

attempt to educate" (pp. 148–150).

By the early 1960s, the miners in Holaday's study cohort were dying of lung cancer at a higher rate than expected on the basis of the incidence of the disease in the general population. In 1963, the widow of one of them, Mrs Eola Garner, started to press a legal case for compensation. In 1967, J.V. Reistrup, a reporter for the *Washington Post*, brought the plight of the miners to national attention and Willard Wirtz, the Secretary of Labor, on the authority of an old statute finally acted to set federal safety standards in the uranium mines. By 1977, when Mrs Garner at last won a favourable settlement from the state of Colorado, conditions in the mines were much safer.

Uranium Frenzy is not a probing analysis of high policy, but it is a fine example of high and absorbing journalistic art. It graphically depicts the behaviour and attitudes in the uranium game on the Colorado Plateau, delineating in moving counterpoint the United States govern-

ment's material success against the ill fate of the men who dug the precious ore out of the rock. Ringholz's prose is detached and clear-eyed, understated yet unsparing in its assessments of the winners, the victims, the public health officials who tried to forestall the tragedy that befell the miners — and the bureaucratic postures that prevented them from succeeding. Her book makes utterly plausible the summary of the uranium craze that Stewart Udall, the one-time Secretary of the Interior, supplied her in a letter, in November 1987: "What is most poignant is that the losers were innocent victims — and the Atomic Energy big shots were 'patriots' who lied to protect what they conceived as the 'national interest'" (p. 262). The lies may have taken the form mainly of suppressions and omissions, but they were lies, fatal lies, nonetheless. □

Daniel J. Kevles is the J.O. and Juliette Koepfli Professor of the Humanities, California Institute of Technology, Pasadena, California 91125, USA.

In his own time

Mark Ridley

The Non-Darwinian Revolution: Reinterpreting a Historical Myth. By Peter J. Bowler. *The Johns Hopkins University Press: 1988. Pp.238. \$30.25, £17.50.*

THE Reverend Thomas Malthus, who is well known for his belief that population growth must exceed the food supply, argued also that the resulting food shortage is beneficial for the human race. It raises people out of idleness and torpor. "The necessity of food for the support of life [he wrote] gives rise, probably, to a greater quantity of exertions than any other want, bodily or mental." It is these exertions that have been the motor of human progress — "Had population and food increased in the same ratio, it is probable that man might never have risen from the savage state". Malthus's ideas would develop into the familiar victorian idea of 'progress through struggle': we desire to better our condition, we strive to do so and (provided the government follows a *laissez faire* policy) progress is the result.

Historians, and biologists, have often described Darwin's theory as an expression of the broader victorian political economy. Strictly, this has no bearing on whether Darwin was right; but Darwin's critics have always been fond of the analogy, both for the ideological tarnish and the chance of compromising Darwin's originality. Peter Bowler's latest book is most interesting for the thorough, critical look it takes at the historical question.

Bowler has to deal with three argu-

ments. First, that Darwin's theory apparently resembles those of Malthus, and of Herbert Spencer and other victorian writers; second, that natural selection was simultaneously discovered, at least by Alfred Russel Wallace and perhaps by Patrick Matthew and Edward Blyth, which suggests that the idea was indeed in the air; and finally, that Darwin's theory was rapidly accepted and developed into the influential politics of social darwinism.

Bowler has objections to all three arguments. For a start, the way that the struggle for existence led to progress was crucially different in the theories of Darwin and of the political economists. For Malthus, and Spencer, the struggle worked as a stimulus to individual action, whereas in Darwin's theory selection takes place on inherited differences between individuals within a population. As Bowler neatly puts it, in Spencer's lamarckist theory, evolution takes place in individuals, not populations; it lacks what Ernst Mayr calls 'population thinking'.

Wallace's theory may also have differed from Darwin's. In modern population genetical terms, Wallace appears to have been a group selectionist who thought of all selection as 'hard'. He was concerned with selection between "varieties", not individuals, and thought that selection only took place when a variety did not possess an adaptation needed to survive the external environment. Wallace's theory, like Spencer's, lacked Darwin's ideas of intraspecific competition and individual selection.

Finally, Darwin's theory was hardly accepted at all in the late nineteenth, or the early twentieth, centuries. What actually happened was that Darwin persuaded

biologists only about evolutionary change. They then called themselves darwinians, but were really (what Bowler calls) "pseudo-Darwinians"; they believed not in the darwinian sort of branching, contingent, unplanned evolution, but in evolution through a series of developmental stages from protozoa to human beings. The developmental model of evolution resulted in the recapitulatory, haeckelian kind of research in embryology, and in the theory of orthogenesis in palaeontology: both of these theories were still teleological, even if the static teleology of pre-darwinian natural theology had become the temporal teleology of orthogenesis. Bowler also argues that social darwinists were inspired by Spencer's lamarckist and progressive model of evolution, rather than by Darwin. In another chapter he describes a similar tendency in anthropology, as human evolution was considered to proceed through a series of racial stages, from savages to civilized Westerners.

Darwin thus appears as a historically isolated figure. There was no 'darwinian revolution'. The main stream of victorian thought started with the natural theologians and idealists, such as Richard Owen, who believed in a more or less atemporal plan of nature. It ran through Chambers, and Spencer, who tried to temporalize the plan, but proved unpersuasive. Darwin, however, was successful. He unintentionally led late-nineteenth-century biologists to accept a temporal, though still teleological, plan of nature, in which evolution proceeds through a series of stages, driven by some process of directed variation. He convinced no one either about his branching and non-progressive theory of evolution, or his materialist mechanism for it.

The 'Darwin industry' has often been criticized for concentrating on Darwin and ignoring his historical context. Bowler himself has some sharp things — not well directed, in my opinion — to say about that industry. *The Non-Darwinian Revolution* is a professional and worthwhile book, which merits reading; it offers a new (at least for the non-specialist reader) interpretation of events about which most people have opinions. I only really disagree with the way Bowler treats his fellow historians, whom he from time to time ignores or caricatures, but this is only a minor defect. Indeed, the industry itself may enjoy the last laugh. If we look past Bowler's various criticisms, and concentrate on his conclusions, he appears to have vindicated those whom he purports to oppose. Bowler has given Darwin his real victorian context: and ends up justifying those who study Darwin in isolation. □

Mark Ridley is in the Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ, UK.