EXHIBITION

A protein ghost etched in glass

Marta Paterlini

The starting point of the touring exhibition *Design4Science*, now running at the Nobel Museum in Stockholm, was the pioneering Laboratory of Molecular Biology in Cambridge, UK — the birthplace of protein crystallography. Max Perutz, who was chairman of the lab when it was founded in 1962, encouraged photographers and designers to be part of the scientific team from the start.

Wandering around the well-known protein and virus models that resulted, one much more recent piece stands out: a dizzying ghost of a protein molecule

mounted in a block of glass.

Colin Rennie, a young artist from Sunderland, UK, took inspiration from ATP synthase, the molecule that rotates to produce adenosine triphosphate, the universal currency of biological energy. Rennie used a powerful water-jet cutter to recreate the three-dimensional structure of the molecule in a 780-kilogram cube of 30 glass layers measuring 1 metre across.

Rennie's vibrant artwork captures the spatial and temporal fixity of protein crystallography and the sense of motion of this particular molecule. The transparent glass embodies the

tension between the seen and the unseen that is intrinsic to our perception of the molecular world. At the same time, it mimics the protein crystals that give scientists their atomic models.

As the renowned scientific artist Irving Geis once said: "We can only

say 'it's something like that' — and only create a visual metaphor."

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Design4Science runs until 31 August at the Nobel Museum, Stockholm (www.nobelmuseum.se).

DESIGN4SCIENCE

Census of cyberspace censoring

Access Denied

edited by Ronald Deibert, John Palfrey, Rafal Rohozinski and Jonathan Zittrain
MIT Press: 2008. 320 pp. \$20.00, £12.95

Bruce Schneier

In 1993, Internet pioneer John Gilmore said "the net interprets censorship as damage and routes around it", and we believed him. In 1996, cyberlibertarian John Perry Barlow issued his 'Declaration of the Independence of Cyberspace' at the World Economic Forum at Davos, Switzerland, and online. He told governments: "You have no moral right to rule us, nor do you possess any methods of enforcement that we have true reason to fear."

At the time, many shared Barlow's sentiments. The Internet empowered people. It gave them access to information and couldn't be stopped, blocked or filtered. Give someone access to the Internet, and they have access to everything. Governments that relied on censorship to control their citizens were doomed.

Today, things are very different. Internet censorship is flourishing. Organizations selectively block employees' access to the Internet. At least 26 countries — mainly in the Middle East, North Africa, Asia, the Pacific and the former Soviet Union — selectively block their citizens' Internet access. Even more countries legislate to control what can and cannot be said, downloaded or linked to. "You have no sovereignty where we gather," said Barlow. Oh yes we do, the governments of the world have replied.

Access Denied is a survey of the practice of Internet filtering, and a sourcebook of details about the countries that engage in the practice. It is written by researchers of the OpenNet

Initiative (ONI; www.opennet.net), an organization that is dedicated to documenting global Internet filtering around the world.

The first half of the book comprises essays written by ONI researchers on the politics, practice, technology, legality and social effects of Internet filtering. There are three basic rationales for Internet censorship: politics and power; social norms, morals and religion; and security concerns.

Some countries, such as India, filter only a few sites; others, such as Iran, extensively filter the Internet. Saudi Arabia tries to block all

China restricts Internet access by keyword.

pornography (social norms and morals). Syria blocks everything from the Israeli domain 'il' (politics and power). Some countries filter only at certain times. During the 2006 elections in Belarus, for example, the website of the main opposition candidate disappeared from the Internet.

The effectiveness of Internet filtering is mixed; it depends on the tools used and the granularity of filtering. It is much easier to block particular URLs or entire domains than it is to block information on a particular topic. Some countries block specific sites or URLs based on some pre-defined list but new URLs with similar content appear all the time. Other countries — notably China — try to filter on the basis of keywords in the actual web pages. A halfway measure is to filter on the basis of URL keywords: names of dissidents or political parties, or sexual words.

Much of the technology has other applications. Software for filtering is a legitimate product category, purchased by schools to limit access by children to objectionable material and by corporations trying to prevent their employees from being distracted at work. One chapter discusses the ethical implications of companies selling products, services and technologies that enable Internet censorship.

Some censorship is legal, not technical. Countries have laws against publishing certain content, registration requirements that prevent anonymous Internet use, liability laws that force Internet service providers to filter themselves, or surveillance. Egypt does not engage in technical Internet filtering; instead, its laws discourage the publishing and reading of certain content — it has even jailed people for their online activities.

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