

14 of 17 DOCUMENTS

The Washington Post

washingtonpost.com

The **Washington Post**

January 11, 2004 Sunday

Final Edition

Inquiring Minds; How the rise of experimentation changed our view of the world around us.

BYLINE: Reviewed by Marcia **Bartusiak**

SECTION: Book World; T10

LENGTH: 1045 words

THE SCIENTISTS

A History of Science Told Through the

Lives of Its Greatest Inventors

By John Gribbin. Random House. 647 pp. \$35

Anoted historian recently told me that his colleagues seem reluctant to write grand histories of science these days. More occupied with the trees than the forest in recent years, they could be wary of the wrath that might descend upon them for leaving out a cherished detail. Fortunately, John Gribbin has no such apprehension. His latest book takes us on a rollicking and intellectually absorbing ride through the last 500 years of Western science.

A British astrophysicist and the prolific author of many other books on science, Gribbin focuses heavily in this work on the physical sciences, but the great moments in biology, geology and chemistry are well covered. "My choice of events to highlight is necessarily incomplete," he admits, "but my aim is to give a feel for the full sweep of science, which has taken us from the realization that the Earth is not at the centre of the Universe and that human beings are 'only' animals, to the theory of the Big Bang and a complete map of the human genome."

His story opens in the days of Nicolaus Copernicus, Tycho Brahe and Johannes Kepler, the 16th-century scholars whose discoveries helped initiate the age of modern science. This era dawned when investigators no longer relied on reason alone (the tradition established by the ancient Greeks) but began to set up experiments to test their hypotheses and to match theory with observation. As William Gilbert, personal physician to England's Elizabeth I and discoverer of the laws of magnetism, noted: "Stronger reasons are obtained from sure experiments and demonstrated arguments than from probable conjectures and the opinions of philosophical speculators." Gilbert's work directly influenced Galileo, whose own experimental tests ultimately led to Isaac Newton's revolutionary laws on gravity and motion.

Inquiring Minds; How the rise of experimentation changed our view of the world around us. The Washington Post
January 11, 2004 Sunday

Gribbin sets these accounts within a rich biographical narrative, allowing us to see how both major and minor scientists at a particular time, often interacted with one another, their influence then filtering down to succeeding generations. Sometimes the results can be surprising. For example, Robert Hooke, a man known predominantly as Newton's nemesis, is depicted in a more congenial way. Hooke was an accomplished engineer (he devised a balance-spring pocket watch) and microscopist (he introduced the term "cell"), and he correctly identified fossils as the remains of once-living creatures. But Hooke unluckily proceeded to irritate Newton, a man with Machiavellian attributes, when he also had inventive insights on gravity and light propagation. Newton, who Gribbin hints was inflamed by jealousy, may have conveniently "lost" Hooke's portrait when the Royal Society moved to new quarters in 1710.

Although Gribbin at first lingers over his venerable subjects, his pace eventually quickens, matching the exponential expansion of science over the centuries. The industrial revolution, with its advances in finely honed instrumentation, served as a catalyst for further progress. In France, Antoine-Laurent Lavoisier largely put alchemy to rest and established the modern field of chemistry with his model of combustion and a more simplified chemical nomenclature. This minor aristocrat might have made further contributions had he not been caught up in the French Revolution and guillotined in 1794. Meanwhile, in England, James Watt with his steam engine instituted a trend that continues to this day: turning scientific research into high-tech items.

The success of Newtonian physics, says Gribbin, encouraged "chemists and biologists to think that their parts of the natural world might be explained on the basis of simple laws" as well. And just as astronomers earlier struggled with the theological implications of Earth's subordinate position in the solar system, geologists and biologists in the 18th and 19th centuries had to confront the growing evidence of Earth's great age, far older than the Bible implied. This struggle culminated in the Darwinian revolution.

Charles Darwin was one of the last "gentlemen scientists," well off enough to pursue his interests almost as a hobby. He sat on his theory of evolution for two decades, fearful of the public reaction to its heretical concepts. Gribbin carefully renders the historic precursors to Darwin's ideas, including the work of botanist John Ray (who in the 17th century established our modern notion of species) and of geologist Charles Lyell, who in the 1830s gathered extensive evidence that the Earth's surface undergoes continual resculpting from erosion, sedimentation and uplifting over long stretches of time. Darwin was not the first to suggest an evolutionary scheme or that man descended from the apes, but in light of Lyell's findings he was at last able to offer a viable mechanism for evolution -- natural selection, the adaptation of a species to ever-changing environments and resources.

The 20th century passes by speedily in the last quarter of the book. We come upon Alfred Wegener and his proposal that continents drift (the seed of what is now known as plate tectonics), the rise of atomic physics, the discovery of our expanding universe, and the rapid development of the field of genetics. What linger and beguile, though, are the quaint little facts: that the plus and minus signs in arithmetic were not introduced until 1540; that Edmond Halley (of comet fame) spied for England and developed a diving bell; that Marie Curie's laboratory notebooks are still so radioactive that they are kept in a lead-lined safe, taken out only under extreme precaution.

In many ways *The Scientists* also serves as a handy reference work. Each scientist's story, succinct and entertaining, can be perused and appreciated individually. Historians may quibble over a particular detail or analysis, but no matter. Gribbin's work offers general audiences an engaging and informative view of modern science's prodigious accomplishments since the Renaissance. *

Marcia Bartusiak is a visiting professor in the graduate program in science writing at the Massachusetts Institute of Technology. Her latest book is "Einstein's Unfinished Symphony."

LOAD-DATE: January 11, 2004

LANGUAGE: ENGLISH

Inquiring Minds; How the rise of experimentation changed our view of the world around us. The Washington Post
January 11, 2004 Sunday

PUBLICATION-TYPE: Newspaper

Copyright 2004 The **Washington Post**