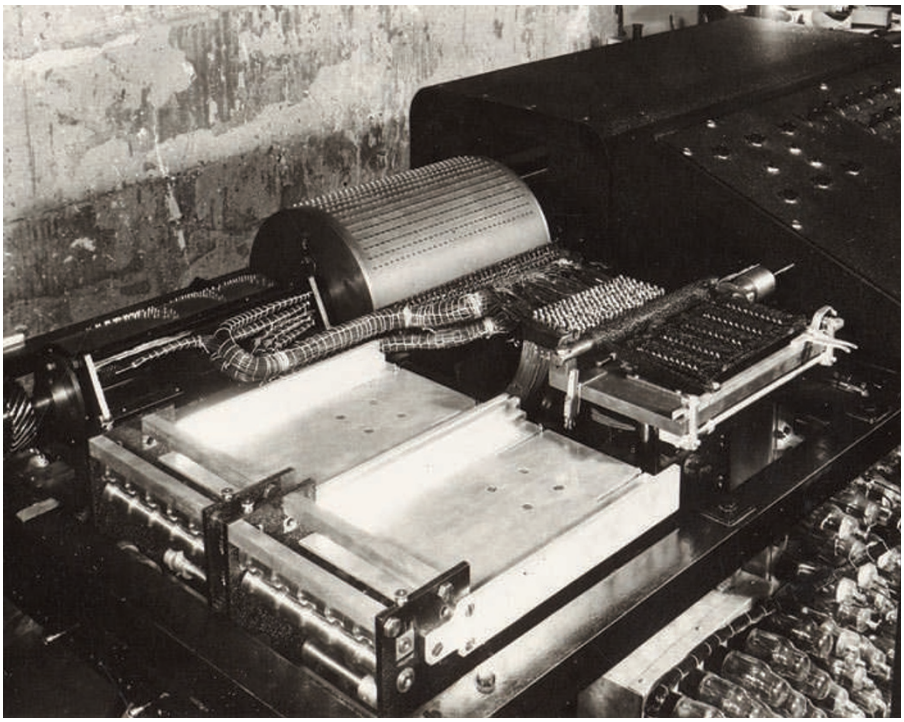

The 1940s Atanasoff–Berry Computer (ABC) was the first to use innovations such as vacuum tubes.

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BIOGRAPHY

The ABC of computing

An engaging biography of John Atanasoff reveals the obscure origins of the computer, explains **John Gilbey**.

Who invented the digital computer? Depending on your definition, mathematical pioneers such as John von Neumann or Alan Turing might spring to mind, but its origin lies with US physicist John Atanasoff. Although few people could name him today, this rewarding biography by Pulitzer prizewinning author Jane Smiley may change that.

Atanasoff embodies the American Dream. The son of a Bulgarian immigrant who had fled to the United States as a child in the late 1880s, he grew up on the family farm in Florida. Through mastering the slide rule, helping his father with house electrical wiring and driving the family's Model T Ford at age 11, he developed a passion for engineering and mathematics.

After graduating from the University of Florida in Gainesville in 1925, with the highest grade average it had ever recorded, Atanasoff joined a master's programme at what is now Iowa State University in Ames. He turned down an offer to move to Harvard University and gained a PhD in physics at the University of Wisconsin-Madison. He returned to Iowa State — again declining an offer from Harvard — as an assistant professor.

In *The Man Who Invented the Computer*, Smiley describes how Atanasoff developed an interest in mechanical calculators and modified an IBM tabulator to suit his own needs. But to meet his wider scientific aspirations — in particular, to solve simultaneous linear equations quickly — he realized that he would have to build a calculator himself. His struggle to design it concluded with an episode of pure cinema. Atanasoff, "unhappy to an extreme degree", jumped in his car and drove more than 300 kilometres to the shore of the Mississippi River. Sitting in a roadside tavern with a glass of bourbon and soda, the solution fell into place. He began to make notes on a paper napkin.

Crucially, Iowa State had an excellent college of engineering. In 1939, Atanasoff teamed up with recent graduate Clifford Berry to develop the system that became known as the Atanasoff–Berry Computer (ABC). Built on a shoestring budget, the simple 'breadboard' prototype that emerged contained significant innovations. These included the use of vacuum tubes as the computing mechanism and operating memory; binary and logical calculation; serial computation; and the use of capacitors as storage memory. By the summer of 1940, Smiley tells us, a second, more-developed prototype was running and Atanasoff and Berry had written a 35-page manuscript describing it.

Other people were working on similar devices. In the United Kingdom and at Princeton University in New Jersey, Turing was investigating practical outlets for the concepts in his 1936 paper 'On Computable Numbers'. In London, British engineer Tommy Flowers was using vacuum tubes as electronic switches for telephone exchanges in the General Post Office. In Germany, Konrad Zuse was working on a floating-point calculator — albeit based on electromechanical technology — that would have a 64-word storage capacity by 1941. Smiley weaves these stories into the narrative effectively, giving a broad sense of the rich ecology of thought that burgeoned during this crucial period of technological and logical development.

The Second World War changed everything. Atanasoff left Iowa State to work in the Naval Ordnance Laboratory in Washington DC. His prototype computer remained unpatented in the basement of the physics department until the machine was broken up in 1948. The exigencies of war meant that substantial resources were made available for key computing projects such as the vast Electrical Numerical Integrator and Calculator (ENIAC) machine at the University of Pennsylvania in Philadelphia, the launch of which Atanasoff attended in 1946. But Atanasoff moved on, and in 1951 went into

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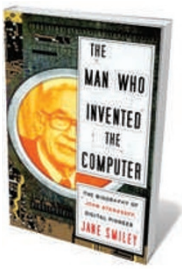
John Atanasoff built the first electronic computer.



The Man Who Invented the Computer: The Biography of John Atanasoff, Digital Pioneer
JANE SMILEY
Doubleday: 2010. 256 pp. $25.95

business for himself. His Ordnance Engineering Corporation was sold for a healthy profit five years later.

Atanasoff was brought back into the picture by the untimely death of Berry in an apparent suicide in 1963. Concerned, Atanasoff travelled to New York to investigate. The family considered that murder was a possibility — Berry's father had been shot decades earlier by a disgruntled ex-employee — but it was never proven.

In 1973, Atanasoff again found himself in the spotlight after his work was cited in the conclusions of a patent dispute between computing-industry giants Honeywell and Sperry Rand about the early development of the digital computer. Smiley quotes Judge Earl Larson's acknowledgement that "between 1937 and 1942, Atanasoff … developed and built an automatic electronic digital computer for solving large systems of simultaneous linear algebraic equations".

Judge Larson further noted that John Mauchly, one of the ENIAC developers who had visited Atanasoff in Iowa, had inspected the Atanasoff–Berry Computer and had read the manuscript describing it. Mauchly derived from this, the judge said, "'the invention of the automatic electronic digital computer' claimed in the ENIAC patent" — indicating Atanasoff's key contribution, albeit unwitting, to the later project.

Belatedly, and largely through the advocacy of friends and writers, Atanasoff gained recognition. Owing to his father's origins, he received early plaudits in Bulgaria, where in 1970 he was granted the Order of Cyril and Methodius, First Class. In 1990 he was awarded the National Medal of Technology by President George H. W. Bush for his invention of the electronic digital computer and for contributions to the development of a technically trained US workforce. Atanasoff died in 1995.

The Man Who Invented the Computer is a vivid telling of the early story of the computing industry. By focusing on Atanasoff, Smiley blends obscure threads with those that are better known. The result would, without embellishment, make an exceptional feature film. ■

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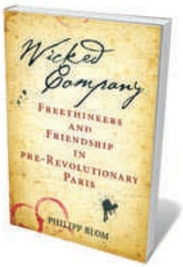
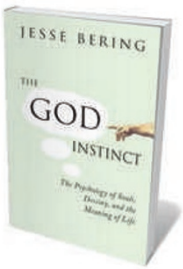
Books in brief



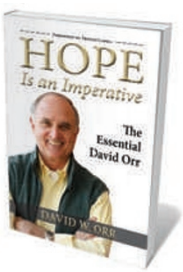
Wicked Company: Freethinkers and Friendship in Pre-Revolutionary Paris
Philipp Blom BASIC BOOKS *384 pp. $29.95 (2010)*
The French Enlightenment's triumph of reason over religious dogma was plotted in an eighteenth-century Paris salon. Hosted by Baron Paul-Henri Thiry Holbach, the radical thinkers who gathered there included the philosophers Denis Diderot and Jean-Jacques Rousseau. Historian Philipp Blom revives their legacy and examines the rivalries that sprang up among the group and with competitors such as the writer Voltaire. Their ideas about society and the natural world went on to influence politics and science globally.

How Old is the Universe?
David A. Weintraub PRINCETON UNIVERSITY PRESS *380 pp. $29.95 (2010)*
Astronomer David Weintraub explains in his latest book how we know that the Universe is 13.7 billion years old, a finding that has had an impact on science, philosophy and religion. By looking at the various ways in which the age of the cosmos has been established over the centuries — from the lifecycles and pulsations of stars to galactic structures and cosmology — he reveals the process of scientific enquiry and shows how astronomers gather evidence to grapple with deep questions.

The Abacus and the Cross: The Story of the Pope Who Brought the Light of Science to the Dark Ages
Nancy Marie Brown BASIC BOOKS *328 pp. $27.95 (2010)*
Far from being intolerant of science, the medieval Catholic Church saw reason as a means of getting closer to God. In the year 1000, there was even a 'scientist pope': Gerbert of Aurillac was the leading mathematician and astronomer of his day. Science writer Nancy Marie Brown describes his dramatic rise from humble peasant to visionary pontiff. A mathematics teacher to kings, and occasional spy, he adopted scientific ideas from the Islamic world, including the nine Arabic numerals and the concept of zero.



The God Instinct: The Psychology of Souls, Destiny and the Meaning of Life
Jesse Bering NICHOLAS BREALEY PUBLISHING *288 pp. £16.99 (2010)*
Psychologist Jesse Bering argues that religious beliefs are a sophisticated cognitive illusion rather than an irrational delusion. Because we have the ability to think beyond our immediate surroundings, we have evolved a tendency to project the idea that a transcendent being, or God, influences our lives. Taking a balanced and considered approach to this often inflammatory topic, he explains why this religious trait has evolutionary benefits and why it sets us apart from other animals.



Hope is an Imperative: The Essential David Orr
David Orr ISLAND PRESS *400 pp. £31 (2010)*
Key writings of environmental scientist David Orr from the past 30 years are collected in this volume. A champion of ecological design, Orr explains why it is important to educate people about sustainability, why university campuses should be green, and the environmental consequences of bringing children into the world. Leading a push within his own town of Oberlin, Ohio, to embrace green building practices, he reveals why he is both an optimist and a pragmatist.