usefully learn from the development of Anglo-American eugenics and human genetics, it makes a marvellous story. Kevles has done a prodigious amount of research and has uncovered a wealth of fascinating material. In the first part of the book, however, the author's lack of philosophical sympathy with the central characters, Galton, Pearson and Davenport, is rather too much in evidence. I found myself irritated by his periodic forays into psychoanalysis, as when he speculates that "Galton may well have diverted frustration over his own lack of children into an obsession with the eugenic propagation of Galton-like offspring". And his portrait of Pearson seems somewhat one-sided, if the accounts of other authors are anything to go by. Contrast Kevles's assertions that Pearson was "blinded by eugenic prejudice" and that he "often display[ed] a relentless closed-mindedness" with Helen Walker's assessment (in the *International Encyclopedia of the Social Sciences*): "his first thought was to get to the truth and if intellectually convinced of an error, Pearson was ready to admit it". Questions of personality aside, Kevles hardly conveys adequately the magnitude and scope of Pearson's achievements as a scientist, which were by no means restricted to the study of human heredity and statistical theory.

I have, though, nothing but praise for Kevles's treatment of the "golden age" of British genetics: the age of Ronald Fisher, Lionel Penrose, Julian Huxley, J.B.S. Haldane and Lancelot Hogben. It was a time when the Galton Laboratory in London, in spite of being chronically underfunded, boasted an astonishing concentration of talent and completely transformed the study of human genetics. Perhaps, indeed, it was partly *because* of the lack of funds that they achieved so much: Haldane remarked that, in the absence of equipment, they were forced to *think*. It is an exciting, even inspiring tale. And Kevles tells it beautifully.

The work done at the Galton laid the foundations for all modern research on the subject: research which was eventually to give rise to a new branch of medicine. With it came, first, genetic counselling, then programmes of genetic screening — for sickle-cell in blacks and Tay-Sachs in the Jewish population. Also amniocentesis and, latterly, chorionic biopsy, making it increasingly possible to detect genetic and chromosomal abnormalities in the womb and selectively to abort. The advent of *in vitro* fertilization raises possibilities previously undreamt of. We are still a long way from being able, as Huxley put it, to "take charge of our own evolution". But we are a lot closer than when he said it. And no closer, I fear, to knowing what we shall do with this power when we have it.

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Insight into Earth's changing face

Joe Cann

New Views on an Old Planet: Continental Drift and the History of the Earth. By Tjeerd H. van Andel. *Cambridge University Press: 1985. Pp.324. £15, $19.95.*

A CENTURY ago, gentlemen of leisure considered it quite the proper thing to take an active interest in geology. After all, geology had brought about the Huttonian Revolution, which extended the age of the Earth at least a thousand-fold, and evidence from fossils was central to the ideas of Darwin. Geology was seen as a key part of scientific culture.

How different is the situation now! The Huttonian Revolution, which achieved as great a cultural change as the Copernican, is now taken for granted, even in the country of its birth. Where is the monument at Jedburgh, where the signpost to Siccar Point? Moreover geology has since brought about another revolution, so that continents are mobile, sliding over the Earth, splitting and colliding, and separated by dynamically evolving deep-ocean basins, rather than fixed and anchored as the old orthodoxy would have it. So why is geology not again a central science? Is it because of the lack of informed popularization by creative geologists? Certainly much popular geological writing is abysmally inept.

Against this background it is particularly interesting to read Tjeerd van Andel's new book. van Andel is not only a scientist who has contributed important elements to the new geological framework, but also a man of scholarship and wide erudition. Here he sets out to tell one part of the new story: how our ideas of geological history have been changed and how we have gained radical new insights into the changing face of the Earth.

This is only one half of the story, an important point to stress, since the book scarcely touches on geological process, the mechanisms by which geological changes occur. This is perhaps partly because the subject is treated entirely without mathematics, but also, I suspect, because van Andel's main interest lies in Earth history. The book arose from a series of lectures to non-geologists at Stanford, and van Andel does try very hard to use the smallest possible selection of the multifarious and notorious specialist vocabulary of geology.

There are five main sections, starting with the most recent topic, the last ice age, moving on to continental drift, and building on that to examine climates of the past, before proceeding to look at the earliest stages of Earth history and, finally, the history of life. *New Views on an Old Planet* is well enough written and presented, but its main strength is the depth of insight it shows. A scientist of van Andel's calibre does not bankrupt his knowledge in the writing of a single book, but selects creatively from his considerably greater store. Whatever the educational bargain-hunters of the present day say, a close involvement with research does enrich and enliven teaching (and popularization); that shows clearly here. Perhaps the book will encourage other prominent geologists to attempt similar works, and perhaps this in turn will restore to geology some of its former public understanding.

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New edition

• *World Nuclear Directory: A Guide to Organizations and Research Activities in Atomic Energy*, 7th Edn, consultant editor C.W.J. Wilson. The *Directory* includes details of some 2,000 laboratories and establishments worldwide, and is published by Longman/Gale Research. Price is £95, $180.

Catholic interests

H.W. Paul

Uneasy Genius: The Life and Work of Pierre Duhem. By Stanley L. Jaki. *Martinus Nijhoff:1985. Pp.472. Dfl.175, $65.50, £44.50.*

"SHH! Papa is looking for a theorem." His daughter's silence did not help Pierre Duhem (1861–1916) to discover any great theorems, but he did enough good physics to find a couple of equations that share his name with Margules and Gibbs. Less because of his physics than because of his work in the history and philosophy of science, Duhem is one of the best known of the generation of nineteenth-century giants whose immense productivity drives the jet-setters of today to despair. *Nature*'s obituary in 1916 hit the right note:

> If Duhem did not concentrate his main efforts on the discovery of new phenomena or the measurement and remeasurement of physical constants, he at least played an equally important part in the advancement of our knowledge by evolving order out of chaos, and uniting isolated portions of mathematical physics in the form of a connected and logical theory.

Be this as it may, Duhem's classic work in thermodynamics has been resurrected lately by mandarins of the calibre of Prigogine and Truesdell. A reprinting in 1961 of his *Recherches sur l'Hydrodynamique* (first published in 1903) shows the value of older work on the mechanics of fluids for the engineer when he has to worry about the shock waves produced at supersonic speeds. Contrary to the opinions of Perrin and Langevin, Duhem's anti-atomism and opposition to relativity did not doom him