

nature

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How much coal?

There is not the slightest doubt that an immense amount of coal resides under the British Isles. Onshore there are at present many healthy coalfields, and new ones such as Selby, Belvoir and Coventry-Kenilworth could make substantial additions; further down the line the Oxfordshire field could possibly outshine anything that has gone before. Offshore, there is ample evidence of rich fields at great depth below the North Sea. Why then should anyone disagree with the claims of the National Coal Board (NCB), repeated recently in large advertisements, that 'we have proven coal resources to last for at least another three hundred years'? Is it not just an academic quibble to ask for more scrupulous definitions of the term 'proven resources'?

A wide range of geological opinion thinks not. The Flowers' Commission on Energy and the Environment has recently been turning its attention to coal, and has received some tart comments about NCB publicity — this is a dispute which has simmered for many years. Terminology in the assessment of minerals is, if you will pardon the phrase, a minefield. But common practice is to distinguish, first, between reserves and resources. The term 'resource' covers all material about which something is known, although information may be exceedingly thin either about the extent of the resource or about ways in which it could be exploited. And, not surprisingly, a 'resource' includes a large amount of material which will on further research, turn out to be unexploitable because of, for instance, environmental or social unacceptability. So one thing the NCB does not have is a 'proven resource' — a contradiction in terms.

What the board is actually talking about if it uses the word 'proven' is 'reserves': materials that have been mapped out sufficiently well that they can be the subject of mining by known methods. The most important of the several definitions of reserve is the 'workable' or 'operating' reserve — the amount of coal that can be mined economically according to present-day detailed assessment. This figure, like all reserves, may fall if the price of coal were to drop, and may fall just as easily as rise if new equipment were installed that required thicker seams or was sensitive to faulting. In 1973 the NCB's assessment

of current workable reserves amounted to 3.9 billion tonnes according to the board's then Chief Geologist (G. Armstrong, *Phil. Trans. roy. Soc.*, 276, 439-452 (1974)). This is enough for around 30 years at present rates of consumption. Since then a vigorous programme of exploration and assessment has inched the workable reserves up to 6 billion tonnes.

How, then, does the NCB get its figure of 300 years — equivalent to a workable reserve of 45 billion tonnes? Geologists outside the NCB claim that the board tends to be a law unto itself and there is a severe shortage of coal geologists outside the board's embrace able to provide an independent estimate. But one thing does seem to be clear — that the 45 billion tonnes is bound to contain a vast amount of coal that is no more than rough guesswork at present. It seems that the figure arises not from the building up of detailed estimates from individual fields but from an estimate of what could be the total coal (shallower than 4,000 feet and in seams greater than 2 feet thick) under Britain; the total is then cut down to reflect the fraction of this coal which, on past experience, has actually been brought to the surface. The picture of a coal industry progressively and steadily working its way through the production of 45 billion tonnes over the next 300 years is thus, at best, no more than a giant extrapolation; at worst it could be totally deceptive.

But does it matter? Shouldn't the NCB be allowed a certain amount of exuberance concerning its future? In private, yes; there is little harm in a bit of optimism about an energy source that Britain has somewhat neglected in the recent past. But continued public statements on the subject could have a very harmful effect, as investment in energy technology and the development of other types of energy sources is bound to be distorted once the NCB's point of view gains general currency, particularly amongst politicians.

Most prudent energy industries like to look ahead at least fifteen years, and whilst NCB is talking about figures such as 6 billion tonnes it is being equally prudent. In making guesses at much larger figures and calling them 'proven resources' it is surely taking quite unnecessary liberties. □