

of Environmental Practice" involving a series of moral responses and practical obligations. The UK white paper (policy document) *This Common Inheritance* (HMSO, 1990) began with a statement of general principle: "We have a moral duty to look after our planet and hand it on in good order to future generations. . . . We must not sacrifice our future well-being for short-term gains, nor pile up environmental debts which will burden our children." The policy statement *Sustainable Development: The UK Strategy* (HMSO, 1994) reaffirmed this commitment.

There are other examples. The point is that Oelschlaeger's thesis is not original, but needs continual reiteration. I hope that North Americans read it and heed his message, and that rational beings elsewhere heed it also and do not get distracted by the North American framework.

The Earth, Humanity and God by Colin Russell, a professional science historian, is explicitly theological and splendidly conservative. By this I mean that he shows

the consistency and coherence of the responsibility doctrine embodied in Judaeo-Christian teaching with a proper application of conservation measures. He argues that both conventional reductionist science and postmodern mystical claims of the Earth as alive are inadequate by themselves, and that a third approach based on "stewardship" offers the best prospect for the future.

The book is the fruit of a lecture series given by Russell in Cambridge, England, in 1993 under the auspices of the Templeton Foundation. If other series attain this level, we shall be enriched. There will be readers who do not share Russell's Christian commitment, but they will do well to take seriously his account of the interplay of faith, reason and fear; none of us is exempt, even if our faith is in human rationality or nihilism rather than a conventional God. □

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from coal through hydrogenation.

But bombing and destruction left the chemical industry at a standstill after the war. The Allies had achieved their goal of breaking up I. G. Farben into smaller companies, a process that was the subject of Stokes's first book *Divide and Prosper*. The sequel is even more authoritative; Stokes demonstrates great command over his sources.

By the 1960s, coal had been largely abandoned as a feedstock by most West German companies in favour of the cheaper and better US petroleum methods. But Stokes provides one example of a small company, Bergkamen, that continued to use the Fischer-Tropsch process until well after the war. Like BASF and Bayer, which had 50–50 partnerships with Shell and BP, respectively, Bergkamen eventually abandoned any hope of economic self-sufficiency and began to embrace international trade and to use petroleum as a feedstock.

A topic Stokes only touches on is the comparison with developments in East Germany. Material became available to him only after the book was completed and a more detailed account is planned for another volume. The comparison, however, will be illuminating. It seems that although East Germany recognized the importance of petroleum, it committed itself more to coal-based chemistry, falling behind the West for many reasons, including the lack of foreign exchange, old-fashioned equipment, the shortage of employees as a result of emigration to the West and ties to the Soviet economy. All this requires another book to complement this fine achievement in scholarly analysis. □

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Fuelling the engines of growth

Kristie Macrakis

Opting for Oil: The Political Economy of Technological Change in the West German Chemical Industry, 1945–1961. By Raymond G. Stokes. Cambridge University Press: 1994. Pp. 259. £30, \$49.95.

VISITORS to East Germany in the early 1980s were often struck by the pungent smell of coal in the air. Used as a feedstock, or primary starting material, coal had there remained almost synonymous with industry — but not so in West Germany.

Raymond G. Stokes's finely crafted book is one long argument supporting the claim that it was, in part, the transition from a traditional coal-based industry to a modern petroleum-based industry that allowed West Germany to compete in world markets. The transition helped the country to achieve the economic miracle of the 1950s that brought success during the 1960s and later.

The petroleum-based chemical industry spawned technological developments that transformed the world and vastly improved standards of living: after the Second World War, plastics began to dominate the world market, and polyethylene, widely used in wire insulation, containers and packaging, became one of the most important products to be manufactured from petroleum. But the nitty-gritty of these products is not the author's main concern. Rather, Stokes gives a highly interpretative historical account that focuses on business, technol-

ogy and Germany as a whole. It is mostly organized chronologically. After several background chapters (1860–1945), he introduces his analysis of technological change and transfer, and provides case studies of representative companies to show the alternative paths taken towards prosperity. The transition to oil was not uniform in all industries and involved a gradual change in cultural attitudes.

Germany has a venerable tradition of excellence in the chemical industry. Dyes, pharmaceuticals and synthetic fuels have long been associated with a country backed by a skilled and disciplined workforce. By the end of the nineteenth century, the organic chemical industry had become an engine for economic growth and a source of political power. German companies soon dominated and monopolized world markets; in 1913, 88 per cent of the world's dyestuffs came from Germany.

BASF, Hoechst, Bosch and Bayer were all founded either on the eve of German unification (1871) or in its aftermath. By the beginning of the Weimar period, I. G. Farben was formed as an umbrella organization for these companies — and in unity lay strength. New technologies were developed during the 1920s and 1930s to harvest the fruits of raw materials available to Germany, and during the period of National Socialism, a state-sanctioned policy of economic self-sufficiency accelerated the need for such technologies. One of these methods was the Fischer-Tropsch process, implemented by the Nazis to manufacture liquid fuels

Recent textbooks

The Invertebrates: A New Synthesis by R. S. K. Barnes, P. Calow and P. J. W. Olive (2nd edn). Blackwell Scientific, £47.50 (hbk), £19.95 (pbk). "Students will like this book. It deserves to succeed", wrote A. Brafield of the first edition (*Nature* **338**, 185; 1989).

Biology of Amphibians by William E. Duellman and Linda Trueb (2nd edn). Johns Hopkins University Press, £33 (pbk). In a review of the first edition, T. Halliday wrote that the text was "clear, concise and richly illustrated. . . likely to be an important source of reference" (*Nature* **319**, 364; 1986).

The Cell Cycle: An Introduction by Andrew Murray and Tim Hunt. Oxford University Press, £15.95 (pbk).

Modern Parasitology edited by F. E. G. Cox (2nd edn). Blackwell Scientific, £18.95 (pbk). Greatly revised, with a new chapter on molecular biology.