Until the relatively recent past, shoe, glove and sporting goods manufacturers had a simple option - use leather or find something else which would not meet the performance, hand and longevity of beautifully finished hides and skins. Then came "man-made leather", but the real thing was still instantly recognisable to the consumer. The fake was obvious. Then came microfibres, the microscopic analysis of the hide structure itself and the technology to create near-clones of leather out of textiles. It's a new ball game now.

Genuine or not - it's here to stay



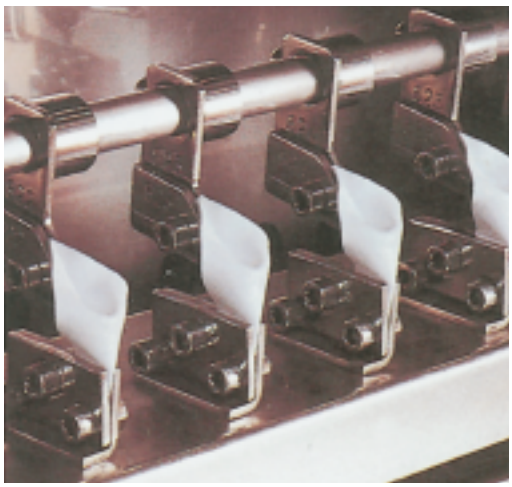
Photo: Lorica

The world of synthetics has begun to muscle in on territory that for long has been the single domain of the real thing - the real thing in this case being leather. In fact, one could say that synthetics, because of the advent of microfibres, have been flexing their muscles pretty strongly in recent years. Fortunately for the genuine leather industry, the synthetic full grain look-alikes still do not really look-alike and the ordinary consumer should have little difficulty in distinguishing a genuine leather pair of shoes, bag or accessory from the fake. But even in this more difficult area of quality, progress continues apace.

The most confusion in feel and performance has been largely confined to the suede and nubuck types - and, considering that the producer of the artificial product has the ability to add the smell of leather if so desired, even professional leather buyers may be hard put to distinguish between the genuine article and the pretender. Certainly in gloves and footwear, the synthetic has been making real inroads and when it comes to using the microfibre imitation as decorative or functional panels within a garment, shoe or glove, it might be sensible to question the use of genuine leather.

Artificial leather - a term which sits uncomfortably in the language because either it is leather or it is not leather - is said to have originated in the United States in the early 1960s. From there it migrated to Japan. In Japan, however, Kuraray's Clarino division claims to have been the first to develop man-made leather in 1964. Whatever. By the 1980s, the various producers were beginning to claim that the artificial product was healthier and cleaner than the real thing - but this is a claim which would not stand up to detailed analysis and would be hotly denied by the tanneries turning out finished leather. But it needed the broader development of the ultra-fine deniers, the microfibres, for leather look-alikes to become serious challengers to the use of the genuine article.

The Italians, Taiwanese and Japanese have been the major producers and promoters of the microfibre imitation. Three comments are worth making immediately: one, that it is ironic that some of the best products are coming from Italy,



Fleximeter at work in the Mycro laboratory

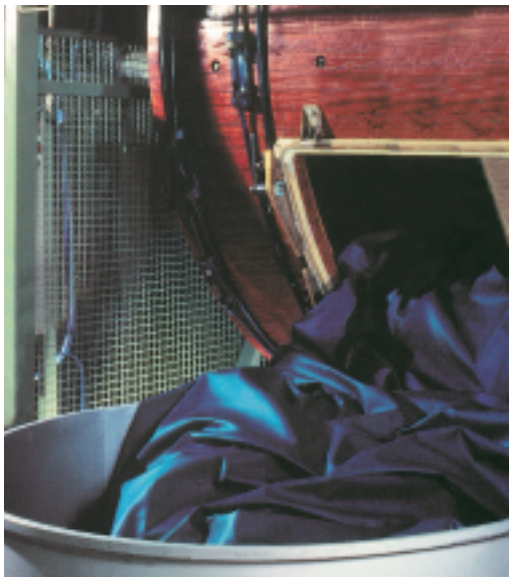
the country which is acknowledged as the world's No.1 producer of superb leather, with thousands of tanneries still producing leather which is the envy of most tanners worldwide. The second comment which needs to be made is that, without exception, the manufacturers of the look-alike all wish to compare their products with leather and promote it as a substitute for the real thing. On this basis, logic would dictate that the real thing must therefore be the desired product of choice - which seems a sad reflection on their promotional skills; many of the synthetics have a beautiful feel and hand and could easily stand alone without comparison to any other substrate.

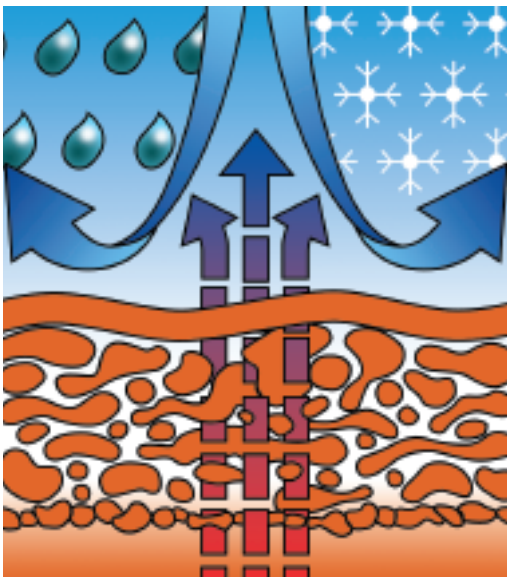
In their endeavours to produce an alternative to leather, the manufacturers have gone to great lengths to replicate as closely as possible the structure of natural leather. And, perhaps in order to make potential users feel more comfortable about switching from real to imitation, manufacturers sprinkle their literature with electron-microscopic enlargement photographs to show similarities in fibre bundles to the fibril bundles of hides and skins.

The third comment is that, given the strides made by the producers of the synthetic product, the leather producers themselves might need to look to their laurels and begin to promote and market the genuine article more aggressively. Perceived superiority and longevity of the tanning business are not automatic reasons for success in today's competitive world.

A company such as Giardini, centred in the shoe manufacturing centre of Vigevano, near Milan, has been producing coated fabrics since 1937 and today has a capacity to produce 28,000 sq.m. a day. Sophisticated R&D facilities include a pilot plant where it can run a small batch of a customer's needs in just a few days but, if material is required ex-stock, the company can oblige from its warehouse of 400,000 sq.m. Its Mycro microfibre range is seen as high-tech and, reassuringly, the company is a member of SATRA, the UK-based technology centre considered one of the finest testing houses in the world of footwear manufacturing. Mycro is three times lighter than leather with a similar thickness, so for the athlete or hiker, this means less effort. (The fibres used 0.001-0.003 denier -10 grams of the stuff would stretch twice round the earth at the equator.) It has a very high resistance, equal or better than fine leather on the fleximeter, and is breathable. Surface finishing makes the product completely waterproof and is non-aging. The characteristics of the easily worked and cut material remain unchanged over time, maintaining its appearance and original softness. According to SATRA tests, its sueded non woven microfibre easily meets the requirements for mens and womens footwear. On its vamp flex test, there was no cracking noted on the material after 1,000,000 flexes at 20°C.

Another Italian company specialising in what it calls new generation leather is Lorica Sud, based in Milan. It has targeted the sports and safety footwear sectors with its breathable, water-repellent and water vapour permeable material which is resistant to tearing, splitting, scratching and abrasion. Lorica has worked with Japanese company Kuraray in developing its microfibre product. Among the claims made for it is that it is non-allergenic and non irritating to the skin.





Like natural leather, Lorica breathes for wearer comfort. It's also water-repellent, doesn't stain, can't be scratched and improves with age!

Far left: Tanning drums are used for synthetic leather too



Electron-microscope enlargement of Lorica



Electron-microscope enlargement of natural leather

Washability is a property which comes into the equation, and the leather alternatives are frequently said to be machine washable and stains are easy to remove with mild soap and water, without affecting the surface feel. What is ironic for the leather industry is that the idea for the product originated in a tannery, thanks to work done by researchers beavering away in the special products department of a major Italian leather producer.

Targeting the environment

In Japan, Teijin has developed its synthetic challenger, Loele, using a moisture-dispersing polyurethane, avoiding the use of organic solvents. The process is said to be more environmentally friendly. It took three years of R&D to create the composite fibre and polyurethane structure, very close to the structure of real leather, which is done by impregnating a finely structured, high density non woven fabric with a unique moisture-dispersing polyurethane which quickly solidifies.

It is refreshing to see claims of environmental friendliness being made on the basis of the process itself. Regrettably, some producers have tried to claim that the artificial product would place less strain on the global environment than the production of leather. Considering the resources being used to create the fibres and the end product, it is again a statement which would be hotly debated, even if tanners use a range of chemicals in processing. After all, the leather industry does not grow anything and it does not use up any finite resources - the leather industry uses the by-product of the food industry and, by converting the waste hide and skins into something useful and desirable, is getting rid of a huge environmental problem which countries with an animal population would otherwise have to face.

Getting smarter

The tannery link has been taken a stage further by Kuraray with its new version of man-made leather called Parcassio, and described by the company as advanced leather technology. Kuraray launched its Clarino look-alike in 1965, which has been widely used in the world of sports, where strength and performance are required, in such products as sports and training shoes, gloves, and large balls.

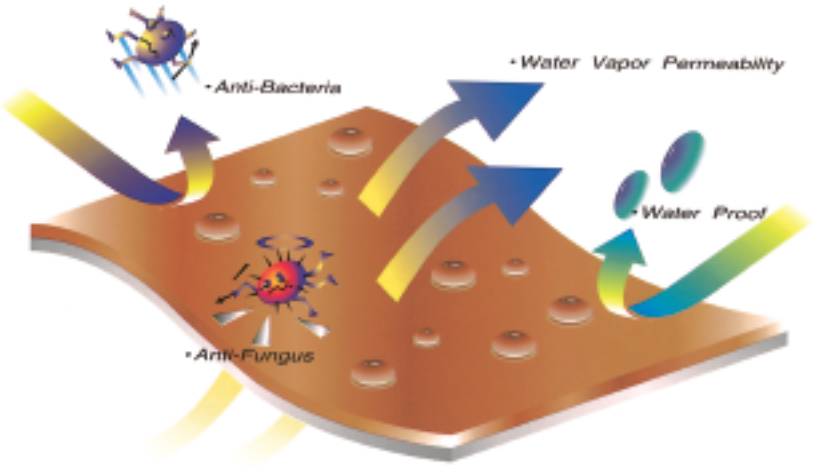
In 2001 it launched Parcassio as a merger of super-microfibre and tannery finishing technologies and appears to have no qualms about promoting it as "the ultimate environmentally friendly performance leather". It may be mimicking the genuine but it is still a compound non woven - it consists of a non-woven substrate of polyurethane fibres over which is laid a layer of two types of microfibre with different deniers. This is covered with a thin polyurethane layer that is permeable to moisture and air. Then the manufacturer applies the same finishing methods as are used for natural leather to the new material. This patented dyeable polyurethane layer accepts almost any colour and surface grain look that may be required. When this layer is applied it is followed by a spray finish layer. Interestingly, Clarino has worked with one of Korea's leading tanneries on the new Parcassio. The Japanese company sends the substrate to the tannery for custom dyeing, embossing, drying and finishing to final specification. The end result is claimed to outperform the natural product on a similar substrate weight basis.

As a company that has been working with the man-made concept for so long, Kuraray has seen many other companies develop similar technologies and so it decided to take a fresh approach to the alternative to leather, to try to get it even closer to the real thing. In itself this may be seen as a recognition that the full grain leather types have not been as successful as has been seen in the production of alternative suedes and nubucks.

The target market for its new variant is the performance athletic field and the company has the capacity to produce over 15 million sq.m. a year. It is estimated that the annual capacity for producing synthetic leathers among just five Japanese companies, admittedly all major names - Kuraray, Toray (the company behind Alcantara, one of the first alternatives to impact the fashion market), Teijin, Asahi and Mitsubishi Rayon - is now 52.5 million sq.m. a year.

Room for one more

With all this technology and capacity around the world, one might be forgiven for thinking that there was more than enough to meet the demands of the various markets for artificial leather - which go far beyond the confines of sport related footwear, gloves, clothing and equipment. It certainly has not daunted a recent entry into the field, Nextec Srl, an Italian company based in Varese, and only set up in 1998. It decided to play in both sectors - by developing OutDry, a patented lamination process for the application of a waterproof breathable membrane to the back of natural leather, which leaves the outer surface unaltered, and Ledra, polyamide microfibres coagulated with breathable polyurethane resins to produce a product with the same characteristics of softness and touch as the real



Breathable PU foil from Chifa

thing, in both 'suedes' and 'full grain'. It is also washable at 40°C without releasing any dye or chemical. And, of course, like its competitors, its attraction is that it can be used at minimal thickness while retaining all its properties of tensile strength and abrasion resistance. With an interesting degree of sensitivity, the company can laminate its OutDry technology on the back surface of the substitute leather too. Nextec has taken a further step in targeting the footwear industry, inventing machinery which changes the whole concept of adding the waterproof membrane to outdoor footwear. (See separate article, page 41.)

Over in Taiwan, the Chifa Leather Corporation has been working the genuine and the imitation with equal facility - it has used its specialist skills in PU technology to produce golfing 'leathers' for gloves and shoes and at the same time has been producing the PU foils which are applied to split and crust leathers to provide the required properties to raw material requiring some performance enhancing assistance.

For companies such as Chifa, the argument about the benefits or superiority of one or other of the substrates - leather or its look-alikes - is fairly academic. They win both ways. Or, in sporting parlance, it's horses for courses.

David Buirski