CONNECTING SEEMINGLY DISPARATE OBSERVATIONS OF THE EARTH

Continents in Motion: The New Earth Debate

Walter Sullivan
AIP, New York, 1991 [1973]. Second edition. 430 pp. $25.00 pb ISBN 0-88318-704-3

Reviewed by J. Tuzo Wilson

"In 1914, as the third regiment of the Queen Elizabeth Grenadier Guards was spearheading the German advance into Belgium, a young reserve lieutenant named Alfred Wegener was shot in the arm and hospitalized." This sentence opens the second edition of *Continents in Motion*, Walter Sullivan's account of what he terms "one of the most profound revolutions in man's understanding of nature." This apparent irrelevance illustrates Sullivan's gift for easing his readers' journey along often difficult paths.

Sullivan's long experience as a reporter and science editor of *The New York Times* has equipped him admirably to write this book, valuable to expert and layman alike, in which he rapidly compares in surprising detail views of the Earth held over the centuries in many parts of the globe.

For example, in just two pages he compares these seemingly disparate observations: the processes Icelanders noticed in 1973 as they battled to save their homes and ports from molten lava pouring from rifts; the extrusion of lavas that Harrison H. Schmitt, the astronaut, had observed the year before as he sailed through space over Ethiopia; and the maps and geological observations of the Jesuit archaeologist Pierre Taillard de Chardin in the Afar desert of Ethiopia in 1930. Finally Sullivan hints at a possible connection between these observations and the hot brines, which for over a century Russian, Swedish, British and American expeditions have extracted from deep basins in the Red Sea. This evidence suggests that as they slowly open, the rifts of the Atlantic Ocean, the Red Sea and the Gulf of Aden bring molten lava and hot rocks to the surface.

Later Sullivan returns to Wegener, the wounded lieutenant, who during his long convalescence cogitated on the enigma of continents and pointed out that the broadening of the Red Sea "is suggested particularly by the course of the coastlines . . . whose otherwise accurate parallelism is spoilt by the projection (the Afar triangle): If one cuts this triangle out, the opposite corner of Arabia fits perfectly into the gap."

No footnotes or references break the easy flow of Sullivan's prose; nothing is allowed to interrupt the pleasure of a good read. Extensive bibliographies are sequestered at the back of the book and are listed chapter by chapter. Maps, photographs and diagrams illustrate the scattered but ingeniously linked vignettes.

For the expert, this book is a chart for the study of the whole Earth, because no single scholar can hope to master every aspect of the Earth's intricacies. Other scientists have sometimes derided geology as old-fashioned and simplistic, suggesting that geologists could tidy up the confusion if they would but learn some mathematics and analyze their results. They ignore the evidence that such giants as Isaac Newton, Pierre-Simon Marquis de Laplace and Carl Friedrich Gauss did apply these methods many years ago, but only produced conclusions about the larger features of the Earth. For most practical purposes, the Earth's minutiae are as yet impervious to explanation in physical terms. In calling for a logical approach to the problems of geology scientists should bear in mind that the momentous advances in other disciplines were the result of alternations between diligent collection of data by normal science, mathematical analysis of data and the great nonrational leaps called scientific revolutions.

Geology still needs its own revolution because no one has yet stated in detail how one might occur in the Earth sciences. But Sullivan, like the writer of a detective mystery or the would-be solver of a jigsaw puzzle, has set out the pieces for examination. He has not prejudged the answer, but rather opened a few leads to help others discover the "grandeur of the history that has set the stage for man and his works." Surely the clue will soon be found; surely it must lie in sound classical physics. No one has better outlined this major problem.

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The Detection of Gravitational Waves

Edited by David G. Blair
Cambridge U. P., New York, 1991. 481 pp. $135.00 hc ISBN 0-521-35278

If you're thinking that this book chronicles the exciting story of how gravitational waves were detected, then think again. Gravitational waves have not yet been detected directly, despite nearly 30 years of intense effort that has resulted in considerable improvement in detection sensitivity. The effort continues, as several laboratories around the world work to construct instruments of sufficient sensitivity to detect gravitational waves from cosmic sources. This volume, assembled by David Blair of the University of Western Australia, sums up the present state of the art and describes plans for future detectors.

Imagine a physicist in the middle of the 21st century stumbling onto a moldy copy of this book in the obsolete hard-copy section of his university library. Will he see the book as a preface (admittedly a rather long preface) to a field that flowered early in his century? Or will he put it down