

Nuclear neighbors mull their fate

Confronting the Bomb Pakistani and Indian Scientists Speak Out

Edited by Pervez Hoodbhoy
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Reviewed by Frank Charles Barnaby

The Project on Peace and Security in South Asia is run by Princeton University's Program on Science and Global Security. One of the project's visiting scientists in 2011 was leading Pakistani nuclear physicist Pervez Hoodbhoy, who has taught at Islamabad's Quaid-i-Azam University, where he was chair of the physics department, and at the Lahore University of Management Sciences.

Researchers with and visitors to the Princeton project have published numerous papers about the dangers posed by nuclear policies in India and Pakistan. *Confronting the Bomb: Pakistani and Indian Scientists Speak Out* is a collection of 17 of those papers. The roughly 400-page volume, edited by Hoodbhoy, includes essays written by him and Princeton project director Zia Mian, an expert on nuclear weapons and nuclear energy policy in South Asia and on nuclear disarmament and peace.

The essays, which address nuclear politics in South Asia, focus on the role of scientists in India's nuclear weapons program and on the historical influence of the US on the establishment of Pakistan's nuclear program. They also discuss the effects of the growing religious and nationalist divisions in both countries; the implications of an "Islamic bomb" on security and the proliferation of nuclear weapons and technology; the risks and consequences of nuclear war in South Asia, with a focus on the India-Pakistan dispute over the Kashmir region; and the catastrophic consequences

of using nuclear weapons against the densely populated South Asian metropolises. Two essays explain why adding more nuclear reactors to generate electricity in Pakistan and India is not the solution to their energy crises.

John Polanyi, a recipient of the 1986 Nobel Prize in Chemistry, writes in the preface, "One source of nuclear folly that the present account brings out in the India-Pakistan context—but it is endemic—is the investment of great influence in a few people. There is a deficiency, often times an absence, of public debate where matters relating to a nation's 'secret' arsenals are concerned. Thus, India appears to have committed itself to the nuclear path before there was any consideration of the likely Pakistani response," which was, of course, to acquire its own nuclear weapons. On 18 May 1974, India tested a nuclear weapon, calling it "a peaceful nuclear explosion." And in May 1998, India conducted five more nuclear weapons tests: three on 11 May and two on 13 May. Then on 28 May Pakistan followed suit; it detonated five nuclear devices and became the world's seventh nuclear weapons country.

Reportedly, Pakistan now has about 100 nuclear weapons in its arsenal (India reportedly has about 90) that are deliverable by aircraft and ballistic missiles. The country is steadily expanding its nuclear capabilities and developing and deploying new nuclear weapons delivery systems, particularly ballistic and cruise missiles. If Pakistan goes on expanding at the present rate, its nuclear arsenal will double to about 200 nuclear warheads in a decade.

The international community has very good reasons to be generally more concerned about Pakistan's nuclear arsenal and its nuclear command-and-control systems than about India's. One is the terrorist activities of Al Qaeda and the Taliban in the country. In the past three years, two highly secure military bases have suffered major attacks. Those attacks have renewed and heightened international anxiety about nuclear safety and security in a country that is politically unstable.

Another is Pakistan's opposition to the international Fissile Material Cutoff Treaty under discussion at the

65-nation Conference on Disarmament, located in Geneva. That stance indicates the country's unwillingness to consider capping its fast-growing nuclear arsenal. It seems that the world will have to live with Pakistan's rapidly increasing nuclear power.

Bringing Pakistani and Indian scientists together to describe the nuclear predicament of their two countries, *Confronting the Bomb* is an excellent and authoritative primer for the debate about one of today's main global problems. The book reads well and treats the topic comprehensively at a suitable length. Hopefully, political leaders, academics, journalists, and other interested parties in nuclear weapons issues will read it.

Complex Plasmas and Colloidal Dispersions

Particle-Resolved Studies of Classical Liquids and Solids

Alexei Ivlev, Hartmut Löwen,
Gregor Morfill, and C. Patrick Royall
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Charged particles 1–10 microns in size and suspended in an ionized gas constitute what is called a complex, or "dusty," plasma. The same particles suspended in a liquid make a colloidal dispersion. Depending on the nature and strength of the interactions between them, the particles in either system can adopt structural arrangements that are the analogs of atomic gases, liquids, and solids. A striking feature is that because of the long range of the Coulombic repulsion between the particles, both plasma and colloidal crystals can be dilute, with lattice spacings of many particle diameters. Particles in this size range can be imaged accurately for the determination of structure, and their motions can be followed by video microscopy.



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