Reaching for Everest

Performance Clothing of the 1920’s

In 2004 Vanessa Anderson as a mature student (2nd year, MA, Performance Sportswear Design) attended a conference on clothing for extremes. During an overview of initial research being carried out on the clothing recovered from the body of George Mallory, presenters, Mary Rose and Mike Parsons, appealed for anyone who might be able to help them in the creation of replicas of the garments. 20 years experience as a pattern cutter and garment technologist led Vanessa, sat in the audience, to think – I could do that! Here she talks about how her knowledge allowed her to rediscover a little of textile’s history.

On September 27th 2005 the first viewing of a replica outfit based upon that worn by George Mallory in 1924 was made at the annual Clothing for Extremes conference at Rheged Discovery Centre, Cumbria, UK. The body of George Mallory was found on 1st May 1999 by a joint Anglo-American Research Expedition on the North side of Mount Everest at 8155 metres, seventy-five years after George Mallory and Andrew Irvine were last seen heading for the summit of Everest. The controversial retrieval of the outfit was made prior to burying George Mallory on Everest. Artifacts, clothing and DNA were taken for the proof of the identity of the man found and to enable the archeological recording of the artifacts found on one of the most famous British climbers in 20th century mountaineering history.

The Layering System used by Mallory

Many photographs of the 1920’s Everest expeditions show men dressed in English tweeds as was the style of the time. From these, the assumption was made that they were inadequately dressed, it was not understood that the photographs were ‘posed’ for at camps leading up to and including base camp. Camps where this would be the general clothing appropriate for the conditions at the lower altitudes.

In contrast, the clothing for climbing on the 1924 expedition has been demonstrated by this project to be sophisticated and innovative. The upper body outfit consisted of:

- Base - Smedley silk/wool long sleeve vest
- Mid - Tussah silk sports shirt
- Mid - ‘Cultivated silk sports shirt, (Junior Army & Navy)
- Mid - Wool flannel sports shirt
- Outer - Burberry Cotton Gabardine ‘Everywhere’ jacket
- Fur wrist bands (to keep cold air out of sleeve)

The trials of these layers in climbing exercises made using the replica garments both in local (UK) and at altitude (on Everest) locations have highlighted the benefits of this outfit. The upper body layers weighed 2675 grams, and together with the lower body layer of a cotton long-john, two pairs of Shetland wool long-johns and Burberry cotton gabardine breeches totaled 4160 grams, a light-weight outfit, unusual for period clothing.

By comparison a typical modern outfit to summit 8000 metre peaks, would weigh 4800 – 4900 grams. The modern outfit results in several inches of thickness due to the insulation layering within the body suit. The trial on Everest proved the replica period outfit allowed for easier movement for cutting steps in the ice and gaining entry into the tunnel openings of the tents compared with the modern equivalent.

Bulk, like weight, adds to the problems of movement at high altitude and low temperatures. The remains of all the original Mallory garments are very fragile. Seventy-five years of freezing conditions, high winds, high altitude resulting in low oxygen and high levels of ultraviolet rays had deteriorated some or most of the garment exposed to the elements depending on the fibre content. However, these conditions also delayed the usual decay or deterioration from moisture, insect or pathogen organisms. The areas of the garments that had been ‘sheltered’ by the position of George Mallory’s body had remained in reasonable condition.

Like for Like

The inspiration for the project came to Mike Parsons and Mary Rose, of Lancaster University, UK, when viewing the fragments of the original clothing at the Mountain Heritage Textiles.
Trust. Aiming to gain a better understanding of the performance, construction, wind-proofing and insulation qualities of the clothing, they hoped the information gained would add new knowledge to the history of performance clothing.

To understand the insulation properties and the wind-proof qualities of the fabrics, analysis was carried out by Dave Brook at the Performance Clothing Research Centre, University of Leeds, UK. The department, highly regarded in analysing modern textile performance gear and fabrics, used non invasive but thorough techniques to measure the TOG / CLO value. The layers together were equivalent to 3.5TOG. The same level of insulation worn when working hard in Antarctica in 1996 at -40°C by Ranulph Fiennes and Mike Stroud. The outer layer Gabardine fabric test results proved to be close to the wind-proof qualities of Mitsui’s Pertex fabric. Dave Brooks’s conclusion was, ‘…Mallory was sufficiently well insulated to survive on Everest, provided he was moving, though not for a bivouac...’. Proving the clothing to be an effective high performance layering system.

A team led by Amber Rowe at the Textile Conservation Centre (Southampton University, UK) carried out non-invasive scientific primary fabric and fibre analysis including scanning electron microscopy, microphotography, spectrometry and x-ray spectroscopy.

Surprising Discoveries

Two finds stood out. The first being the vest, it had the appearance of being shiny, looking similar to mercerized cotton. Analysis had revealed the garment to be a mixture of wool and silk. The combination of two denier gradients has been used in base layers for the last decade, on the original 1924 garment the plate knit fabric had wool on the inner and silk on the outer surface. The garment label located the original purchase to be from a Scottish Retailer, long since gone. John Smedley of Matlock, Derbyshire, UK, was asked to replicate the garment, they identified the original retailer as one of their previous customers. The garment was one of theirs!

The second surprise - the jacket, an initial assumption was that this would be a Norfolk jacket style, the preferred sports jacket of the period. Clothing receipts of another Everest mountaineer had indicated windproofed fabrics to come from Burberry. The original artifact’s fabric structure fitted the description of the light-weight Burberry windproof Gaberdine, the buttons had ‘Burberry London’ carved on the rim. However, the cut of the garment showed something rather special. The remains of the back neck label were traced to a Burberry label design of pre WWII and the sleeve design to the Articulated Sleeve Patented by Arthur Burberry in 1901. Something no-one had anticipated.

This jacket detail was so exciting because of the free style and confident cut of the sleeve. Garment references were sought, but none were found. The garment could now be unique – if another original garment could be found it would be helpful to reference back to it – those involved would be grateful for any information which may lead to locating one.

To cut the pattern, the styling of the jacket had to be established. Laying out the fragments (first the left front, this being the most intact), showed the button positions, most of the cartridge pocket – so favored by ex-Army officers from the First World War and the under sleeve detail of the Burberry pivot sleeve. The back panels were more fragmented but enough had survived of the seams to piece together the outline of a ‘Sac Jacket’ block and to trace a fragment of shoulder pad material.

The research for the pattern started with looking at tailor cutting books of the period. Good reference books found included the ‘Tailor & Cutter’ 1927 and a Navy Uniform cutting book containing many jackets and breeches of the period. These were also useful cross reference material to establish sizing.

The original jacket had a very small across the back measurement – not unusual at the time as medical ideology regarding healthy posture recommended shoulders down and back to improve breathing and this affected the cut of a jacket. There was little sizing information for George Mallory available, his height, weight and chest size. Research was limited to working from photos of George Mallory and sizing tables of the period.

The construction of the jacket was very similar to modern half lined jackets in appearance. However, with lap seams hand turned and machine stitched, lined pockets distinctly attached with large ‘L’ shaped corner supports, button holes and eyelet’s hand sewn with silk thread and several linen and canvas qualities of interlining sewn in, a story emerged. The buttons were ‘wood ivory’, a traditional menswear button carved from a coconut seed and having a similar appearance to ivory.

The sleeve was a standard two piece with the pivot underarm detail. The underarm seam was positioned forward, thus allowing the cut to follow the arm’s natural forward motion when lifted. The construction of the sleeve to armhole was most interesting – the sleeve was part set in (the sleeve head) and part laid onto the jacket (edge stitch
Every garment in the outfit has a story of its own to tell, 15 garments have been recreated, the complete replica outfit is on exhibition at Rheged Discovery Centre, Cumbria, UK. The project proved the layering system worn by George Mallory was an innovative and sophisticated outfit, highlighting the importance of clothing manufacturers of the period and their role in innovative and progressive performance design. The outfits worn by Mallory and Irvine were not a limiting factor in establishing the possibilities of success in reaching the summit of Everest.

The immediate replica team included: Vanessa Anderson – Garment Technologist, Klowt; Amber Rowe - University of Southampton; Dave Brook - University of Leeds; and John Angus - University of Derby. Joyce Meader (who was responsible for the knitwear) is a freelance historic knitter. The project was supported by: Woodrow Universal Mills, supplier of the outerwear fabric, donated by Burberry. Burberry, Castleford assisted with finishing the outerwear. John Smedley Ltd Matlock supplied the vest. Puttees (a strip of cloth wound around the lower leg, like a gaiter, used by the British Army up to the 1960s), hand woven by Simon Young. Wool flannel shirting, woven by Michael Banister, Banister Brothers. Shoulder pads donated by Helsa. Threads and advice from Coates Threads and Donnithorpe. Financial support was very gratefully received from the Heritage Lottery Fund and the Pasold Research Fund.

The replicated jacket and plus fours being tested for articulation for climbing in Heathersage, Derbyshire. Climber, Andrew Davison (Mountain Rescue).

Trials

The jacket and plus-fours were trialed at two locations, initially at Heathersage, Derbyshire, UK and later on Mount Everest to 4877 metres (21,000 feet). The UK trial showed the ease of movement for the leg and upper body for taking hold in the rock. The jacket pocket positions were noticeably well placed, as they did not bounce on the thigh, absorbing energy.

Graham Hoyland, great nephew of Howard Somervell, veteran of the 1922 and 1924 Everest Expeditions wore the replica garments on Everest. The trial at altitude proved consistent with the UK trial, exhibiting the effective windproof qualities of the outer layer and the comfort and ease of movement and the warmth of the fabrics when put on. One immediate problem would be fastening the button fly with cold fingers. It was suspected the fly would have been left undone, Graham noted ‘...there were enough layers to interleave.’ He continued in his comments that he could lift his arm to full extent without disturbing the warm layers of air. Working hard and cutting ice steps was hot work in the outfit. Graham’s conclusion was that the outfit was more than adequate to climb to the summit.