

▶ allure of the mathematical one.

If *Birth of a Theorem* is the personal record of a single-minded quest, *Mathematics Without Apologies* is a kaleidoscope of philosophical, sociological, historical and literary perspectives on what mathematicians do, and why. Do they pursue their work for the public good? Harris dismisses that as a pose, useful for grant applications and little else. Is it the absolute truth of mathematical demonstrations that drives the field? That, Harris contends, is a conceit of philosophers: practising mathematicians seek insight, not certainty. What about the lauded beauty of mathematics? Perhaps, Harris concedes, but when mathematicians talk about beauty, what they mean is pleasure. A 2012 sociological survey found that 91% of pure mathematicians cited it as a key attribute of the field. Mathematicians, Harris concludes, do what they do because of the enormous pleasure it brings them.

Pleasure is not an explanation likely to satisfy funding agencies. Yet Harris makes no apologies. He is concerned that the field has made a Faustian bargain with the institutions that provide the material conditions for mathematical research. Leading mathematics departments have trained an army of quantitative analysts, or quants, to implement the algorithms that govern financial trading practices. The impersonal, unchallengeable equations of higher mathematics, he worries, contribute to a moral vacuum at the heart of high finance.

Harris's insider view reveals a community in which each mathematician is placed in an informal but strict hierarchy, depending on acknowledged brilliance and accomplishments. He takes a playful detour, arguing that each of US writer Thomas Pynchon's 'non-linear' novels is organized around a different conic section, such as a parabola. Throughout the book, he verbally spars with an imaginary "performing artist" while trying to explain the mysteries of number theory.

But, like Villani, Harris returns repeatedly to the chasm between the human world and the mathematical one — a tension that in his own life has proved fruitful. Stuck in a professional cul-de-sac in the 1990s, Harris experienced a revelation: a dream showed him a new mathematical path, which led to his ascent up the mathematical hierarchy and transformed his life.

For him as for Villani, mathematical insight at its deepest core remains an irreducible personal experience. ■

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SOCIAL SCIENCE

Aid's inconvenient truth

Erin Bohensky applauds a documentary revealing how disaster relief can have disastrous impacts.

At the start of Raphael Barth's provocative documentary *Aftermath*, a bottle of Coca-Cola lands on a pristine beach. The image calls to mind the satirical 1980 film *The Gods Must Be Crazy*, in which the lives of Kalahari Desert tribal peoples are changed irreversibly by modernization. Barth's is the true story of how foreign aid delivered to inhabitants of the Nicobar Islands after the 2004 Indian Ocean tsunami became a second disaster.

Barth's film focuses on social ecologist Simron Singh and his work with these indigenous peoples. In setting out to help them, Singh grapples with two questions: why is aid so dysfunctional, and how can science help people in crisis?

Singh first visited the islands in 1999 to research Nicobarese culture, and befriended many in the community. After the tsunami, they asked him for help. Singh mobilized funding from the Austrian Science Fund to support rehabilitation research. In the film, he — with community spokesperson Prince Rasheed Yusoof and local reporter Denis Giles — watches aid pour in from hundreds of non-governmental organizations (NGOs). In effect, the tsunami engineers the perfect social experiment, revealing what happens when cash and unneeded commodities are funneled to a remote indigenous community. There was "no way back", Singh admits.

The donations, Barth shows, are mismatched to needs and context. The community wants tools; donors bring blankets. Houses and schools rebuilt with aid are ill-ventilated "boiling chambers". A government initiative provides European-style dwellings housing just five or six people, fragmenting the large joint family groups traditional among the Nicobarese. "Who is helping whom?" Singh asks. "Are the victims helping the organizations to reproduce themselves?"

How can the messy problem of ineffective aid be fixed? Development analyst Ben Ramalingam has argued that we must understand development as a complex system to address underlying causes rather than treat symptoms. *Aftermath* shows Singh and colleagues in Vienna creating the Sustainable Indigenous Futures (SIF) fund in 2005, to



Aftermath: The Second Flood

DIRECTOR: RAPHAEL BARTH
Golden Girls/Filmtank/
TwoPair/Tata Institute
of Social Sciences/
ORF: 2014.

provide financial aid directly to the community. As they soon learn, however, even well-directed intervention is no substitute for empowerment. Nominated community members struggle to abide by NGO norms of accountability. "A Nicobarese cannot become a project officer in ten days," Yusoof concedes. The community shuns Singh when the SIF stops sending money. In 2009, Singh and the SIF establish a partnership with a local NGO, the Tata Institute of Social Sciences, to reinstate resource-based livelihoods such as fishing in the islands.

Is the global aid enterprise learning from its mistakes? Perhaps. Extreme events can be catalysts for change. One young Nicobarese man leaves to pursue a higher degree, noting how the tsunami has shaped his aspirations. Yusoof is building a community tourist resort to generate income locally. Through such proactivity, resilience is built.

Finally, we see Singh, meticulously sorting slides, promising to document it all for the Nicobarese. But he questions the current paradigm of aid based on Western capitalist values. He even asks whether people in crisis need assistance at all. Scientists, he proposes, can help most by bringing together scientific and local ways of thinking to guide NGOs' actions on the ground.

Aftermath is a gritty, honest picture of two communities: the Nicobarese and aid agencies. Raw moments such as a ceremonial pig butchering, or a glimpse of the ethical and administrative conflicts that can trap development agencies in operational gridlock, are delivered unflinchingly. Ultimately, the Nicobarese have hope. "The aid has stopped," Yusoof concludes. "Now the real normal life starts, and we are happy." ■

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