At the local spreading rate of 0.2 km yr^{-1}, the flow represents 1,000 years' supply of lava erupted at one place and time.

There are two ways in which new sea floor is created: by magmatic intrusion and extrusion to form new crust; and by stretching of pre-existing crust. When the latter happens on a large scale, as it does in the North Atlantic, the magnetic-anomaly pattern is degraded and outcrops of lower-oceanic crust are found at the sea floor. Such effects would be seen on the East Pacific Rise if eruptions occurred only once every 1,000 yr and each covered less than 10 per cent of the sea floor accessible to major eruptions. In 10,000 yr, about 2 km of new sea floor forms at these fast spreading rates, and most of this would have to be produced by crustal stretching if eruptions were episodic. In fact, the East Pacific Rise has a continuous lava carapace, outcrops are confined to fracture zones, and the magnetic anomaly pattern contains much fine detail. Probably no more than 10 per cent of lava can be erupted in major flows if both of these conditions are to be maintained, which would mean that the world-wide recurrent interval of major flows must be more than 50 yr, perhaps several hundred years. Indeed, the Lakagigur eruption in Iceland may have been the most recent eruption of this kind preceding the Pacific one.

Macdonald *et al.* discuss the effect of the eruption on the axial magma chamber that has been demonstrated to underlie the crest of the East Pacific Rise elsewhere. They estimate that the flow represents about 10 per cent of the volume of the magma chamber, but in doing so, I believe, they overestimate the size of the chamber: the flow may represent as much as half its volume. In either case, the eruption should have resulted in a significant deflation of the ridge crest at least in the local area of the eruptive craters. Yet the ridge-crest morphology is described as inflated and appears so on the map. If this is the case, then the eruption (which emerged apparently not from the crest of the ridge but from the base of the axial high 2–3 km from the spreading axis) must have resulted from some extra inflation, perhaps from the sudden injection of a large volume of new magma into an already inflated magma chamber.

This presents another fascinating aspect of the problem. Recently McKenzie and colleagues[6] succeeded in convincing many volcanologists that magma must dribble out of the mantle as soon as it forms, and that large bodies of magma cannot form within the viscous asthenosphere which underlies the mantle. If here we have a spectacular counter-example, suggesting a sudden input of several cubic kilometres at once into a magma chamber at one place, that would have a profound effect on this line of thought.

By coincidence other apparently young and massive sea-floor lava flows have been discovered recently[7]. But these are not at spreading plate boundaries. Instead they cover large areas of the deep ocean floor around the Hawaiian islands. The flows were discovered during a systematic survey of the US exclusive economic zone with the British side-scan sonar GLORIA. In one place the flows cover 150,000 km^2, and fresh glassy basalt has been recovered, showing that the flows are young. It is not clear whether these flows are related to the island volcanoes (they are found in deep oceans 1–300-km offshore) or to the magmatism of plate boundaries (they are in the centre of the Pacific plate). Whatever the case, they clearly represent another submarine volcanic enigma.

The discovery of these apparently young, large lava flows has led Shaw and Moore[8] to speculate that large sea-floor eruptions might be a trigger for the El Niño climatic fluctuations of the equatorial Pacific. They suggest that the amount of heat released from a young lava flow of this size would be enough to produce sufficient warming of the sea surface layers to generate climatic fluctuations. This, I think, is the easiest of the ideas spawned by the East Pacific eruption to test. Not only would the frequency of such eruptions be too low to generate the observed frequency of El Niño, but Shaw and Moore entirely neglect the problem of getting the heat to the surface. For a plume of hot water to penetrate the stratification of the deep ocean, and then the thermocline, in the well-stratified equatorial Pacific, would apparently require a buoyancy flux of far greater magnitude than could be provided by even a large eruption. Surely that trail must be a dead end.

But if a single observation has generated so many interesting sparks even before its formal publication, there must be fair mileage in it yet. The next step must be to go and examine the lava flow, to collect samples for analysis, to determine its helium-isotope content and to determine its age (which will not be easy). The helium plume must be revisited as a matter of urgency to test that side of the story. Then, of course, it might be a good idea to have another look at the more accessible Lakagigur flow. How does that fit into the scheme of global and Icelandic magma plumbing? How is that related to processes in the mantle and to the history of Icelandic volcanism? We'll see. □

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Joe Cann is in the Department of Geology, University of Newcastle upon Tyne, Newcastle upon Tyne NE1 7RU, UK.

Daedalus

Time is money

Queueing, especially in long institutional queues, implies that while the time of the institution is valuable, that of the queuer is worthless. This outlook probably reaches its high point in the Soviet Union, where you can queue indefinitely for a permit to join another queue; but high marks must also go to the packed waiting rooms and overbooked appointments systems of Britain's much-loved National Health Service.

Daedalus now presents a practical solution. The DREADCO Op-time-miser® is a sort of combined register, computer and vending machine. Installed in (say) a hospital waiting room, it accepts details of each patient to transmit ahead to the doctors. It also notes his time of arrival, and requests him to state the value of his time in pounds per hour. It already has this information for those already present: so it can calculate a 'break-even waiting time' for the group as a whole. Those who value their time highly are assigned a shorter waiting time than this, and pay for the time they save; those who value it modestly wait longer, and are paid their stated rate for the added inconvenience. The 'break-even time' is calculated so that the money paid in by the short-stayers is just sufficient to recompense the long-stayers. The group transaction always breaks even.

Thus the usual dreary waiting for broken appointments is eliminated. Patients just turn up out of the blue and immediately receive an estimate of their waiting time and its likely cost or reimbursement. This time may change as later arrivals modify the optimization; but each queuer knows how much he will be paid for added inconvenience, or charged for speedier service. The rich, as ever, can buy their way to the head of the queue; but the poor are not aggrieved, as they get the money. Nobody will put an absurdly high value on his time; for that increases the chance that he will have to pay out at that rate. But a deposit may have to be charged, to deter healthy layabouts who set a very low value on their time so as to sit endlessly in the warm waiting room at a slowly growing profit.

The Op-time-miser will revolutionize public life. In hospitals, passport offices and unemployment bureaux, wherever an inflexible bureaucracy confronts a resentful public, it will rationalize and smooth their dealings. Daedalus also plans to sell its software to all those booking, repair and installation services that have to juggle unpredictable customer requests into a queue. It will compensate for the sort of maddening delays and broken promises that gave rise to this announcement in the 'Births' column of a British national newspaper: "To Mr and Mrs Smith. Gratefully, after seven years. A telephone". David Jones