Joseph Rotblat shared the Nobel Peace Prize for his efforts to rid the world of nuclear weapons.

NUCLEAR PHYSICS

Arms and the man

Martin Rees applauds a biography of the physicist who kickstarted the Pugwash Conferences for arms control.

The physicists who developed nuclear weapons during the Second World War mostly returned to academic pursuits when peace was declared. But some did what they could, however little, to control the powers that they had helped to unleash. The most committed and idealistic of these was Joseph Rotblat — the instigator and driving force behind the Pugwash Conferences on Science and World Affairs, which aim to reduce the danger of armed conflict through global cooperation.

Radiation oncologist Andrew Brown's fine biography, *Keeper of the Nuclear Conscience*, chronicles a life spanning almost the entire twentieth century and moulded by its turmoil and horrors. Rotblat was born in Poland in 1908, and his family suffered severe privations in the First World War. But he was energetic and persistent — a lifelong trait — and, by the age of 30, had achieved international standing in radioactivity research.

In 1939 he left the Warsaw Radiological Laboratory in Poland to take up a short-term

Keeper of the Nuclear Conscience: The Life and Work of Joseph Rotblat

ANDREW BROWN
Oxford University
Press: 2012. 368 pp.
£18.99, \$29.95

this UK effort was subsumed into the US Manhattan Project in 1943, Chadwick used his influence to enable Rotblat to move to the Los Alamos Laboratory in New Mexico, despite his Polish citizenship.

Since 1940, nuclear physicists had feared

post with physicist James Chadwick at the University of Liverpool, UK. This was a fortunate move: the Warsaw lab was destroyed a year later, and few of its staff survived the Nazi occupation. Rotblat quickly became Chadwick's trusted lieutenant. Chadwick was part of a team studying the feasibility of a fission weapon under the code names Maud and Tube Alloys. When

a nightmare scenario in which Adolf Hitler developed atomic weapons. For Rotblat, this was the only moral justification for the Allies' bomb project. He was, famously, the only scientist to leave the Manhattan Project when, by 1944, this threat no longer seemed realistic. He recounted that the trigger was a comment by Leslie Groves, the military head of the project, that the bomb could be used against the Soviet Union. But Brown elaborates the complex motives and personal turmoil behind this decision. Rotblat had heard nothing from his wife since 1939, and learnt only later that she had perished in a concentration camp. And he was mindful that US authorities were concerned that his secret knowledge might reach Poland and fall into the hands of the Nazis or Soviets.

Rotblat returned to Liverpool, helping to rebuild the physics department, but moved in 1950 to a position in radiation medicine attached to St Bartholomew's Hospital in London. He first gained public prominence in 1954. By analysing radioactive dust from a Japanese fishing boat that strayed too close to a US thermonuclear test, he inferred key features of the bomb's design. He also appeared, with British philosopher Bertrand Russell, in an early *Panorama* programme on BBC television, highlighting the hazards of nuclear fallout. Russell subsequently prepared a manifesto against nuclear weapons, signed by Albert Einstein and other eminent scientists, which declared that the signatories were speaking "not as members of this or that nation, continent, or creed, but as human beings, members of the species Man, whose continued existence is in doubt".

Bolstered by this initiative, in 1957 Rotblat arranged for a select group of Eastern and Western scientists to meet in the Canadian village of Pugwash, Nova Scotia, for private discussions of how to control nuclear arms. Thus began the Pugwash conferences and workshops. There have now been around 300; Rotblat attended almost all of them before his death in 2005. Funding was a continual challenge, especially because it was crucial to avoid sponsorship from propagandist bodies.

BAN BROKER

How much influence did these non-governmental gatherings have? During the 1960s, the Pugwash Conferences undoubtedly offered crucial back-channel contact between the United States and the Soviet Union. This eased the path for the Partial Test Ban Treaty of 1963, and the subsequent anti-ballistic missile and non-proliferation treaties. The Pugwash agenda later broadened to include biological weapons and problems of the developing world. Brown argues that the

➔ **NATURE.COM**

For more on Joseph Rotblat and Pugwash: go.nature.com/tj6nn2

conferences thereby became less distinctive, and that their influence was diluted.

Brown also notes the tension between those who wished to promote piecemeal progress and those, such as Rotblat, who did not wish to lose sight of the long-term aim to rid the world of nuclear weapons. This latter view was widely derided as woolly idealism. But it gradually gained broader establishment support. In his later years, for instance, Robert McNamara, defence secretary to US presidents John F. Kennedy and Lyndon Johnson, attended several Pugwash meetings. This might have seemed incongruous, as did Rotblat's friendship with Soviet Union President Mikhail Gorbachev. But these men came together with the realization that eliminating nuclear weapons should be an eventual goal. This view has become mainstream, espoused recently by the US 'gang of four' (former secretaries of state Henry Kissinger and George Schultz, former defence secretary William Perry and former Senator Sam Nunn) and proclaimed in President Barack Obama's 2009 speech in Prague.

When the Pugwash Conferences were recognized by the 1995 Nobel Peace Prize, half of the award went to the organization and half to Rotblat personally. It was characteristic that he donated his half of the prize money to the organization.

That was also the year of Rotblat's absurdly overdue election to the Royal Society — recognition that meant a lot to him. In a memorable speech, he warned against exchanging the ivory tower for secret work. He quoted Solly Zuckerman, long-term adviser on nuclear policy to the UK government: "When it comes to nuclear weapons ... it is he, the technician, not the commander in the field, who is at the heart of the arms race".

Until his last few months (he died aged 96), Rotblat travelled the world with the resilience of a man half his age. He was concerned about the hazards that could stem from the misuse of twenty-first-century science, so was keen to convey his disquiet beyond the Pugwash community, and to a younger generation. He favoured a 'Hippocratic oath' whereby scientists would pledge to use their talents for human benefit. Whether or not such an oath would have substance, there can be no doubt of his success at raising awareness. Even in his nineties, he could still captivate students.

Brown's balanced and comprehensive biography is welcome. Rotblat's inspiring life — against a backdrop of tragedy and hardship, with idealism but without illusions — deserves to be better known. ■

Martin Rees is master of Trinity College, Cambridge, UK; former president of the Royal Society; and author of *From Here to Infinity: Scientific Horizons*. He has attended several Pugwash meetings.
e-mail: mjr36@cam.ac.uk

Books in brief

A User's Guide to Thought and Meaning

Ray Jackendoff OXFORD UNIVERSITY PRESS 288 pp. £16.99 (2012)
Linguist Ray Jackendoff wends his way through thorny questions around language and thought, hedge-clippers in hand. Covering words and meaning, consciousness and perception, reference, rationality and intuition, he reveals the split between how we experience the world and how perception and language are organized. His conclusion is that rational thought rests on intuition — and that meaning and thought are almost completely unconscious. The book is a multi-perspective journey into the hinterlands of the 'problem of knowledge'.

The Science of Yoga: The Risks and the Rewards

William J. Broad SIMON & SCHUSTER 336 pp. £16.63 (2012)
Whether it is hatha, ashtanga or kundalini, yoga is swathed in hype. This ancient discipline is a vast and growing industry in the West, and ripe for investigation. Science writer William Broad, a two-time Pulitzer prizewinner and experienced yoga practitioner, has spent five years researching the teaching and practice. The result is illuminating and often unnerving. Yoga has proven physical and psychological benefits, yet Broad shows how even ordinary poses, poorly taught to the unfit, can lead to strokes, serious hip-joint damage and worse.

Steam-Powered Knowledge: William Chambers and the Business of Publishing, 1820–1860

Aileen Fyfe UNIVERSITY OF CHICAGO PRESS 336 pp. \$50 (2012)
As e-books rise, it is salutary to recall another technological revolution in bringing words to mind: the steam-powered printing press. Historian Aileen Fyfe focuses on Edinburgh publishing firm W. & R. Chambers to reveal how the cheap print that flooded both sides of the Atlantic in the 1800s transformed the dissemination of knowledge. This chronicle of great endeavour is studded with small pleasures, from the horror over 'sordid' railway literature to engineer Charles Babbage's awe of printing speeds at *The Times*.

Across Atlantic Ice: The Origin of America's Clovis Culture

Dennis J. Stanford and Bruce A. Bradley UNIVERSITY OF CALIFORNIA PRESS 336 pp. \$34.95 (2012)

North America's first peoples were long thought to be Asians who migrated over the Bering land bridge some 12,000 years ago, bringing with them the tools of the Clovis culture. Now archaeologists Dennis Stanford and Bruce Bradley have radically recast the story. Drawing on climatic, genetic and archaeological evidence, they argue that the roots of Clovis culture rest in the Solutrean people of Spain and France, who sent some of their number across the Atlantic in boats 18,000 years ago.

The Puzzler's Dilemma: From the Lighthouse of Alexandria to Monty Hall, a Fresh Look at Classic Conundrums of Logic, Mathematics, and Life

Derrick Niederman DUCKWORTH 216 pp. £14.99 (2012)
Mathematician Derrick Niederman takes classic logic puzzles and weaves them into a fiendish brain-teaser of a narrative. He covers 'kangaroo' puzzles that contain their own answers, lateral-thinking posers, and even riddles that abide by Sherlock Holmes's great technique — eliminating the impossible so that "whatever remains, however improbable, must be the truth".