage the timber forests in the Eastern Transvaal were recently reported (Ref 3). Intensive studies in the near future will show whether these symptoms are really due to pollution damage and if so what the mechanisms are. My point here is that this work will be concentrated on a few exotic tree species of great industrial importance. Finding out what the risks are for our own inherited wealth of indigenous species is a huge responsibility that lies ahead.

REFERENCES

1. South African Year book 1985.
2. G E Gibbs Russell. Analysis of the size and composition of the Southern African flora. *Botalia* 15, 3 & @p 613-619 (1985).
3. P D Tyson, F J Kruger and C W Louw. Atmospheric pollution and its implications in the Eastern Transvaal Highveld. South African National Scientific Programmes Report No. 150.

TABLE 1 Comparison of species/area ratios for large regions

Region	Species per 10 000 sq.km.
Australian	32
Brazil	47
Europe	11
Eastern North America	14
Sudan	13
South Africa	81
Tropical Asia	41
Tropical Africa	15
Western Tropical Africa	16