Extreme_Innovation.qxd 14/11/06 5:10 pm Page 2





# Innovation for extremes

*Mike Parsons of the Institute for Entrepreneurship and Enterprise Development*
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The fourth Innovation for Extremes conference was held at Lancaster University in the UK in September. The UK Outdoor Industry is a relatively small, close-knit group, with a reputation for being good with new ideas, albeit not always getting those ideas successfully onto the world stage.

The conference highlighted the fact that we are on the edge of very interesting technical times with new themes and technology running through. These areas include weight, where the business of nanotechnology and wearable electronics might take us, and the ever-increasing presence of environmental concerns. Compared with the USA, the main area missing is the involvement of the military as the industry structure is quite different and the legal situation does not require so much national content.

The University of Lancaster also hosts the very successful Institute for Entrepreneurship and Enterprise Development, as the conference very much fits with the role of the Institute as a bridge for knowledge transfer between universities and business. The Institute and the conference argue that popular wisdom has it that invention is like a bolt of lightning. However innovation is evolutionary in the Darwinian sense, as knowledge and expertise build and change and other more suitable/competitive ideas crush and replace the preceding ones.

Innovation involves boundary crossing and creativity, with inspiration coming from the past, from science, suppliers and other products. It combines imagination and creativity with an understanding of both users and competitors. Above all, it involves high risk and its successful diffusion is more a sociological process than a technological one.

These meetings are consequently particularly important in order to make the unexpected connections which lead to quantum leaps in product. As such, the subjects covered the evolution of equipment for potholing, climbing Everest in replica Mallory clothing, nano-technology, smart technology and the importance of standards.

We have read and written much about the recreation of the Mallory clothing and the fact that his clothing was better suited to the task than had been thought, but to hear this first hand from a mountaineer who has been involved with Everest and the Mallory project for many years is inspiring. Graham Hoyland, who does programmes for BBC TV and the Discovery Channel, went back this year to Everest to test the replica clothing worn by Mallory on his ascent from the North Side of Everest.

## Mallory probably did summit

Mallory did not wander up Everest in a tweed jacket as many old stories suggest, but rather in clothing which Hoyland described as having a pleasant handle, well-fitted and well-designed - especially the belted jacket and sleeve design. There were more or less eight layers made up of silks, cottons and wools and the fitting was such that today's CAD/CAM systems would be hard-pressed to improve on what was achieved 80 years ago. Replicas of the boots have not yet

Extreme_Innovation.qxd 14/11/06 5:11 pm Page 3



been made but Hoyland noted that the lightly nailed boots were light and efficient. The nails did not pass through the soles all the way to the foot, so the cold did not transfer. They were not as well insulated as today's footwear but they were excellent for the task.

Hoyland took the clothing to 22,000 feet on Everest and still hopes to persuade the BBC to fund the whole climb. He thinks now that Mallory did summit but fell on the way down and tried to overnight. The equipment was not capable of aiding overnight survival.

Many lessons are to be learned from this. One is that in a rush to synthetics much of the industry abandoned the technology of natural materials, and at the same time we allowed our clothing, footwear and kit to get heavier. Eighty years ago our mountaineers had better kit than we imagined and it was lighter than much of what we wear today.

Today's expert on lightweight kit, Mike Parsons, agrees that lightweight is not so new. He described how Norwegian Fridtjof Nansen crossed Greenland in 1888-89 and in so doing broke the rules for this sort of travel. These rules had been set via the naval approach to the search for the North West passage in the early 19th century and were based around ensuring that equipment and stores ensured a safe return in case of failure.

Instead, Nansen ignored the escape insurance approach and went for speed and lightness and from then on there was a building of lightweight knowledge, even to the Mummery 1895 tent, using the ice axe as a pole and weighing just 0.66-0.89kg. The difference by region in equipment development is also interesting, according to Parsons. The heritage of US tents is in the backwoods, while that of the UK is in the mountains. New technologies in the last two decades have transformed the possibilities here with aluminium, new electronics to replace the sextant and call in emergency help, and the many smart fabric advances with nano approaches and biomimetics.

## The study of very small things

Professor of physics, Colin Lambert, took the conference into the realm of nanotechnology. Nano means dwarf in Greek, but here we are playing at very small dwarfs indeed, with nanoscience being all about the 1-100nm level. At this tiny size odd things happen. We know that apples fall to the ground from trees, but dust particles do not fall in the same way. As things get smaller their properties change and our daily common sense does not apply. Eventually we approach an atomic scale at which quantum physics comes into play.

He noted that this really began when Gerd Binnig, along with his colleague, Heinrich



*Mountaineer Graham Hoyland on Everest wearing 1920s replica gear.*
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Rohrer, was awarded the Nobel Prize in Physics in 1986 for his work in scanning tunnelling microscopy. This was the first time scientists could look at atoms and since then the concept of nanotechnology has moved in many different directions, electronically and via carbon nanotubes. Whether we are ready as a society or not, nanoscience has arrived. Computers will soon be all pervasive, in bodies, in clothing and other items. And they will change the whole interface between the computer and the individual. The question was asked about the implication of the moment when a transistor can be reduced to the size of an atom...and was left hanging.

The conference moved on to standards, with Mick Farnworth of Mammut discussing the testing of sleeping bags. The industry needs to be properly involved. Tests are expensive – €1,500 per sleeping bag – have some legislative authority, and yet are often developed by either some bureaucrat with no industry or product knowledge or by one or more industry participants who wish to secure a commercial advantage rather than achieve the best objective test.

Will customers be willing to pay for the new nano and bio technologies? According to one senior retailer in Scotland, the top selling items in the last year have been GPS, digital maps, and head lamps. Yet as the baby boomers come of age and the industry needs to attract them into the outdoors, do they need simpler things to head for the hills? Whatever the truth, segmenting, targeting and positioning, along with sorting the supply networks to reduce inventories and lead times, are topics for the future.