helped organize into the International Crustal Research Drilling Group.

Looking at a typical rock core from the ocean floor one sees, at its top, a thin layer of sediments; under this come the pillow lavas, rounded, often purple shapes characteristic of lava cooled underwater; then, the sheeted dykes — basalt frozen like so many playing cards in the fissures characteristic of a spreading sea floor; below, the greenish, coarse-grained gabbro, lava which never reached the surface but froze here at depth; and in the mysterious regions lying still deeper, the heavy rock of frozen magma chambers and of the mantle.

Hall and his scientific partners have become adept at reading the messages written in such cores and in numerous papers they have reported their surprising interpretations:

- The outpouring of lava that forms the ocean floor, for instance, is not continuous; major eruptions occur once every 10 000 years of so, each fed by lava from a distinct magma chamber.
- Drill cores tell of volcanoes fighting to rise above the waves only to sink again and again beneath the weight of accumulating lava.
- One of the biggest surprises — the oceanic crust has been tilted, rotated, and structurally distorted.
- And, though the fact of sea floor spreading has been well established, no source has yet been found for the strange magnetic stripes. Drills probing for details within an anomalously magnetized block of crust reveal not the uniformly magnetized rock expected but instead a magnetic jumble.

The ocean floor, in short, is far more complicated than the tidy picture sketched by plate tectonics theory a decade ago. "After years of drilling merrily away," says Hall, "we failed to find the simple patterns we were looking for."

Usually when Hall says "we" he is referring to his close friend and collaborator, Paul Robinson. They met on board the *Glomar Challenger*, found they both were bitten by the ocean floor bug, and have since productively melded their specialities: Hall is an expert on rock magnetism, Robinson on structure and geochemistry. Robinson has taken three years leave from the University of California to work alongside Hall.

For Hall and Robinson, their next scientific expedition to study the ocean floor is not over water, but on land — the island of Cyprus. With the help of almost $2 million from science funding agencies in other countries, from Canada's Natural Sciences and Engineering Research Council and the International Development Research Centre, Hall and Robinson, a Canadian drilling crew, and an international team of almost 100 earth scientists are now at work on the eastern Mediterranean island. They are recovering more than 4 km of drill core from a chunk of ocean floor which somehow, during the collision between the African and Eurasian plates, was thrown onto the island of Cyprus, where it is known as the Troodos mountains.

It is an ambitious project. The plan includes investigating what Robinson calls "the plumbing system" beneath an exhausted copper mine. Hot springs on the ocean floor become, when fossilized, the ore bodies such as Cyprus was famed for in antiquity (the words "Cyprus" and "copper" in fact, are synonymous) and many of those we mine today. Such studies may well lead to predictions of where ore occurs, and perhaps to new prospecting tools. It is probable that drilling below the Troodos range will also yield information on underground reserves of water, a precious commodity on semiarid Cyprus. As well, earth scientists from many Third World countries have been invited to attend eight-week-long training sessions in Cyprus, to learn about Canadian diamond drilling, groundwater exploration, and marine geology.

The overiding goal, of course, is to find more facts about the ocean floor, and with them as raw material, to attempt the feat that challenges all scientists — to add new ideas to our stock of truths.□

Séan McCutcheon

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NSERC

Apart from the operating grant that Jim Hall receives from the Natural Sciences and Engineering Research Council (NSERC) to keep his university laboratory running, he also gets what is known as a strategic grant. This added funding is provided because Dr. Hall's research is in one of the areas that NSERC has identified as vital to the national interest: oceans (the others are energy, communications, agriculture, environmental toxicology, and the recently introduced area of biotechnology). Hall is no stranger to the study of rock samples retrieved from kilometres below the ocean floor, as a cursory glance back on his work reveals. A decade ago, he and fellow Dalhousie University Professor Fabrizio Aumento led a project on the scientific research ship *Glomar Challenger* that featured an international team of scientists drilling for seafloor rock samples along the Mid-Atlantic Ridge; this spine of undersea mountains runs down the central part of the Atlantic ocean. That work was also funded by NSERC when it functioned as NRC's Office of Grants and Scholarships.

The *Glomar Challenger* at sea — site of the forging of the Hall–Robinson collaboration.

En mer, avec le *Glomar Challenger* où s'est forgée la collaboration entre Hall et Robinson.