EDELWEISS & POLAR BEARS

What's the connection? Both are adapted to survival in extreme conditions and the adaptations of both may each provide a benefit to the human race.

The Polar bear has become adapted to life in an unpleasant environment of extreme cold. It has developed a generous layer of insulating sub-dermal fat and its hair is like none other. The fur has developed highly efficient insulating properties by developing a hollow structure effectively providing an additional insulating layer – a feature that has already been copied by manufacturers of synthetic insulating materials as a means improving their insulating properties or tog rating.

OK, but how does the tiny alpine Edelweiss enter the equation? True, living in high mountainous regions it needs to be hardy but its main problem comes not from below zero temperatures but from the impact of excessively high Ultra Violet Radiation levels. Those keen on skiing will be aware that high altitude and clear atmosphere mean that little of the natural ultra-violet radiation will have been absorbed before falling on Man, Animal and Plant alike. Man can provide his own artificial protection, animals to an extent, can avoid exposure but plants grow where they grow.

Researchers at the University of Notre Dame de la Paix in Belgium have investigated the plant discovering a mechanism by which the plant has developed a unique mechanism to avoid the effects of high exposure to Ultra-violet rays.

Edelweiss is not content to avoid the excessive UV radiation by hiding itself in shaded sheltered situations, employs a neat trick enabling it to absorb the high quantities of UV to which it is exposed. The leaves of the plant are covered by a layer of small white hairs which first receive light and could conceivably be the first line of UV defence. Using scanning electron microscopy to examine the structure of the hairs and the leaves scientists discovered that the structure of the hairs consisted of parallel 'fibres'. These were measured at 0.18 micrometres across, a size that is very close to the wavelength of Ultra-Violet radiation. The size and the uniform nature of the fibres enabling the UV light to be directed along the length of the leaves. This results in the complete absorption of the UV in the superficial parts of the plant rather than entering directly into the main body of the plant where it could, and undoubtedly would, cause harm.