...directly to the South Col

'Serious' mountaineering is practiced by those whose sport takes them into the permanency of snow and ice at significant heights on the Earth's surface. Danger is ever-present – if not, why go there – and often the first indication of a physical problem is the oldest marker known to man; cold feet. And for that reason 'serious' mountaineers wear double boots consisting of a stiff protective outer and a softer, heat retaining inner.

Although originally the combination was a mixture of thick leather and felted wool, modern high-expedition boots can be a mix of leather and plastic, a combination of plastics with complementary properties, or the toughest of modern polymer fibres matched to a high level of insulation. The technology employed for the inners uses MVT (moisture vapour transmission) fabrics, foam insulation and brushed nylon or polyester linings.

The use and manufacture of crampons is a subject well worth investigation on its own account, but it follows that these aids to movement on icy surfaces are a prerequisite for mountaineering at this level – and all the footwear must of necessity be crampon compatible. It normally takes several hours if not days to reach the steep mountainous ice conditions necessitating the use of boots with crampon systems. The two key performance features offered in this footwear category are protection from cold and protection from injury. Comfort is important, but let's face it, rigid or semi-rigid boots weighing 5 to 7 lbs. are not likely to feel like bedroom slippers. Amongst the slightly less serious, but more comfortable, glacier boots available on the market are the new Salomon Mountain 9, the Asolo Guide and the Vasque Alpine. These are all light, comfortable, crampon compatible boots suitable for anything up to high-angle ice climbing or winter mountaineering. Expedition grade footwear is a category unto itself. Climbing at the top of the world requires insulation capable of withstanding -50°F temperatures as well as offering physical protection and a range of technical high-altitude climbing features.



A double boot system with an integral gaiter of DuPont Cordura, La Sportiva's Olympic Mons is the latest extreme model from the lasts of this Italian manufacturer



Freney-XT by Scarpa. A very light boot lined with Thinsulate.

Keep your footbeds dry

The latest mountaineering boot from La Sportiva (Italy) is its knee-high Olympus Mons model. This double boot has an integrated gaiter made of DuPont Cordura with abrasion resistant Aramide high tenacity fibre reinforcement combined with a PE



The boot with the narrowest footprint on the market, Asolo's Ottomila nevertheless manages to include a board-lasted inner shoe into its specification.

(polyethylene) insulating barrier. The outer boot is a Cordura upper with dual density PE micro-cellular insulating closed cell foam lined with a thermo-reflective aluminum facing. The inner boot is built with a water repellent breathable upper and dual density PE micro-perforated ventilated foam, with a tri-dimensional structured polyester and pile lining. It has a durable anti-slip MPE "bath tub" lug sole that will lock on to any step-in crampon mountaineering binding and is backed with an insole that has a 6mm insulating honeycomb structure carbon fibre with PE insert for stiffness. The insulating footbed is removable and it is always advisable to keep a dry replacement pair available.

La Sportiva makes several boots for expeditions and hard ice climbing: Lhotse GTX for ladies, Trango S and Trango Ice Boots and Nepal Extreme. Intended for technical mixed ice climbing, the Trango is a light and flexible boot with a Lorica liner. The Schoeller-Keprotec uppers have thermo-reflective Aluminia insulation and an integrated Schoeller Dynamic gaiter in the upper. The Nepal Extreme boot has a leather Synergy-PTFE lining insulated with 200 gsm 3M Thinsulate and a Thermo midsole that helps to keep the feet moving as the mercury falls below 0°F. Weighing in at about 5lbs apiece the Nepal Extreme has adequate room for several layers of socks, a heel pocket and a tall cuff that keeps the foot totally locked on front points yet flexible enough for approaches to the cliff edge. The French 3.2mm Idro Perwanger full leather chassis with HP3 midsole sticky rand helps to keep control on the icy slopes.

Socks, MVT and more socks

Layering socks seem to be the best method of retaining heat between the foot and the inner boot. Minimal amounts of moisture evaporation occur in heavy mountaineering boots during use; especially as the plastic outer shells have only marginal breathable qualities. However, sock brands such as Thorlo, Smartwool and Seirus produce specific winter socks offering acrylic and polyester fibre blends to wick moisture away from the skin. Many cold weather climbers still prefer high wool content in outer socks combined with nylon or Capilene worn next to the skin. This reduces the incidence of blisters, frostbite and hot spots. Lorpen has recently launched its TEPA sock with Polartec Power Stretch fabric, which is extremely warm when used in thicker base layers. The sock, which is asymmetrically manufactured, is recommended to be worn in extremely low temperatures such as occur when ice climbing.

Koflach invented the dual-density polyurethane shell combining the comfort of leather and the waterproof, durable, ultra-supportive performance of plastic, it calls Y-Technology. Koflach makes several boots in the "expedition" mountain climbing category. The Arctis Expedition Boot and Koflach Vertical plastic boot share the same shell, however the Expedition uses a full size larger for the same size boot to accommodate the thicker and warmer liner. Performance Fit liners in the Vertical are slightly thinner to deliver better technical ice climbing performance. Both are guaranteed to keep the feet warm to -40°F. In fact, the Vertical is as warm as the competition "expedition" boots,

The right socks are undoubtedly the best method of retaining warmth in the feet. Lorpen brand uses Polartec Power Stretch from Malden Mills.





Tecnica T-Rock Thermal boot. The first, and so far the only, footwear to include Primaloft insulation in its make-up.

making them ideal for adventures at lower altitudes where the Y-Technology ensures the boots, without crampons hike as well as they climb. 3M's Thinsulate Ultra has been developed for extreme performance footwear.

For unique applications such as Arctic and Himalayan expedition footwear, 1000 gsm Thinsulate is the recommended specification. Both Cambrelle Extreme and Thinsulate Ultra set minimum testing and manufacturing standards at 400 gsm. In order to use the Thinsulate Ultra label 3M insist on at least 400 gsm of insulation and manufacturers such as Koflach insulate its boots to strict specifications, through the toe, vamp, and heel and all the way over the ankle. At 600 and 800 gsm Thinsulate is recommended for use under extreme conditions where there is a minimal build up of body heat because of low activity levels. The Degree Boot is another mountaineering boot made by Koflach that meets these specifications and it is probably the most comfortable. Y-Technology combines two different plastic durometers in the shell for maximum flexibility.

Gaiters can be integral

In the Millet Everest boot, Aveolite double foam insulation provides the maximum protection in the colder regions on Earth – such as the Himalayas and Alaska. The outer shell is made of Schoeller's Keprotec polyamide with DuPont Kevlar reinforcements, topped by a three-ply Gore-Tex gaiter with an elastic upper closure and a warm removable inner boot in Aveolite with Velcro closure. The Everest is compatible with all crampon attachment systems and is the only boot in the world to have stood on all fourteen 8000m summits and both Poles - this boot, weighing over 7 lbs each, is the choice for 85% of Himalayan expeditions and insulates down to -50ºF.

Civetta Extreme by Lowa offers a crampon-compatible hard shell mountaineering boot suitable for the toughest conditions. The inner boot is lined with Gore-Tex Duratherm and insulated with Thinsulate. It has a climate-control footbed and the shell has a watertight tongue. The sole is Vibram 'Alpine' with a protective rubber rand. The Civetta Extreme has easy-thread lace loops and water-repellent laces. Lowa also make the top-of-the range Cristallo F1 boot from 3.2mm Hydro cowhide, with a sealed, seamless tongue section lined with climate-control Outlast. It also has a climate-control system footbed. Other features include lightweight alloy lacing components with sprung lace hooks, high protective rubber rand, plastic midsole stiffener and the new crampon-compatible Vibram 'Vertige' sole. Tecnica's T-Rock Thermal boot, to be launched in March 2003, will use an exclusive Vibram sole and PrimaLoft insulation.

Extremes in Alpine climbing

Scarpa from Italy also makes excellent Alpine climbing boots for extreme conditions. The Scarpa Manta M4B is a mid-price model, but



(left) The Civetta Extreme boot by Lowa features easy-thread lace loops, Outlast climate-control footbed and 3M Thinsulate thermal padding.

(right) This is Lowa's top-of-the-range model, the Cristallo F1. The outer is 3.2mm Hydro hide lined with Outlast climate-control foam and this boot features the latest Vibram Vertige outsole



The Vasque Alpine light boot is specified for extremes in ice climbing and winter mountaineering.

next up in the range is the Inverno plastic boot. The Inverno is a unisex boot featuring a more pronounced forward stiffness to support long periods of technical ice climbing. Pebax plastic outer shells offer lightweight, flexible protection on snow and ice routes. Hinged ankles and tongues made of softer plastic allow ankle flexibility; harder plastic uppers assure rigidity and durability. Removable, lace-up, EVA-foam liners feature 1000-denier Cordura nylon shells. The foam footbeds have brushed nylon linings for comfort. Midsoles are made from natural cork to add critical cushion and plantar surface support. Two top of the range boots from Scarpa's glacier line are named Thermo Cerro Torre and Scarpa Alpha. The Alpha is a double plastic boot "designed to be the most lightweight, precise, comfortable plastic boot made". The comfort factor is due in part to the fact that the Alpha is created on an asymmetrical leather boot last. A lightweight component thermoplastic-carbon fibre midsole provides rigidity and a low-profile rubber sole places the foot closer to the terrain for ultimate sensitivity. The softer tongue and ankle areas of the shell are made of softer Pebax for climbing and walking comfort and to provide a soft forward flex. The more technical performing sole profile is compounded for friction on rock and ice.

The Asolo Ottomilla plastic boot, also from Italy, has some unique features prized by high altitude climbers. This boot has the smallest footprint of any plastic boot and is renowned for its narrow fitting. If fitted properly, however, it is also one of the most technically capable boots in the tight spots, especially on difficult vertical routes. The outer shell is Pebax with the inner foot liner insulated with Thinsulate for low bulk performance.

Serious climbers choose their boots carefully and fitting is crucial to maximize heat retention and technical climbing performance. A qualified mountain boot fitter can be a valued part of the team when it comes to outfitting a Himalayan expedition. Even if you know your boots intimately this is one category of footwear where the Internet is not a good place to buy - your life may well depend upon it.

Mel Cheskin