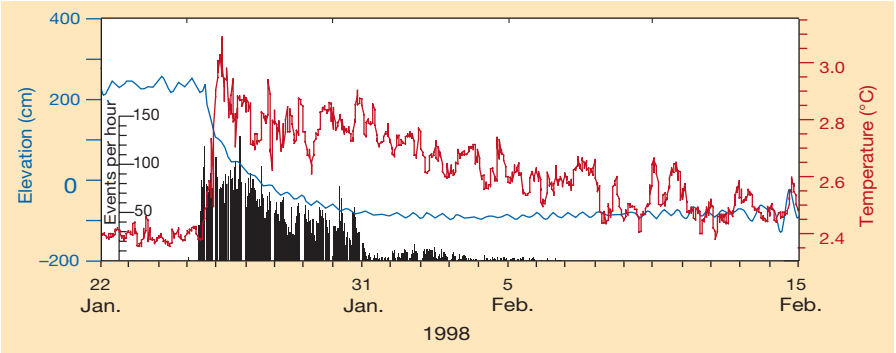

Figure 2 **Sequence of eruption-related events at Axial Seamount from 22 January to 15 February 1998. Shown are the number of earthquakes identified per hour from SOSUS acoustic data (black)[1]; subsidence of the sea floor of the seamount's caldera (arbitrary absolute scale) (blue)[2]; and temperatures measured 15 m above the sea floor (red)[4].**

and in the water column above the caldera detected a temperature anomaly[2,4] (Fig. 2).

While the caldera remained active, seismic activity also began to migrate along the southern rift zone. Initially the rate was rapid, but it then stabilized to 20 km per day for about three days and ended roughly 70 km away (Fig. 2). Detectable activity continued for about ten days at the extremity of the rift zone, but at a much lower level[1]. A low level of activity at the caldera was observed to continue for nearly two months with ocean-bottom hydrophones placed near the seamount summit[8]. The correlation between caldera subsidence and the migration of seismicity (Fig. 2) led to the conclusion that the eruption, fed along a sheet-like dike beneath the southern rift zone, had partially drained the magma chamber located about 3 km below the caldera floor.

Despite the possibility of winter storms, an immediate event-response cruise (followed by three more in the summer) was organized to take a closer look. The ship arrived 18 days after the initial detection of the earthquake swarm. Comparison of new swath-echo-sounding data and visual observations with previous information provided constraints on the thickness and extent of new volcanic rock erupted at the sea floor[5]. It is estimated from this and from the 3-m magnitude of the caldera subsidence that roughly $1–2 \times 10^8$ m^3 of magma had been supplied from the summit magma chamber to seafloor flows and to the feeder dike beneath the southern rift zone during the eruption. Eruption of seafloor lavas extended 9 km down the rift, although this was only a fraction of the dike-propagation distance indicated by the seismic data.

Action at Axial Seamount was not confined to seismicity and volcanism. Initial signs of hydrothermal activity were seen in the monitoring data, and thermal profiling during the first response cruise revealed a large 'lens' of warm water southwest of the summit[4], one with an anomalously low ^{3}He/heat ratio[6]. This 'fingerprint' suggests that the warm lens had been produced rapidly by heat exchange during the ten-day eruptive phase, and was subsequently swept some 20 km from its source by ocean currents. The increased rate of hydrothermal heat transfer was estimated to be as much as 200 gigawatts, more than two orders of magnitude greater than the typical heat output from the caldera during quiescent periods[4].

One intriguing finding was the increase, relative to typical values in hydrothermal vent water at Axial Seamount, of methane concentrations in the plume created by the volcanic activity[7]. Although the source is unknown, one possibility is that microbiologically 'mature' water in the crust, cool enough to support life, was suddenly heated by the volcanism and buoyantly ejected.

None of these observations runs counter to our general ideas about how volcanism and associated hydrothermal activity might operate. Nevertheless the data provide excellent quantitative information about the relationships between tectonics, volcanism and hydrothermal circulation at seafloor-spreading centres, and about the magnitude of one particular episode of activity at this site. They show that such events happen often enough for monitoring over a period of decades to bear results. And they make it clear that they are sufficiently short-lived to make continuous observatory monitoring essential. How typical this particular episode might be will emerge from continuing studies, and with expanded undersea technologies it will be possible to catch more of the action the next time it happens. ■

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Daedalus

No more feelings

Last week Daedalus decided that consciousness, as a product of evolution, must be coded for in the genome of all conscious creatures. Anaesthetics abolish it selectively. 'Dissociative' anaesthetics, such as ketamine, even leave a degree of responsiveness. By identifying the gene or genes for consciousness, and working out the actions of the proteins they code for, DREADCO biochemists now plan to synthesize the ultimate dissociative anaesthetic. It will abolish awareness, but no other brain function. Like an alcoholic in a state of palimpsest, the user will seem entirely normal. But he will be a pure robot, reacting in all the usual ways but without feeling. Behind his fluent mannerisms and animated face, inside his skull, there will be nobody at home.

'Nothingness', as the new anaesthetic will be called, will bring compassion to modern farming. The ruthless brutalities of agri-business will still make its animal victims cry and cower in seeming misery. But these will be empty, robotic reactions, no longer denoting real suffering.

Human demand for Nothingness will also grow rapidly. It will be smuggled into prisons, releasing the inmates from their extended ordeal without brutal warders or interrogators suspecting anything. A prisoner on Nothingness will still eat, walk, talk, spit defiance or yell with pain without anyone suspecting that he is not suffering. People trapped in ghastly jobs or marriages, debilitating illnesses or grinding poverty, will also welcome the chance to erase their miseries while still fulfilling their obligations.

Nothingness will raise in an acute form the old philosophical problem of telling if anyone or anything is truly conscious, or is merely reacting without feeling. Alan Turing's famous test challenges a judge to distinguish the subject's responses from those of a computer simulation. In effect, the judge assesses the consciousness of man or machine by comparing them with an authentic sample of consciousness — his own. A robotic individual on Nothingness, with no internal standard of consciousness, could not do this. So Daedalus, cunningly, will judge the effectiveness of his product by a 'meta-Turing' test. A robotic, unconscious man will reveal the fact by being quite unable to judge a Turing test. David Jones

The Further Inventions of Daedalus **(Oxford University Press), 148 past Daedalus columns expanded and illustrated, is now on sale. Special *Nature* offer: m.curtis@nature.com**