

W O O L

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Degree

1986

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M0056523NC

WOOL

4th YEAR THESIS

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FASHION

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INTRODUCTION

Egon Kolsch, Director, International Wool Secretariat, International Marketing, retired after 32 years service with the IWS.

"In my early years with the IWS I often questioned the wisdom of my choice of career. The papers were full of advertisements and editorials on man-made fibres, but very little on wool. If wool was mentioned at all it was usually in connection with some forecast predicting that by 1980, wool's role in the worlds textile markets would be reduced to that of an insignificant luxury fibre".

The wool growers, however, had an unparalleled determination to impress their own mould of the future on the market. One of the most important steps was the introduction and price support schemes. Despite the accumulation from time to time of large stockpiles of world wool, these schemes have eliminated the violent price changes which were common. The price stability which we have today was an absolute prerequisite for wools long term survival. Without this stability a lot of textile manufacturers would have lost interest in wool as a viable raw material for large scale production. A price scheme alone cannot secure demand. Strong promotion activities must accompany it. Wool growers realise that and IWS now command what must be one of the most efficient promotion organisations for any type of product in the world. The turning point in wools fight for survival came when under the leadership of two great Australians, Bill Gunn and Bill Vines, the IWS was reshaped from a small PR-organisation into a full-fledged marketing arm which in 1985 spent more than \$100 million to stimulate wool demand world wide. Wool now plays a clear leadership role and its prospects at present could hardly be better.

There can be no doubt that the IWS has made, and is making, an emence contribution to the developments in, and the use of, wool worldwide. In this essay, however, I have focussed not only on wool in its present day setting, but have traced the ancestry of the Wool Industry from its earliest uses through the more recent introduction of the woolmark to its current position in Irish textiles.

CHAPTER 1

HISTORY OF WOOL

HISTORY OF WOOL

Wool has a long and exciting history. It parallels the advance of civilization and the course of empires. The beginnings of man's early culture, his first faltering steps as a social creature, are associated with the domestication of sheep.

The Swiss Lake Dwellers who lived in the later Stone Age kept sheep and used their wool. Like other early peoples they had discovered sheep could supply the basic necessities of life - food, clothing and shelter - in the form of tents. Sheep were easy to domesticate and herd and they lived on what the land had to offer. The Scriptures are replete with references to sheep and shepherds. Abel was a keeper of sheep. The Israelites were, above all, shepherds, their flocks were their pride and wealth. In the Biblical lands of Babylonia and Mesopotania, as early as the year 4,000 B.C. people wore garments of wool and the fleece of the sheep had become a commodity in trade. In Britain during the Bronze Age (3000 B.C.) woolen garments were worn, and the nomadic tribes from the Asia Steppes in the second millennium B.C. insulated their tents with wool carpets, and made shirts and trousers out of wool.

The Greeks, the Romans, and the Persians had access to the sheep of all the known world. They selected and cross bred those which had the finest fleeces. As the Roman Empire made its way from the Mediterranean to the Danube, the Romans and the colonies they created scattered sheep throughout Europe. They made spinning and weaving the labour of all the women of the Roman world.

The Romans brought sheep to Spain because the climate was considered ideal for sheep raising. In the province of Tarraconensis they crossed the Tarretine sheep with the laodicean sheep of Asia Minor to produce the ancestor of today's most important wool bearer, the merino. The Moors, while they dominated Spain, improved the breed and for centuries thereafter the wealth of the Spanish Empire was built on the fleece of the Merino. It was guarded as a national treasure. Laws were passed to protect its use, and death was the penalty for illegal traffic. When Spanish royalty married into other royal families, part of the dowry was always merino sheep. It was only by this method and by the illegal method of smuggling that merinos got out of Spain and began to infiltrate other countries of the world. Columbus carried sheep to America on the Santa Maria, and the Spanish Conquistadores who followed him in 1540 introduced wool to Mexico. Under Spanish domination the Pueblos and the Navajos wove magnificent wool blankets which have seldom been equaled.

Through the years of the Middle Ages Spain and Britain were the two world rivals as producers of wool. Eventually, England won the battle and thus laid the foundation of her riches and her wealth as a world power. The Empire was literally built on the wool she grew, processed, and traded with the rest of the world. The world demand of British Woolens was so great that in the Nineteenth Century England had to turn to her overseas colonies for raw wool. South Africa, Australia, and eventually New Zealand began the foundation of their great sheep raising industries and are today among the world's six largest producers of raw wool.

In the New World, following the example of Columbus, and the

Part of the and
Spanish Conquistadores, the early settlers also began to grow wool. In 1607 the London Company sent to its Virginia colony a flock of sheep "to raise for peltrys and to fertilize ye soil".¹¹⁴ Thirteen years after Plymouth Rock, sheep were introduced into Massachusetts and by 1640 the colonists had a flock of 3000. The Dutch also sent sheep to their settlers in the New World. In the Early Colonies wool growing and weaving was a home industry. The first break in American household self sufficiency came with the establishment of fulling mills (shrinking, shearing and finishing of woven woollen cloth) in 1643. The produce of the first of the mills established by John Pearson at Rowley, Mass., was of such superior finish that a great demand for it was established. A second mill sprang up in Watertown in 1662. The rest of the Colonies soon followed suit and by 1700 mills were numerous.

The Art of the weaver of wool was destined to influence the shaping of the thinking and destiny of America. From these humble beginnings arose the "Manufactories". These establishments served a worthy purpose. They supplied work to the worthy poor making them self supporting, and helped sever American economic bondage to Europe. While these manufacturers did not have power equipment and even the modern machinery of their times, they turned out enough woollen stuffs to make America a power to be reckoned with in wool fabric production. This did not set well with British weavers whose nagging at the Crown was one of the underlying causes of the American Revolution. In 1767 James Hargraves of Standhill, invented the spinning jenny, by which one person unassisted could operate sixteen threads at once. Immediately Colonial production was stepped up. Then came the

'shot' that was heard around the world. The Revolutionary war was on. America learned that wool constituted the real sinews of war. Vally Forge proved the vital necessity for wool clothing, wool blankets, wool hose. The records show that more men left the Army because of an insufficiency of woolen shifts than for any other reason.

The lesson learned in war swiftly applied in peace. In 1780 a woolen factory was established in Hartford which Gerard George Washington visited and commented in his diary, stating that "Their broadcloths are not of the first quality as yet... I ordered a suit to be sent to me at New York".

He is said to have read his inaugural speech to Congress in the ensuing January in a full suit of broadcloth made at the Hartford factory and presented to him by the owners.

While the English had lost the colonies, they did not relinquish their hold on the woolen industry in America. Several British operators incorporated the first woolen organisations at this time. These were the largest organisations in the country. However, Britain would not allow English makers to export wool machinery to America. Schafield had to construct his own machinery without pattern or drawings, and he was compelled to return to England to refresh his memory before he could complete a wool cording machine.

In 1808 he manufactured a piece of black broadcloth of thirteen yards and presented it to President Madison. Many inventions for improving the production of woollen fabrics took place during

this era. The first wool spinning machine was in operation at Peace Dale. R.1 in 1804 / The first power loom for weaving wool cloth was introduced in Massachusetts in 1823. The first loom for weaving fancy cloth was invented by Crampton in 1840.

Because Britain had forbidden export of parts for wool machinery and of machines in toto, Americans were forced to creat their own. On a par with Crampton were Erastus Bigelow and Lucius K. Knowles. During the War of 1812 the woollen industry came to a standstill again. Even though at war with the British, woollen blankets for the American army were brought from England by way of France. Once more Britain unwittingly aided its foe. The import of Merino sheep was not an accident. Previously Spain had restricted the export of these fine wool-bearing animals. When Napoleon conquered Spain, she had to sell her flocks to pay the expenses of war.

Early in the nineteenth century merino sheep were imported to the United States by Elkonah Watson. They multiplied rapidly and formed the basis of a new type of fabric which was manufactured by General David Humphreys at Seymour. General Humphreys not only established a mill but incorporated a model village which is still in existence and operation. One of the most curious outgrowths of the War of 1812 was the popularity of the trousers. These shank covering garments became the American rage as a symbol of revolt against British imperialism which was associated with knee breeches. In 1813 the first worsteds were manufactured for women's dress goods but it was not until 1867 that American worsteds were used for men's suiting. England had the monopoly and prohibited the export of worsted machinery, but Americans

needed worsteds - a fabric much harder than the woollen materials then in use. A machine was invented here by which worsted yarn could be combed as well as woollens.

In 1854 the Pacific Mills installed the first worsted machines. The Civil War need for uniforms made a great market for its production. New mills sprang up all over the country. Many cotton mills deprived of raw material changed over to the manufacture of woollen and worsteds. More and more inventions came into being, lightening the work so that women could be employed in the worsted manufacture. As cotton production fell off, wool manufacture increased. The largest woollen mill in the world was established in Lawrence, Massachusetts.

CHAPTER 2

'THE WOOL MARK'

THE WOOL MARK

The Woolmark is the IWS's symbol for products made from pure new wool, produced to its quality specifications. The Woolmark scheme covers menswear, womenswear, childrenswear, carpets, home furnishings, blankets and a wide range of industrial and consumer products.

Woolmark products must be made entirely from new (virgin) wool. However, 5% of other fibres may be added for decorative effect.

The Woolmark symbol is recognised and understood by more than 400 million consumers - world wide. IWS market research proves that its not only the world's best known textile trademark, but also ranks alongside famous soft drinks and motor car symbols for recognition.

More than 400 million labels are applied every year. Licencees exceed 15,000 in more than 50 countries. Some 6,000 manufacture tailored clothing; 3,800 produced knitted outerwear, 1,700 make fabric and 700 carpets. 90 washing machine and 81 detergent companies are licenced.

A Quality Symbol

Every product has to meet strict quality standards before it can be labelled with the Woolmark.

The IWS lays down quality specifications that each category of product must meet. These cover not only fibre content but also other factors, that affect the performance of products, including

change of appearance in wear, durability and dimensional stability.

Woolmark apparel must similarly meet high manufacturing standards - finished garments must offer adequate performance to the purchaser.

Woolmark licensees are responsible for meeting the standards laid down. The function of the IWS is to determine whether the licensee is fulfilling those obligations.

IWS product technologists are its link with manufacturers. They give practical, in-plant assistance so that woolmark quality is maintained. Product Technologists visit licensees and check raw materials and factory records. Thus garment manufacturers labelling their clothes with the Woolmark must ensure that only Woolmark certified cloths are used. Additionally they must record which cloths are used for each end-product.

IWS technologists watch the use of the woolmark on labels and take samples of products for testing.

This is carried out at IWS branch laboratories throughout the world. Harmonisation is ensured by additional testing at the main IWS technical centre in Ilkley, England.

Additionally, the IWS regularly buys Woolmark goods on sale in shops and performs spot checks.

In its pursuit of quality-controlling Woolmark merchandise the IWS has pioneered many new methods of testing products. Various test procedures developed by it have been incorporated into National Standards and some have been adopted by the International Standards Organization.

Woolmark Labelling

Every Woolmark product bears a label which identifies the manufacturer.

Garment labels are designed to meet international requirements and often include universal care labelling symbols. The IWS played a big part in the international committees which established care labelling.

'Joint' labels bear both the Company's brand name and the Woolmark. 'Neutral' labels supplied by the IWS branches in several standard designs, carry the Woolmark symbol and the fibre content phrase.

Origin of the Woolmark

The IWS introduced the Woolmark scheme in 1964. The symbol was designed by Francesco Saroglia. He was one of 13 designers all over the world who worked on ideas for the Woolmark. An international panel of 7 design experts in London chose Saroglia's sketch after studying and debating no less than 86 possible 'Woolmarks'.

Many of those rejected were artistically acceptable as quality symbols. However, they did not meet the complex legal and technical requirements that would enable them to be used in nearly 90 countries.

Mr. Saroglia wanted to suggest wool yarn in the structure of his design and began by twisting and bending slim strips of paper marked with black and white lines. By chance he caught sight of

one of his designs reflected against glass; the curve of its black and white lines abruptly 'bent' to a sharper angle where they touched the glass surface.

The Woolblend Mark

Introduced in 1971 the Woolblend mark denotes quality tested goods that are rich in wool.

It can be applied to the following wool-rich products:

- all childrenwear
- all adults' apparel except knitwear
- retail price goods (e.g. cloth)
- all upholstery, curtains and household drapes
- bedwear - union blankets - needle bonded blankets.

All other wool products are excluded. The main goods not included are poor coverings, knitwear, handknitting yarn and conventional blankets.

Woolblend mark goods must have a minimum new wool content of 60%. The only exceptions are wool/cotton intimate blends where the wool minimum is 55%. In protective clothing the minimum wool content is 80%.

Any non-wool fibre, except reused or reprocessed fibres may be blended into wool. Only one non-wool fibre may be intimately blended with pure wool in a single yarn.

All woolblend mark goods must meet the same high quality specifications that apply to Woolmark products.

More than 3,500 manufacturers are licenced to use the Woolblend

mark in 42 countries. Over 2,200 make tailored apparel, 780 are fabric producers. Seventeen furniture companies are also licensed.

Growth of the Woolmark

The Woolmark story is one of steady growth, which is not to say that there have not been occasional setbacks. The most rapid expansion took place in the early years. Between 1963 and 1970 the number of licensees tripled, from 4,000 to 12,000 and the number of countries with licenses almost doubled from 19 to 37.

During the 1970's, raw wool prices tripled, then collapsed during what was a very volatile period for commodity prices generally. The energy crisis of 1973 brought uncertainty into the business environment, but since the mid 1970's the Woolmark has resumed its upward progress.

Licensee numbers have continued to rise by about 500 per year. In 1975 there were 12,500 licensees and by 1981 these had risen to 15,000.

Since 1975 the number of countries with Woolmark licensees has risen from 43 to 53 in 1981 and is expected to rise gradually through the decade.

Although the growth in the number of countries with the Woolmark has come from developing nations, most of the expansion in licensees has taken place in the industrialised countries, particularly in Western Europe and Japan.

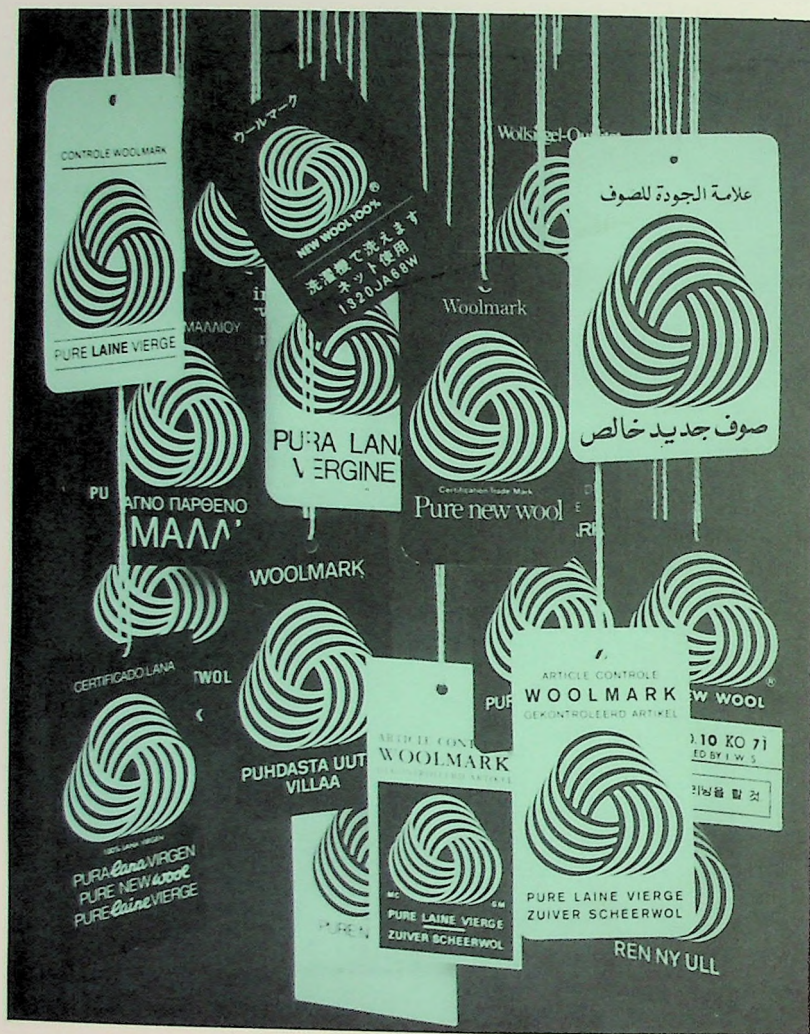
The weight of wool consumed annually in Woolmark products has

also expanded substantially. From 1975's result of 257m kg it has reached 344m kg by 1980. The number of Woolmark labels used by industry also rose strongly from 276 million in the mid decade to 435 million by 1980.

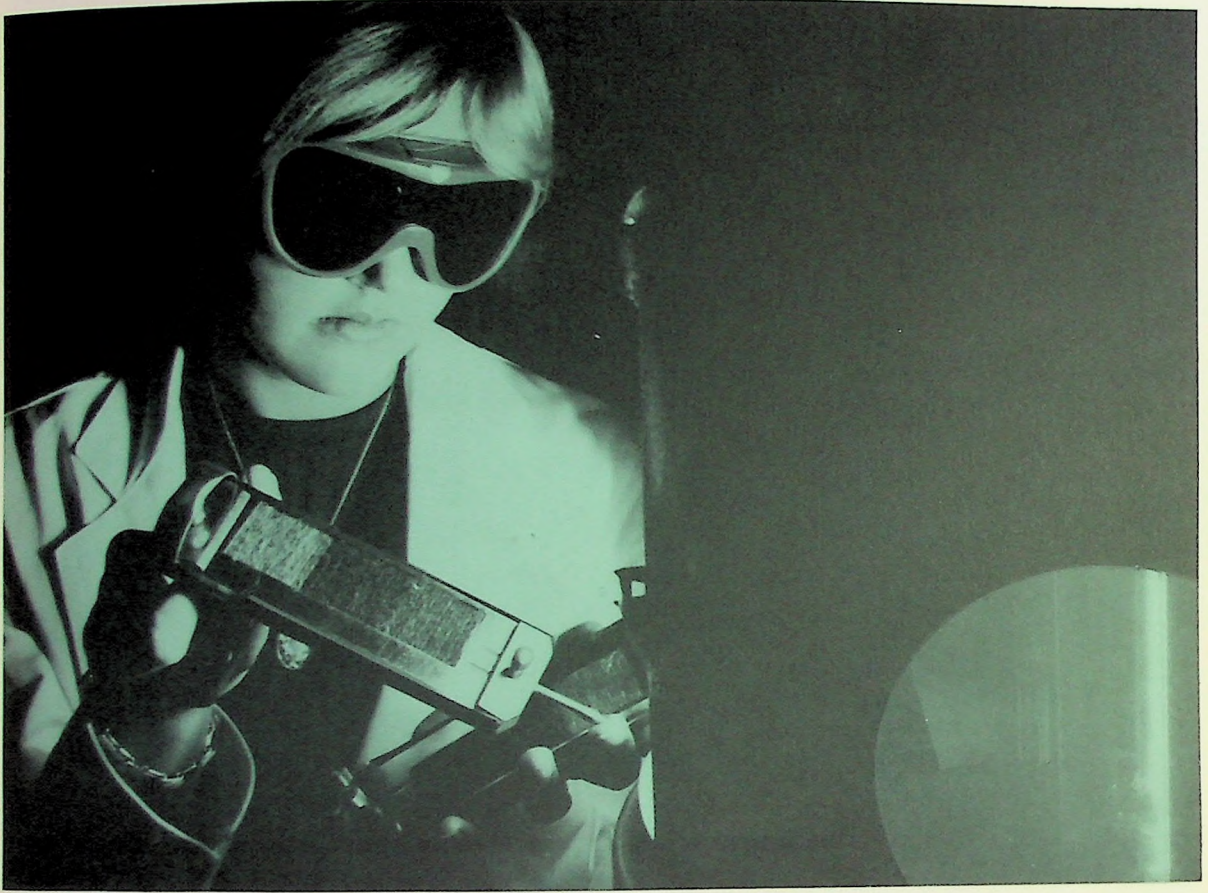
Recognition of the Woolmark is another measure of the pure new wool symbol's success. In Europe and Japan the recognition figures are very high. Italy has the highest ratings with 96% recognition. The figures for other countries are typically in the high 80's.



Francesco Saroglia, the designer of the Woolmark



Woolmark Swing Tickets from several countries

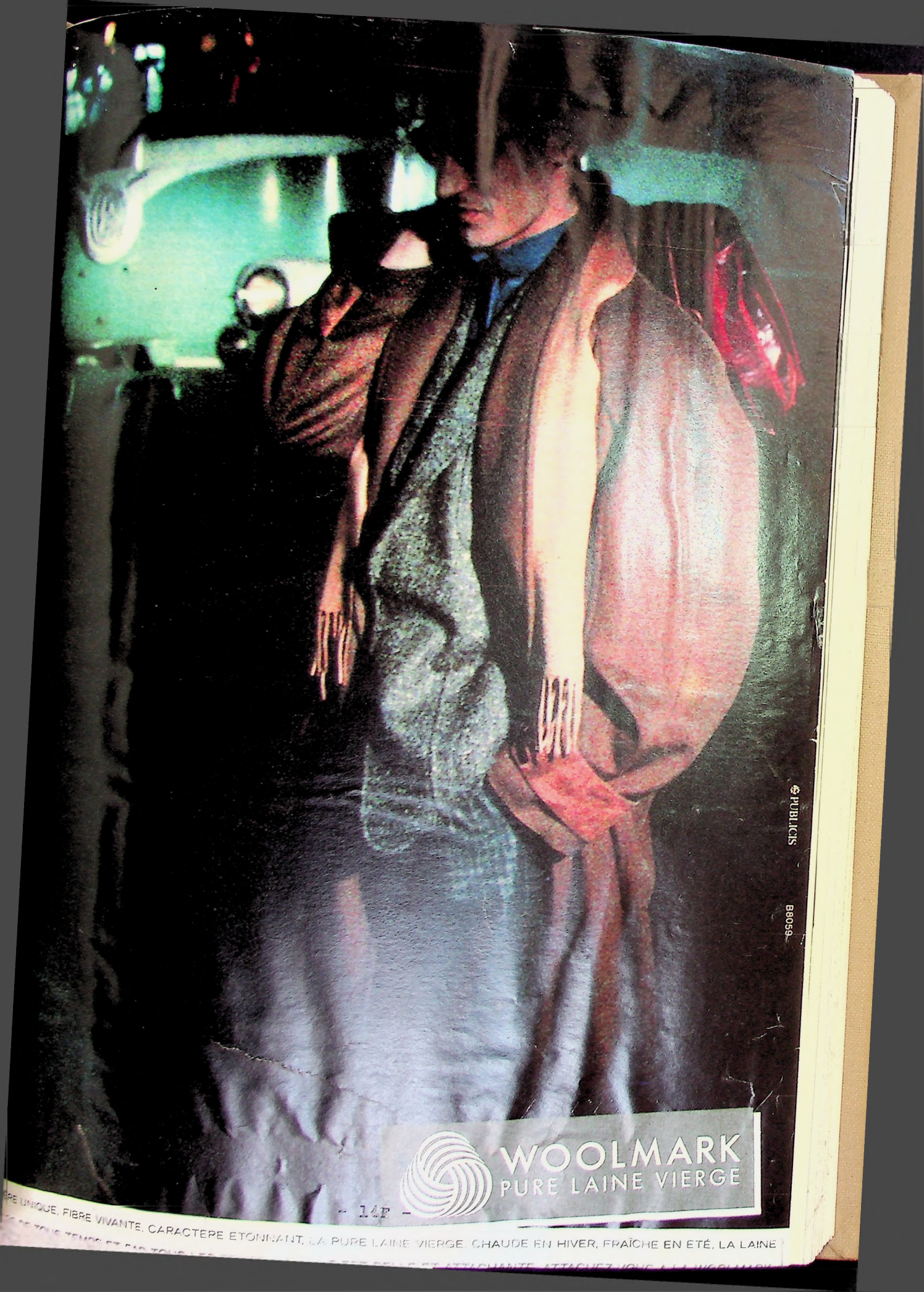


Testing colour fastness of wool yarns





Woolmark d'intensité.



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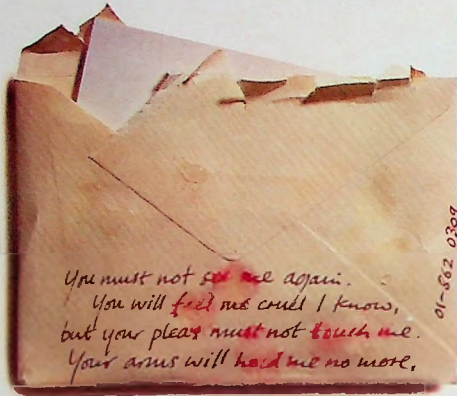


WOOLMARK
PURE LAINE VIERGE

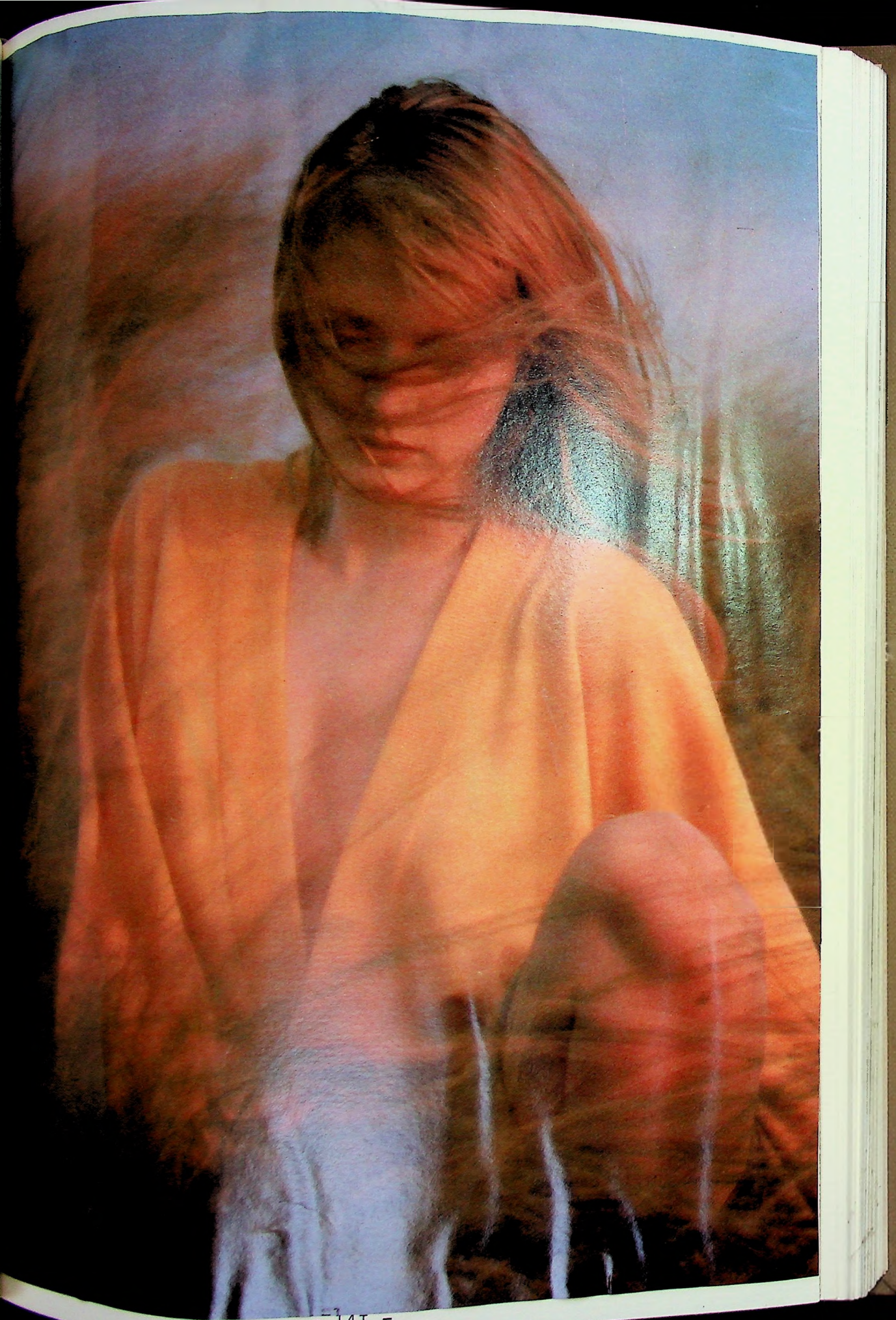
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...PE UNIQUE, FIBRE VIVANTE. CARACTERE ETONNANT, LA PURE LAINE VIERGE. CHAUDE EN HIVER, FRAICHE EN ETÉ, LA LAINE...





Pure new wool



CHAPTER 3

WOOL - THE FIBRE

What is Wool?

Wool grows from follicles in the sheeps skin just like hair which grows from human skin. Like human hair, it is made from the protein keratin, which itself is composed of the most common chemical elements in our world - 50.5% carbon, 20.5% oxygen, 16.8% nitrogen, 6.8% hydrogen and 5.4% sulphur - but there the similarity ends. Because of the wool fibres unusual construction, the qualities that make wool so useful are genetically built into every hair on the sheep.

In cross section, each wool fibre consists of a two-part outer layer and an absorbent core. The outer regulates the fibres dual ability to repel liquid yet absorb moisture. Under a microscope the outer layer consists of a thin porous sheath which covers overlapping scales that act like tiny roof tiles. A 25mm length of wool fibre may contain up to 200 overlapping cells. These scales cause liquid to bead and roll off the surface of the wool fabric. While this membrane can repel liquid (like moderate rain or a spill) wool absorbs moisture vapour (such as air humidity or perspiration) through the porous coating over the scales. Through this unique arrangement wool can absorb up to 30% of its own weight in moisture. Thus wool fabric remains absorbent and comfortable inside because its outer surface releases this moisture through evaporation.

Although shorn wool is no longer 'alive' and growing, it does retain the unique life like action of its thirsty centre cells, always striving to stay in balance with the surrounding moisture conditions. This is why wool is said to breathe. It absorbs and evaporates moisture. Synthetic fibres on the other hand have

little absorptive power and cannot breath. Instead of being absorbed into the fabric, body moisture collects on the synthetic fabrics surface and feels wet next to the skin. As a result, synthetic tend to feel clammy or sticky in warm weather and cold in low temperatures.

Wool owes many of its other properties to another special trait - its natural 'crimp'. Wool fibres grow permanently crimped, like powerful springs. This permits each fibre to return instantly to its natural position after stretching. As a result wool has enormous elasticity and resilience and can be bent and twisted again and again without breaking. When woven or knitted wools crimp also creates millions of microscopic air pockets throughout the fabric, giving it 'loft' and creating an insulating layer of air. (As much as 60-80% of wool fabric volume may be entrapped air). Wools mutual ability to regulate moisture and its 'coiled spring' resilience form the base for many of wools natural properties and comfort characteristics.

Natural Advantages

Evaporation and moisture absorbency. Because it absorbs moisture vapour, wool clothing provides superior comfort in both hot and cold weather. In cold weather even a little moisture on the skin becomes cold quickly reducing the body temperatures. Wool however absorbs and evaporates body moisture leaving a dry layer of air next to the skin which helps hold in body heat. Also wool does not stick to the skin when wet as cotton does for example. Wool with its absorbency and resilience 'stands off' from the skin because of its springy surface. The same absorption /evaporation process works in hot weather to help keep the body cooler. Evaporation of perspiration is the bodys natural cooling

device. Wool helps this process along. Its thirsty centre cells absorbs body vapours and help reduce skin temperature. Also, much of the outdoor heat is blocked out because of wools insulating barrier of loft and airpocketing. This helps protect the body temperature.

In climates and industries where the air temperature is hotter than the body temperature, wool clothes are used to insulate people against heat. Arabs in the desert swathe themselves in wool from head to foot, and workers in steelworks wear wool protective clothing against the heat and molten metal.

Wools absorbancy also allows the body to adapt comfortably to sudden temperature changes. One of the hazards of strenuous outdoor activity such as running or playing tennis on a cool day is that when you stop the accumulated perspiration on your skin contacts your wet clothes - this can make you suddenly cold and bring on a chill. Wool, however, allows your body to adjust slowly and comfortably to the new conditions.

Wool Resists Abrasion:

Many wools feel soft and can be woven into delicate-looking fabrics, yet possess good durability. A wool fibre can be bent back on itself more than 20,000 times without breaking. By comparison, cotton breaks after 3,200 bends, silk after 1,800 bends and viscose after only 75 bends.

One reason why so many people can hang on to a favourite old wool jacket or shirt for so many years is because it retains its original appearance longer than most other fabrics. It can withstand abrasion and contact with hard surfaces (like the seat of

a chair) and still look better than other fabrics, and its resiliency provides a cushion against hard wear.

Wool resists tearing: Wool fibre is so flexible it can be stretched up to 40% beyond its original length before it breaks. This makes wool fabric extremely difficult to tear. When the stress is removed the natural crimp causes the fibres to spring back into place.

Wool resists crocking: Crocking is the rubbing off and fading of dyes. Wool fibres absorb and hold dyes with lasting ability and because of the structure of the fibre, the tendency for crocking is reduced, thus contributing to its longer life and maintaining its good looks.

Wool resists snagging: When fabrics catch and snag on something sharp many tend to pucker. In most cases the snag is permanent, particularly so with continuous filament synthetics. With wool a snag is never long and snagged fibres can often be flattened out by sponging and pressing the fabric. The fibrous nature of wool fabric surfaces also tend to camouflage short snags.

Wool resists pilling: Pilling is caused when fibres break or work loose of the surface of a fabric and collect into tight and unsightly balls or 'pills'. With synthetic fibre fabrics made from staple or continuous filaments, this can be a major problem since the strong filaments hold the pill tightly. Pills are much less of a problem with wool where a soft brushing will remove any that have not fallen off by themselves.

Wool resists wrinkling: Because of its permanent inbuilt tendency to spring back into its original shape, wool is difficult to

wrinkle. Even when a wool fabric has been packed down for days in a crowded suitcase most wrinkles disappear on their own after the garment is hung for a while where it can breathe.

Wool resists static: Because wool naturally absorbs moisture from the air it does not offer the dry friction conditions which encourage the build up of static electricity in clothes or carpets. Walking across a wool carpet you are less likely to be shocked when you touch a grounded object. The tendency for clothes to cling and spark is also reduced with wool.

Wool resists Dirt: Wool stays clean longer than other fabrics. Because there is less static in wool, it does not attract dirt and dust from the air. Furthermore wools crimped fibres and their surface scale structure help to keep dirt from penetrating the fibre. Dirt caught in the springy surface hairs can usually be brushed off easily.

Wool is flame resist: Wool is naturally safe. Because there is moisture in every fibre, wool resists flame without chemical treatment. Instead of burning freely when touched by flame, wool chars. When the flame is removed, the fire goes out almost immediately (especially if the fabric is tightly woven) leaving only a cold ash which can be brushed away

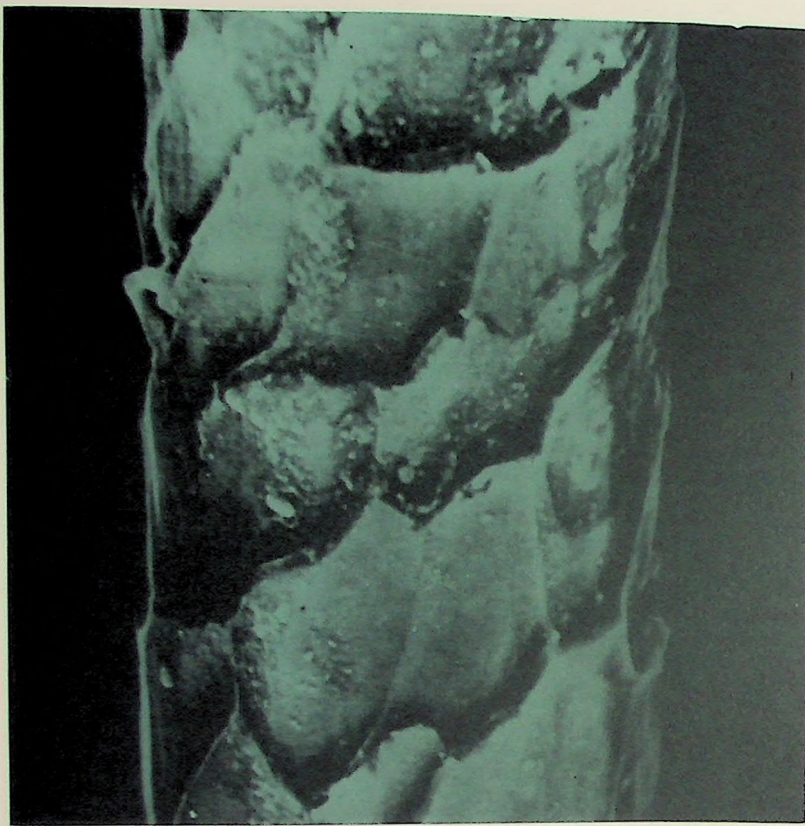
Versatility

Wool cloths superior drape is a major asset and has given it a reputation for ease of tailoring. Drape is the way the cloth fits the body and its movements. It is the supple and flexible character of a fabric. Wool cloth is easy to work with and can be steamed into shape for a variety of styling effects without

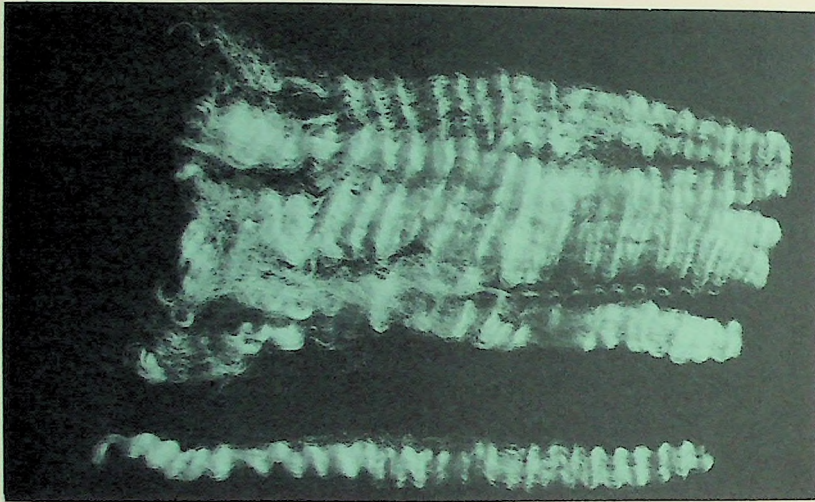
limitations and rigid look imposed by other fibres. Wool cloth, knitwear and carpets are made from a wide range of wool types varying from extrafine for suits and knitwear through to broad fibres which give carpets their strength and character. This means that designers have endless potential from wool in their creations - from delicate knitwear to rugged outdoor wear.

Aesthetics

The tactile quality of wool, its distinct handle - has long been one of the favourite attributes of the fibre. Aiding its aesthetic quality is wools unique ability for wet finishing. Wool cloths when wet can be milled for softness, cropped and sheared for smoothness or pressed flat. Much of the beauty of wool fabrics is developed at this stage.



This scanning micrograph shows a wool fibre enlarged 2400 times.
Note the scales that form the outer surface of the fibre.



The crimp of wool fibres can be seen in these samples. Crimp is wool's inbuilt springiness.

CHAPTER 4

SHEEP BREEDS AND WOOL TYPES

SHEEP BREEDS AND WOOL TYPES

For southern hemisphere wool producers who supply 84% of the wool entering world trade, the choice of sheep breeds reflect the need to use land and climatic conditions profitably and extract the best return. In turn, many types of wool are produced which are suitable for a wide range of textile products because of both genetic and environmental factors.

On land with high rainfall - like part of New Zealand - the Romney breed is the most popular, while in the hilly land of Australias Great Dividing Range a smaller-framed Merino like the Saxon type is used. On the slopes and plains of Australia and South Africa, where the sheep graze in low rainfall high temperature pastoral areas, it is the Merino which is favoured.

Each breed produces a different type of wool. The Romney has a long wool of the coarse cross bred type, the Saxon Merino produces a short, very fine type, while the other types of Merino supply the bulk of the worlds needs of fine wool. Crossbreeds and the Corriedale produce much of the medium wool supply. These breeds are profitable on the type of land for which they are best suited. To take them out of their environment - for example the Romneys from wetlands to sparsely grassed pastoral areas - would increase husbandry problems, reduce the production of wool and cut or destroy profit.

In Australia and South Africa, the Merino is king, while in New Zealand it is the Romney, in Argentina and Uruquay the Corriedale rules. In all five countries minor breeds and crossbreeds flourish to meet specific sheep meat needs or difficult land and climatic conditions. In Africa and Asia there are many indigenous

breeds which have not been improved or methodically interbred. Most have coarse wool suited to carpets, blankets or other end uses like mattress filling and tweed fabrics, although their main use is to provide meat and milk. The Soviet Union which has the worlds largest flock of sheep has a wide range of breeds, some are based on the Merino while others are more akin to Asian fat-tail coarse wool types.

Sheep breeds

Merino: The most important sheepbreed in the world is the Merino. Almost three-quarters of Australian sheep are of this strain and there are many Merinos in South Africa, South America, Soviet Union, North America and Spain. The breed originated in Spain and was prized by European breeders especially in France and Germany. Australia's first Merino arrived in the 1790's. Australian Breeders have been able to combine fineness of wool with a heavier weight of fleece. Merino fleeces can be found as fine as 16 micrometres, the renowned super fine or as broad as 27 micrometres which is called strong. These wools can be used in a wide range of mainly apparel clothes, both woven and knitted. Non apparel uses include felts and billiard cloths. The reason for Merinos popularity is that it produces a fibre that is consistent in quality. Whiteness, uniformity in length, softness, bulk and the lack of black or coloured fibres means that the wool can be used for all types of clothing from a soft pullover to a fireman's uniform.

Long Wools

Many of the other sheep breeds in the major wool exporting countries of the southern hemisphere came from Britain. They include types of wool used for carpets, protective clothing, handcrafts,

knitting yarn as well as furnishings, many types of apparel cloth and blankets. These breeds produce long lustrous fibres which are broader in diameter and less crimped compared with the Merino and are known as longwools. There breed names usually reflect areas in Britain where they originated. The longwools are hardy animals usually found on poor land and on hill farms where there is no improved pasture. Their dense fleeces protect them during hard cold winters in the open.

Short Wools: The South down is a short wool breed, the wool produced by this relatively small sheep is of secondary importance to its prime quality carcass - but it is fine short and white.

In all major wool producing countries the original sheep breeds have been bred together to form new types. The result is a medium sized dual purpose which produces fine to medium wool. One breed, the Drysdale from New Zealand is the product of scientific research. It was found that certain Romneys carried a powerful gene which produced a fleece with a very coarse, long modulated (hairy) fibres. This genetic freck developed as the Drysdale, now numbers 600,000 and provides the source of hard fibre for blends of New Zealand carpet wools. In South Africa and Nambia, the Karaking breed with its coarse coloured wool is raised in arid regions. Originating in Asia, it is kept mainly for the pelts of the day-old lambs which are used to make 'Persian lamb' fur coats. Karaking wool is used mainly for carpets.

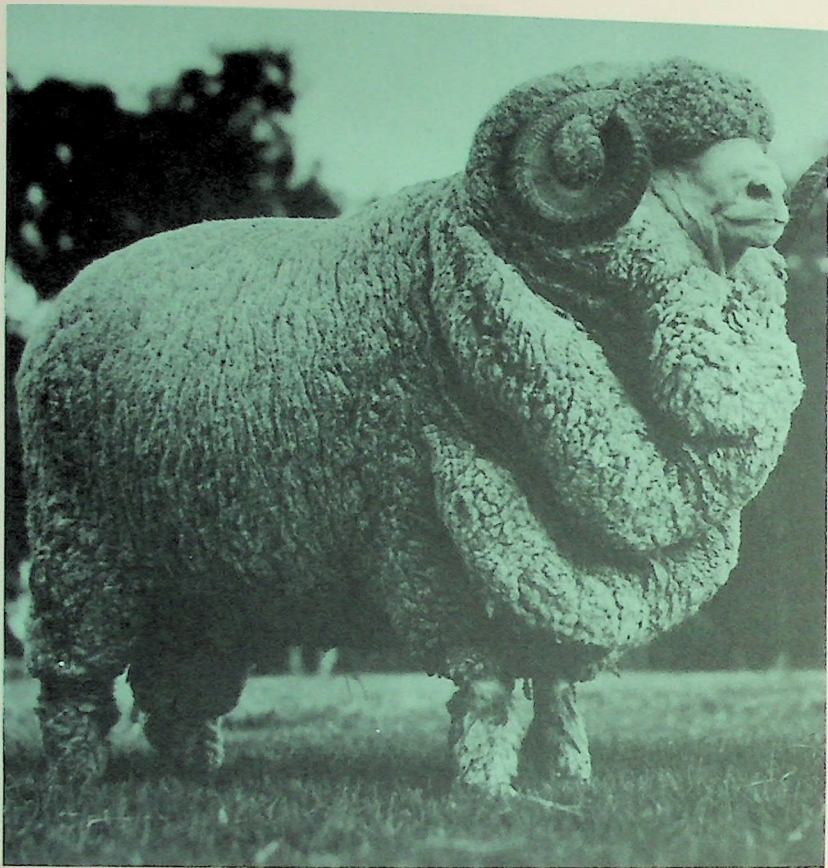
Shearing

To obtain wool the fleece must be removed from the animal with special clippers. This is called shearing. The devices are

usually powered by electricity but in some countries hand clippers (shears) are still used. In clipping the sheep the shearer aims to remove the fleece in one piece and uses long smooth strokes. The animal is not hurt by this process which takes about 5 minutes. After the fleece has been shorn, it is laid out on a skirting table where it is examined for quality. Any shabby or dirty wool is removed - usually the piece around the edges of the fleece. Pieces of similar quality are then pressed into bales and transported to the wool brokers store. Each bale may weigh up to 200 kg. Sheep are usually shorn once a year between early spring and Autumn.

Grading Wool

Traditionally, professional wool buyers needed great skill when they inspected wool before buying it. They would take a sample from the open bale and judge whether the wool met their requirements and what it was worth. They looked for the fineness of the colour, length of the fibre, tenderness and degree and contamination from grazes, burns, dirt dust and the sheep's own oils. All this detail added up to the estimate of what the clean (yield) weight of the wool would be after it had been washed in a scouring line half way around the world. In Australia, New Zealand and South Africa a system called objective measurement has been introduced in recent years. When a lot - comprising a number of bales - is prepared for sale, wool samples are taken from the middle of the bales by a hydraulic corer and a mechanical grab. Once removed the core samples are measured in a laboratory and details of fibre thickness and the yield after the scouring are recorded on a certificate. The grab samples and copies of the certificate are displayed before the lot is auctioned. Known as sale by sample, this method of selling wool now accounts for most of the Australian meetings.



The Australian Merino. This ram is representative of the world's most important sheep breed.



The Romney from New Zealand is the main breed in that country and a major source of carpet and strong wools.



Shearing in New Zealand. The shearer removes the fleece in one piece using long even strokes.



A wool store in Melbourne, Australia.
Buyers are inspecting grab samples
taken from bales. Later in the day,
they will bid for the wool at auction.

CHAPTER 5

WOOL - IMPORTS AND EXPORTS

Where does wool come from?

Many countries have sheep and produce wool, but four countries dominate world trade in wool. Australia, New Zealand, South Africa and Argentina are the most important exporting countries. These first three are members of the International Wool Secretariat, along with Uruguay. These countries, which are all in the southern half of the world, export more than half their wool to the countries of the Northern hemisphere - Japan, Western Europe, the Soviet Union, North America.

Australia produces fine wools which are used in clothing. From New Zealand comes coarse wools for knitwear and carpets. South Africa has fine to medium grade, while Argentina and Uruguayan wools are medium to coarse. Between them, these Southern hemisphere countries supply most of the world's import needs for clothing wools and carpet wool.

The Soviet Union has the world's largest flock of sheep but it does not produce enough wool for the population. China is believed to have almost 100 million sheep but it also needs to buy wool from the Southern hemisphere countries.

Wool Imports

Most of the wool that grows on the sheep of the southern half of the world is sheep to the textile industries of the northern hemisphere. The most important wool consuming areas are Eastern Europe, Japan, Western Europe and North America. Although it has more sheep than Australia, the Soviet Union has to import wool to meet the needs of its vast population. Along with the Soviet Union, the countries of the Eastern bloc - with Poland, Czechos-

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lovakia and Yugoslavia the most important - make up the worlds largest wool using area.

Japan which is the biggest buyer of the wool has only 11,000 sheep on its crowded islands. Its wool textile industry began very modestly in 1879 when the first Australian wool was imported. Now Japan imports more than 170 million Kg of raw wool each year, which is about 16% of all wool exports. The UK, France and Italy are all traditional wool users. Their industries are deeply rooted in history, and it is from them that most of the major developments have come. They are renowned for fine worsted clothes and high class knitwear. Each of the three countries must import the fine and medium wools used in high quality cloths and knitwear, although each country has many sheep. Third after the Soviet Union and Japan in national consumption of wool is West Germany. Of all the major nations, it has the highest use of wool per person and it both imports and exports wool products, especially in trading with other European countries. North America is the fourth largest wool consuming area after Eastern Europe, Japan and Western Europe. As the wagon trains moved West, farmers took sheep with them and made a start on an industry which in the United States now produces about 50 million Kg of wool. Canada produces 1 million Kg of wool a year. Both countries import raw wool from the Southern hemispheres to process as well as buying wool garments from Europe and Asia. In 1977 130 million wool sweaters and cardigans were imported from mostly Asian producers. Imported wool products make up half the United States consumption of wool, which is now more than 100 million Kg each year. It is the countries of Asia, other than Japan, that are making a growing impact on the wool industry. Hong Kong, Taiwan and South Korea make a lot of wool clothing - mostly knitwear,

which is sold on the wealthy markets of Western Europe and North America. Originally low cost production and cheap garments were the reason for their growth but now they are also respected for their quality. These three, particularly South Korea, are increasing their use of wool each year.

The People's Republic of China is also a major importer of wool and in recent years has become the foremost buyer of wool from New Zealand as well as buying extensively from Australia. The Chinese also have a large sheep flock - but as yet there are no accurate statistics on Chinese wool production. India, which has a sheep population totalling 40 million, also imports raw wool which is used to make carpets and knitwear for export and local consumption. Most of India's knitwear production is exported to the Soviet Union and Eastern Europe.

World Sheep Population 1979-80

Total: 1,013 million

Country	Numbers (in millions)
Soviet Union	144
Australia	136
China	120
New Zealand	68
Turkey	46
India	40
Argentina	33
Iran (estimate)	33
United Kingdom	31
South Africa	31

World Wool Production 1980-81

Total: 2,788 million kilograms

Country	Production (in m kg)
Australia	701
Soviet Union	462
New Zealand	380
Argentina	163
South Africa	111
Uruguay	76
Turkey	57
United Kingdom	51
United States	47
Pakistan	42

World Wool Consumption 1980

Total: 1,352 million kilograms

Country	Consumption (in m kg)
Soviet Union	328
Japan	144
German Federal Republic	143
United States	102
United Kingdom	77
Italy	69
France	53

The total figure for world wool consumption is based on selected major consuming countries and includes East European countries.

Virgin Wool Imports — Share held by Main Importing Countries

	1960 %	1975 %	1977 %	1979 %	1980 %
Japan	14	21	19	17	16
United Kingdom	21	12	12	10	9
France	12	11	10	11	10
Soviet Union	4	10	10	11	11
Italy	9	7	8	9	11
German Federal Republic	7	7	7	8	7
All other	33	32	34	34	36
Total	100	100	100	100	100

World Imports of Virgin Wool 1980

Total: 1,116 million kilograms

Country	Imports (in m kg)
Japan	175
Soviet Union	121
France	117
Italy	117
United Kingdom	96
German Federal Republic	79
Belgium	42
United States	33
China	29
Taiwan	25

Virgin Wool Exports — Share Held by Major Exporting Countries

	1960 %	1975 %	1977 %	1979 %	1980 %
Australia	46	48	48	51	46
New Zealand	18	20	20	22	23
Argentina	11	6	8	6	7
South Africa	8	6	8	4	5
Uruguay	3	3	3	1	3
All Other	14	17	14	18	16
Total	100	100	100	100	100

World Virgin Wool Exports 1980

Total: 1,197 million kilograms, actual weight

Country	Exports (in m kg)
Australia	555
New Zealand	273
Argentina	80
South Africa	62
Uruguay	40
France	33
United Kingdom	17

CHAPTER 6

YARN MANUFACTURE

Yarn Manufacture

The wool processing industry separates into two main divisions each carrying out a process based on different principles. These divisions are known as woollen and worsted. The woollen process creates a yarn spun from fibres which are variable in length and which are randomly orientated to one another. They are intermingled and produce a bulky yarn with a fuzzy surface. Worsted yarn is spun from combed wool. Combing is a process where the shorter fibres of wool are removed and the longer ones are left lying parallel. The result is a smooth even yarn. The Woollen sector of the industry differs from the worsted not only in its processing method but also in its organisation. The manufacture of woollen cloth - from raw material to finished fabric - is usually undertaken by one firm. The worsted sector usually divides the process among several mills - combing, spinning, weaving, dyeing and finishing.

Scouring, Drying, Grease Recovery

In its raw state wool carries natural oils and grease as well as dirt and dust, grass seeds and other vegetable matter. Some sorting and blending of selected wools may take place immediately before scouring. The wool is fed into a series of wash bowls and gently moved through a hot aqueous scouring liquor which contains various scouring agents like soap and alkali. It is then rinsed and dried. During this process wools natural grease (lanolin) is removed along with the dirt and may result in a loss in weight of some 30% compared with the original greasy wool. Purified Lanolin is used to manufacture face creams, soaps and ointments.

Carbonising

Some types of raw wool are excessively burry and after scouring

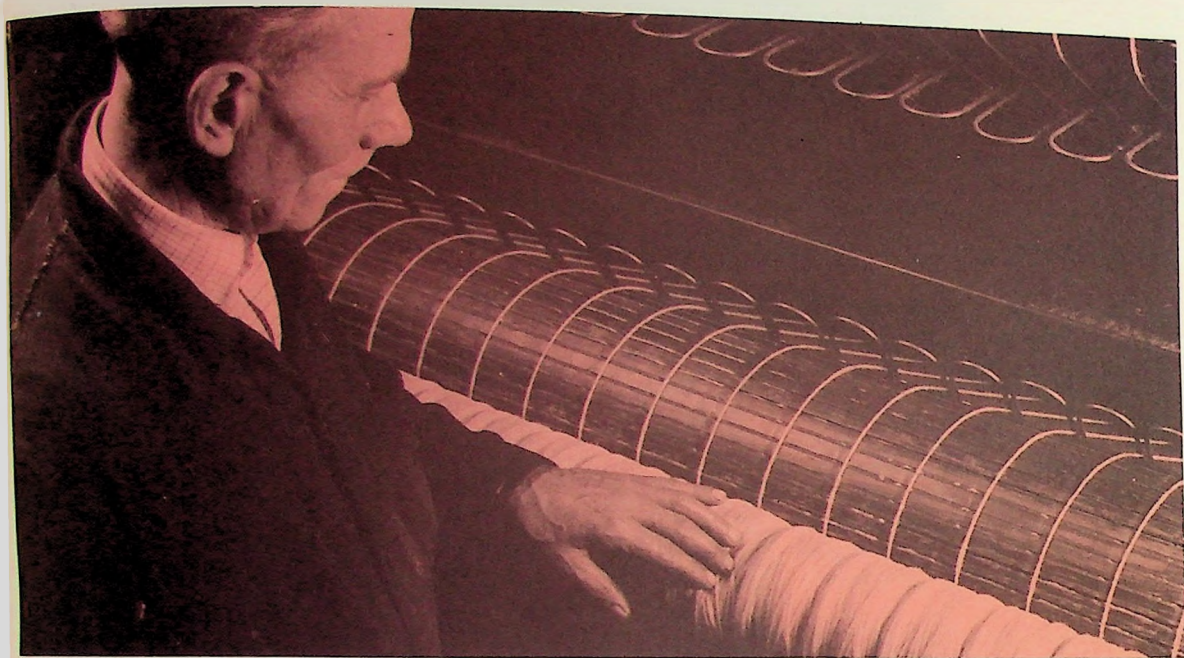
the fleeces retain a large number of spikey seeds which the sheep have gathered. These are removed by a process called carbonising. The burry wool is treated with acid, after which it receives hot air drying and crushing. This causes the burrs to dry up and crumble into powder so that the wool after shaking is ready for further processing. Careful control is required otherwise the wool could be chemically damaged and its value reduced.

Blending, Dyeing and Lubrication

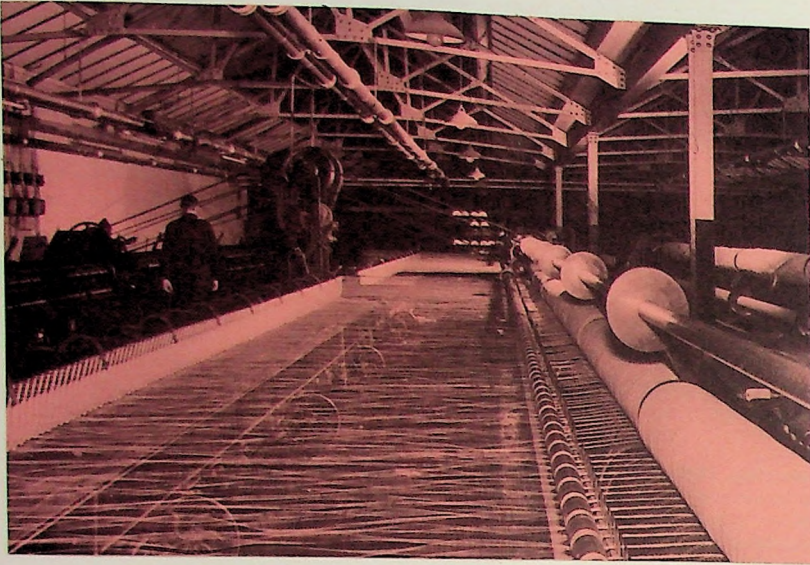
Wool blending is carried out to achieve uniformity of quality and colour and to maintain a competitive product price. As a consequence many different wools are blended together. At this stage nails (short fibres combed out in the worsted process) are blended with the scoured wool. It is also necessary to add lubricants to the wool mass at this stage to ensure good processing and to prevent static electricity build up. Dyeing may be carried out on the loose wool, yarn or cloth depending upon the type of cloth being produced.

Carding

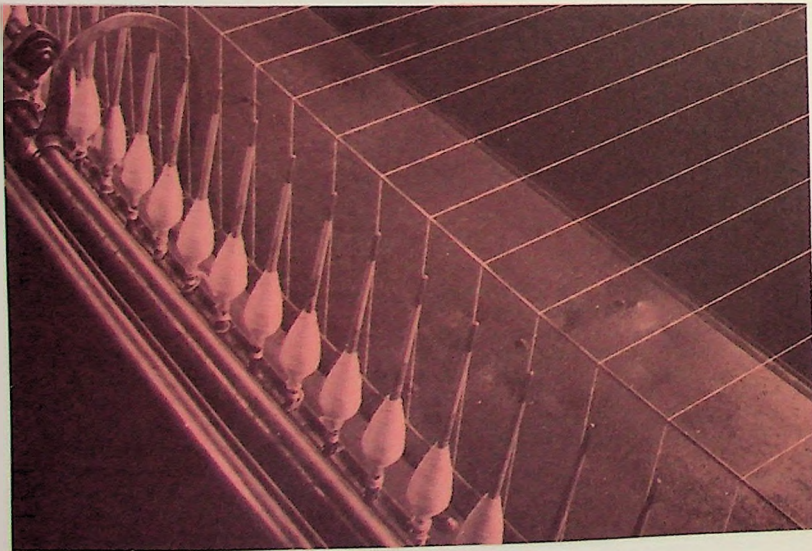
After Blending, the wool is carded in preparation for spinning. The blended wool is fed into the carding machine, perhaps the largest machinery used in the wool textile industry. This machine consists of a series of large cylinders and rollers dotted with thousands of fine wire teeth and as the wool fibres pass over the rotating cylinders they are disentangled and mixed together until an even veil of wool fibres is finally produced. This veil is then divided into strands of untwisted slubbings - thinner than a little finger - and wound on to spools ready for the spinning process.



The final section of a woollen carding machine is the condenser, which divides the web of wool into strips and rubs them together into slubbing. Seen here being wound on to a large bobbin which is then transferred on to the mules for spinning.



The slivers on the large horizontal bobbins on the right are drawn out on the mule spinning frame, given a twist and wound on the yarn bobbins on the left.



This close-up shows the spindles of a mule.



Pure new wool



Scoured



Dried



Blended



**5
Carded**



**6
Spun**



3
Dyed



Blended



5
Carded



6
Spun



7
Woven



8
Bawneen



8
Dyed



8
Tweed



8
Blankets



8
Rugs

Spinning

Woollen spinning takes place on one of two machines - a mule or a woollen ring spinning frame. The former consists of a carriage which runs backward and forwards drawing out the slubbings to the thickness of yarn required, while rotating spindles twist them and wind them, as yarns, onto tubes. Spinning frames are being increasingly used for woollen spinning because of their higher production rate and larger take-up packages. They perform the same function as the mule, but on a continuous basis. The spun yarn may be used as 'singles' (as spun) or twisted together with other yarns (folding). Before weaving or knitting these yarns are usually wound onto suitable packages - 'pirns' for weft or 'cheeses' for warping, or cones for knitting.

The Worsted Process

The aim of the worsted process is to produce a smooth level yarn by ensuring that the fibres used are of reasonably uniform length and fineness as well as being parallel to one another. Thus a worsted yarn has a characteristic smooth, even appearance.

Sorting

Before the greasy wool is subjected to any machine process, it is sorted into lots of comparable quality. The length and fineness of the fibres in a single fleece vary so a wool sorter pulls the fleeces apart and divides them into lots of matchings. Although the practice continues in some countries (notably Japan) the improvement resulting from wool specifications (pre-sale) are more carefully controlled - classing on the farm has resulted in a reduced need for this operation.

After wool has been sorted into types and made up into blends it

is placed in a long bath for scouring. It is then rinsed and dried.

Carding, Gilling and Combing

When the wool comes from scouring it is tangled with fibres pointing in all directions, it is first passed through the carding process. The wool is then processed further by gilling the carded sliver. These treatments together produce a clean uniform sliver of wool fibres ready for the combing machinery. Gilling consists of pulling several wool slivers together through a series of coarse toothed combs (fallens) which help mix them and leave the fibres parallel. The mechanical combing process removes the short and broken fibres from the sliver as well as most of the vegetable impurities remaining and delivers the wool in a sliver of level and uniform thickness. This is then wound into balls which are called 'tops'.

Dyeing

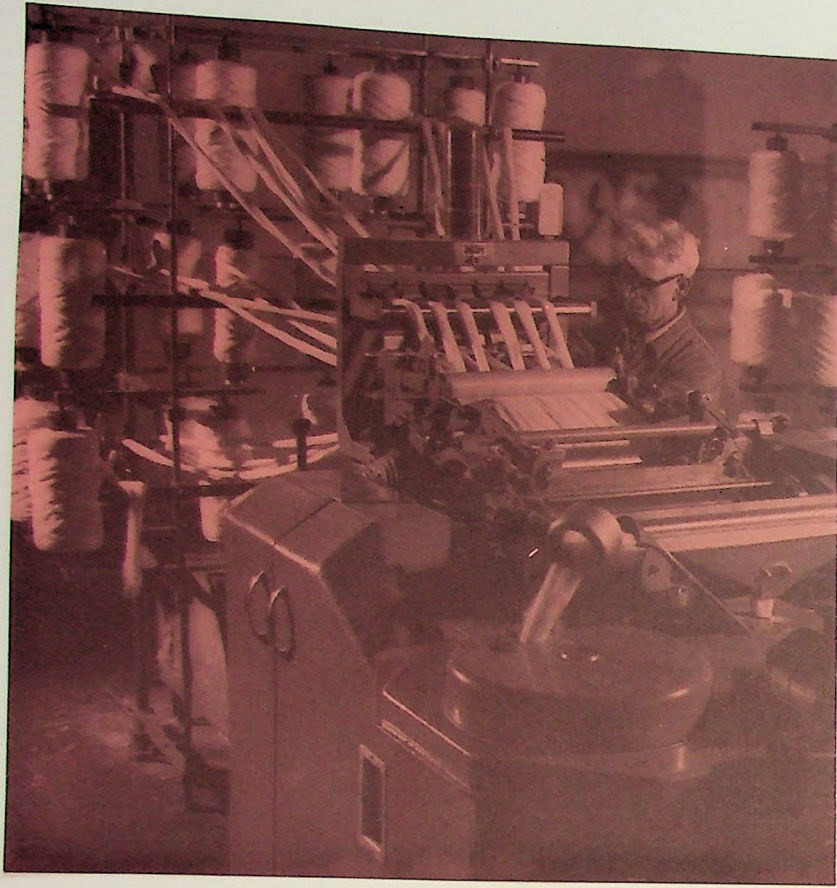
If coloured yarns are required, the wool must be dyed before drawing and spinning. This is generally done when the wool is in the form of a 'top'. Wool is dyed either by placing the 'tops' in canisters through which the dyeing solution is pumped under pressure, called 'top-dyeing' or by unravelling the tops, winding them into loose hanks and immersing them into the dyeing tanks - called slubbing dipping.

Drawing and Spinning

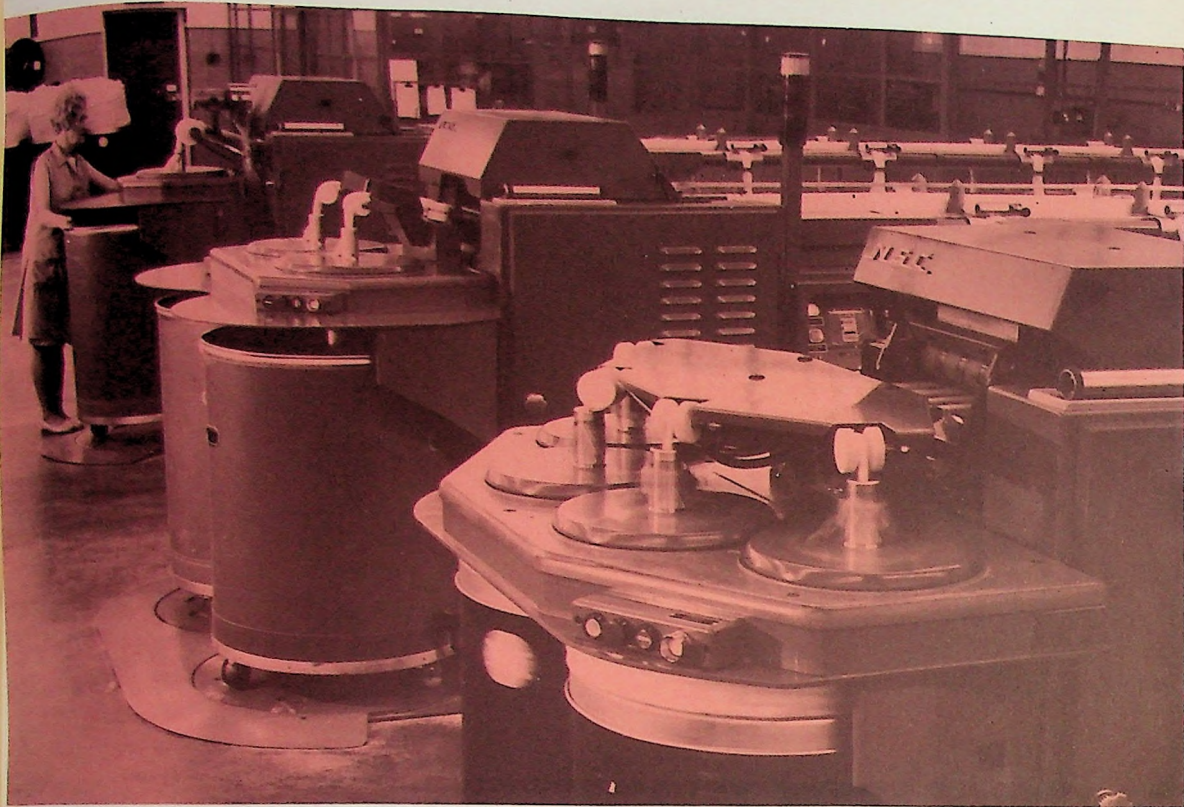
Conversion of the wool top to a roving and then to a yarn takes place in the drawing and spinning section of a mill. Drawing consists of passing the tops through two pairs of rotating rollers, the delivery rollers having a greater surface speed than the feed



In scoured wool, the fibres are aggregated in tufts and have to be separated before the wools can be combed. The carding machine teases out the fibres and removes impurities such as burrs. In the bottom right hand corner of this picture the wool is being removed from the final doffer and gathered into a long even band called a sliver.



Combing is the key operation in the production of worsted yarn. Up to this stage the sliver consists of wool fibres of varying lengths, some of them very short. This machine, a French or rectilinear comb, extracts the short fibres and lays the longer ones in a parallel formation.



The wool top sliver passes through the auto-leveller which levels the sliver during the first operation of drawing. Here are the three stages of gilling from the first gill (background) to the finisher gill in the foreground.



In a continuous process the gilled wool
slivers are reduced in thickness by
drawing (from left) and roving (right)
a final stage before spinning into
worsted yarn.

rollers. The process of drawing might take the form of three or four operations, each time drawing the wool top out thinner and with fibres becoming increasingly aligned/parallel to each other. When the weight (thickness of the top has been reduced to the level required for spinning the resultant product is known as a Roving. The rovings are drawn out again on a spinning frame but here the delivered strand of fibres is twisted into yarn by means of rotating spindle and wound onto a package.

Shrink-Resist Finishes

During the past two decades, wool [^] have devoted more time and effort to the development of shrink resist processes for wool than to any other topic. When washed, fabrics and garments made from unmodified wool shrink irreversibly by a process known as felting and therefore can only be cleaned by very gentle washing or by dry cleaning in solvent.

The Felting Process

Felting is a property peculiar to wool fibre and is the progressive entanglement which occurs when wool fibres are agitated in water causing the fabric to shrink in size. A number of the properties of the wool fibre contribute to the feling process but perhaps the most important is the nature of the fibre surface. Each wool fibre has an outer covering (known as the cuticle) composed of overlapping scales. The free ends of the scales point towards the tip end of the fibre giving it a ratchet-like profile. When the wool fabric is agitated in water the wool fibres in the fabric will slip over each other but the ratchet-like profile will make it much easier for a fibre to move in the direction of its root than its tip. If a fibre cannot move in the direction of its root then it may become stretched or bent and

gradually all the fibres will become more and more entangled, ultimately causing the fabric to shrink. After a lot of agitating the fabric will appear to be a solid mass of fibres and the individual yarns which compose the fabric will no longer be apparent, which is how felt fabrics are made.

The process of deliberately felting a fabric or garment during finishing is referred to as 'milling'. The presence of water is essential to the felting process because it acts as a lubricant, especially in the presence of a soap so that the fibres slip-over each other more easily. In addition wet fibres are more elastic and bend more easily which increases the rate of fibre entanglement. For these reasons wool fabrics do not shrink when agitated in air or in dry cleaning solvent.

Shrink-resist Treatments

The scale structure of the wool fibre is very important to the felting process and therefore by removing the effects of the scale structure it should be possible to prevent the wool fabric from shrinking. Shrink-resist processes can be considered in three distinct categories:

Oxidative Process

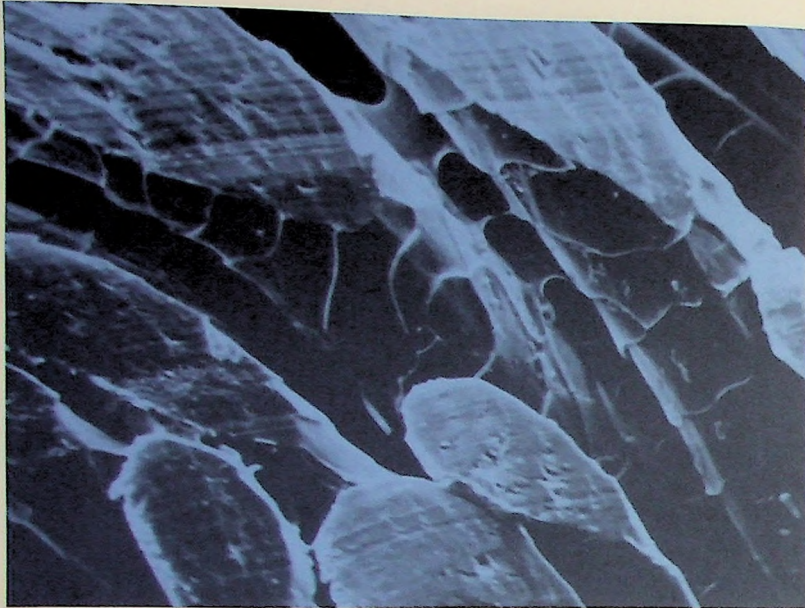
Early shrink resist processes were based on the treatment of wool with an oxidising agent such as chlorine gas or a dilute solution of chlorine in water. This has the effect of softening the scales on the wool fibre surface, making the ratchet-like profile less well defined. When the treated fabrics are washed the softened scales tend to 'plough' into each other rather than slip over each other. This reduced tendency to slip reduces the rate of entanglement and therefore the rate of shrinkage.



Untreated wool fibre (magnification X 2100)



Wool fibre after treatment by chlorination resin process. Scale structure is still apparent but masked by a layer of polymer.



Oblique cross-section of yarn from
polymer treated fabric showing
inter-fibre bonds.

Chlorination processes were first used in the turn of the twentieth century and rather more than half of the worlds shrink resistant wool is still produced using oxidative process of this type. The earlier processes were often associated with strength losses in treated fabrics because chlorine reacts very rapidly with the wool fibre. Unless this reaction is controlled and restricted to the fibre surface, the protective scale structure of the wool fibre will be dissolved and the chlorine will damage the cortex of the fibre. Modern processes overcame these problems of control so that the treatment is even and confined to the fibre surface and the minimum amount of damage is done to the wool fibre. Oxidative shrink resist process can be applied at many stages in the sequence of wool processing and hence can be used to treat wool in the form of tops, yarn, fabric (woven) or garments (knitted).

Machine Washable Wool - This is the trade mark promoted by the IWS to describe wool fabrics, garments or hand-knitting yarns which by virtue of a shrink resist treatment are fully machine washable. Products carrying this label will not shrink when machine washed according to the instructions on the label. Equally important the dyestuffs on the product have been carefully selected so that they will not bleed and stain other garments during washing. The high level of performance of machine-washable products is ensured by the numerous quality control checks made during production.

Fabric Manufacture - Weaving

Woven fabrics are constructed from two sets of threads that cross at right angles. The threads that extend throughout the length of the fabric are termed 'warpthreads' and those which cross the width are termed as wft threads. These threads often referred to

individually as ends and picks respectively. To form fabrics, warp threads are lifted or lowered according to a predetermined pattern and weft threads pass through the aperture or channel so formed (shed). As the shed closes to form the next predetermined order of interlacing the last weft thread to be inserted is pushed or beaten up close to the previous weft thread in order to form a compact fabric.

To complete the weaving cycle there are three basic operations:

1. Shedding - forming the opening with the warp thread.
2. Weft insertion or picking - inserting the weft threads through the warp shed.
3. Beatup - compacting the weft threads to form a close structure.

Wool Fabrics

Worsted Fabrics:

Serge: This fabric uses worsted spun yarn with a similar thread density in a warp and weft directions. The weave used is a 2x2 twill in which the threads interlace in a diagonal form in groups of two, each thread passing over two then under two other threads. The fabric is frequently used for suitings and can be produced from coloured yarns or dyed in fabric form.

Crepe: It is possible to make this type of fabric by one of two ways or a combination of both. These are by using high twist yarns or by using normal yarns in a crepe weave or by a combination of high twist yarns and a crepe weave. The fabric is characterised by a crinkled or puckered surface with no definite pattern. If high twist yarns are used the fabric requires a special finishing

treatment to allow the relaxation of the torque in the yarn to develop the characteristic crepe effect.

Gaberdine: These cloths also use 2x2 twill weave but are made with considerably more threads in the warp than in the weft. Because the warp threads exceed the weft threads the fabric has predominantly a warp face and the twill line is a steep angle. Gaberdines are firmly woven, have a clear finish and are often used for trousers and raincoats.

Woollen Fabrics

Tweed: This refers to a relatively coarse chunky fabric with a textured surfaced fabric. Tweed fabrics can be made in a wide range of weights and weaves, often having colour and weave effects and are usually used in outerwear.

Meltons: Meltons are heavy fabrics used for coatings, often woven with a 2x2 twill or plain weave. The structure is woven relatively loose but the fabric is compacted and consolidated during wet finishing. This special finishing gives the fabric an all over felted appearance and low permeability to air and for this reason it is often used for overcoats.

Velour: These fabrics are primarily for outerwear being solid, heavy weight products. They are made in a similar manner to meltons but finally receive a raising treatment. This lifts the fibres from the body of the fabric.

Knitting

Knitting is an ancient craft which can be traced back to Egyptian times. Examples of advanced hand knitting found in Egyptian

tombs have been dated by Scholars as being from the fifth century BC. No mention of the craft appears in Britain until the fourteenth century when knitting was still a handcraft. The first knitting machine was invented in 1589 by the Rev. William Lee, a resident of Calverton, a village in Nottingham, England.

The Knitting Stitch

The fundamental unit of all knitted fabrics is the loop. This is formed when a loop of yarn or thread is drawn through a previously made loop. There are two ways to produce this interlocking loops - weft knitting and warp knitting. In weft knitting loops are formed by a single yarn passing horizontally across the fabric. Whereas in warp knitting a parallel series of threads is wrapped simultaneously round the knitting needles forming loops which are in a vertical direction. Weft knitting accounts for more than 90% of knitted goods, and an even greater percentage if only wool is considered.

Wools Used in Knitting

Most of the wool used in the knitting industry goes into weft knitted constructions - piece goods (jersey) or knitwear garments characterised by a rib or weft.

Single Jersey - has a variety of uses from skirts, blouses and dresses, mostly in plain knit using finer yarns, to coating and even heavy furnishings in which heavy yarns are inlaid or 'tucked' into a plain knit base.

Double Jersey - in wool is mostly in the plain constructions such as interlock for underwear and Punto-di-Roma or Swiss pique for ladies dresses, skirts and shirts. Inlay constructions using thicker or fancy yarns are also becoming popular in double jersey.

plush - based on single or double jersey is used for seatshirts, jacketings and furnishings. In knitwear, the basic styles are named after the type of wool used or the geographical origin of the pattern.

Botany - produced from Merino wool and spun into lean worsted yarns, the name is derived from Botany Bay in Australia.

Lambswool - very fine, soft handling knitwear, originally produced only from lambswool but now often a mixture of lambswool and other soft fine wools.

Shetland - a cross bred yarn type, originally produced entirely from the coarse, very springy wools grown in the Shetland Isles but now mainly produced from shorter New Zealand wools.

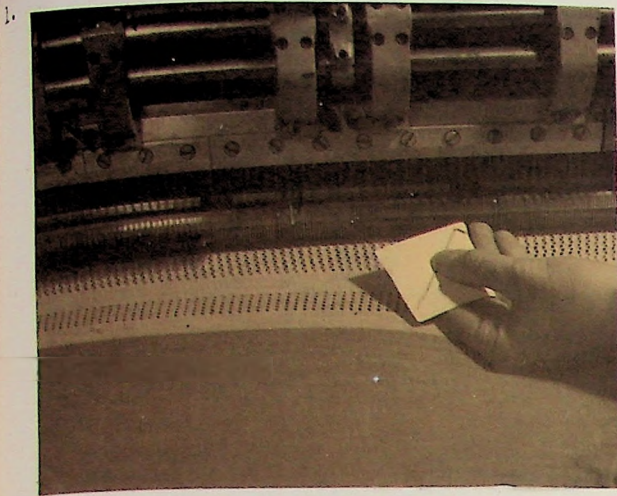
Guernsey - traditional English fishermans sweater, knitted from highly twisted worsted yarn. The close knitted structure and high twist yarn produce a hard-wearing weatherproof garment.

Aran - traditional Irish sweaters knitted in a heavier count yarn, characterised by extensive patterning. The wool is usually dyed, the natural colour enhancing the cables, lattices and other textured stitches used.

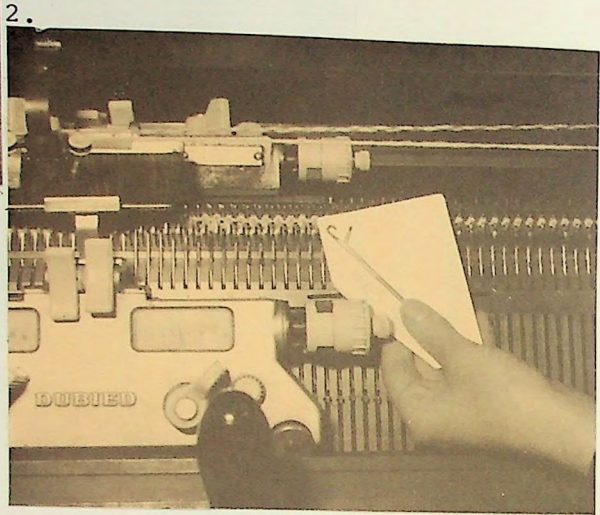
Fair Isle - this style of patterning originated in Spain but was developed among Shetland knitters. True Fair Isles used natural coloured wools, each row of the pattern containing two colours. The yarn is traditionally finer than that used in modern Shetland knitwear.

Carpets

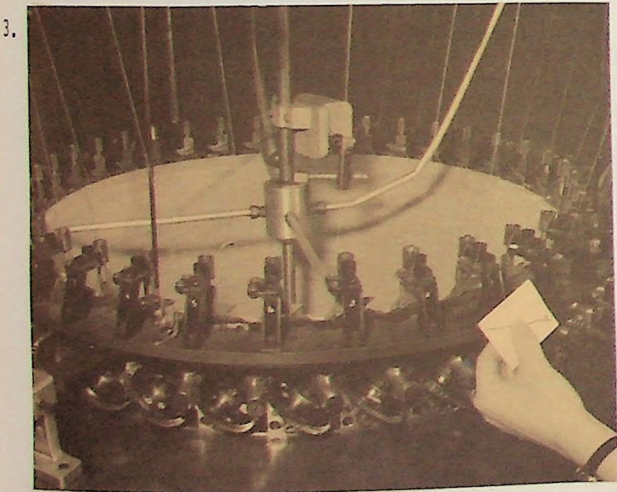
Carpet is a cloth with an extra yarn arranged in vertical position to form the pile. The pile has to be supported by weaving it into sets of warps called binders and stuffers and wefts called shots,



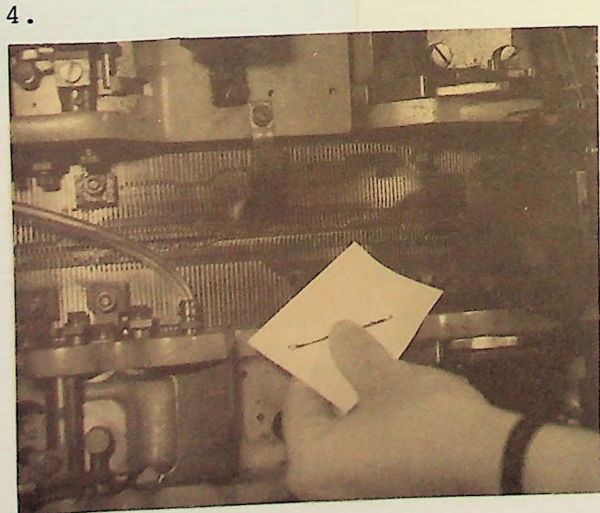
1. A circular Single Jersey machine showing needles.



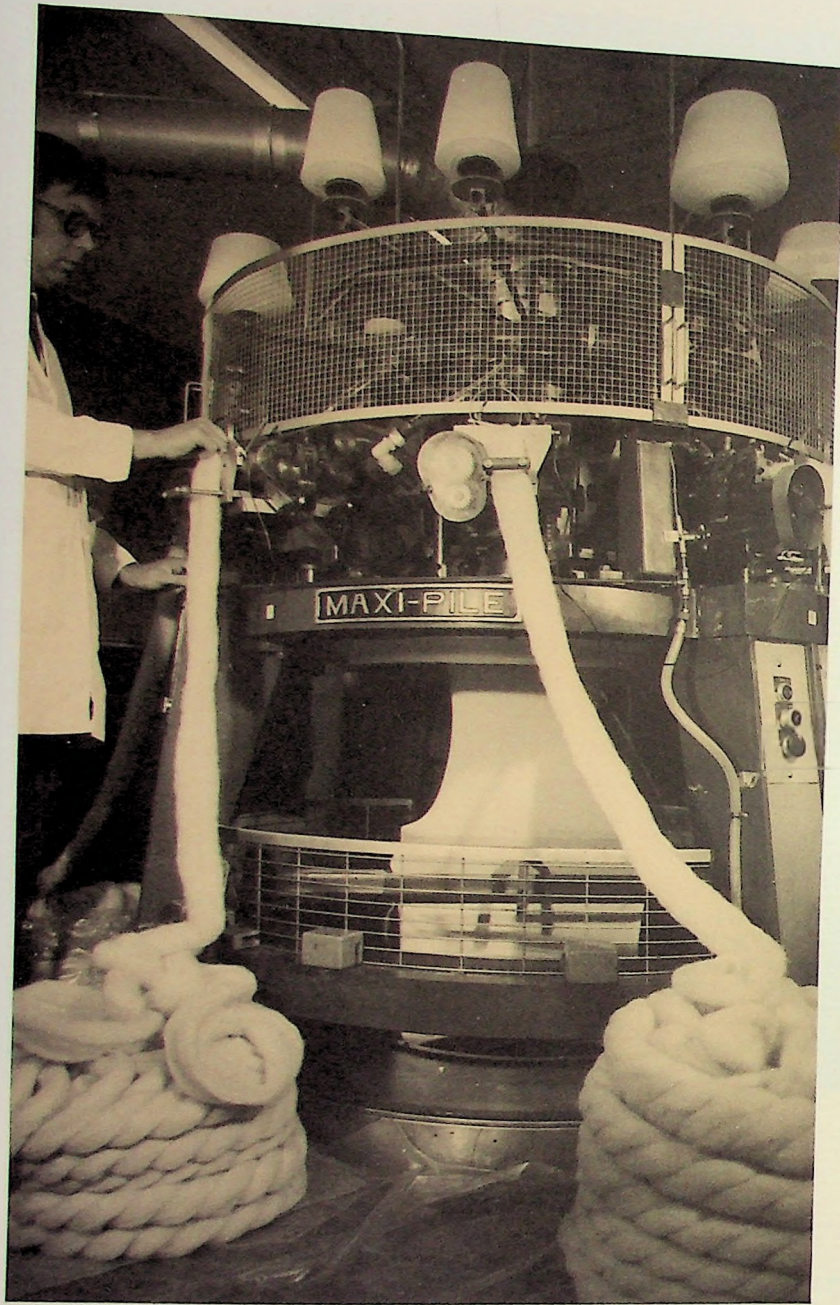
2. A circular Purl Machine showing needles.



3. A Straight Bar "Fully Fashioned" machine showing needle.



4. A Flat bed Machine showing needles.



Sliver knitting machine at work at the IWS Technical Centre at Ilkley, England. The wool sliver or top is locked into a backing fabric as it is being knitted. This creates pile fabrics suitable for a wide range of end uses - ranging from slipper and apparel linings to floor coverings and nursing aids.



A Sliver Knitted wool bedspread. Long staple crossbreed wool has been knitted into a backing fibre to give this 'sheepskin look'.



Checking the pattern repeat on a pure new wool Axminster carpet.

in woven Axminster and Wilton carpets, or by a pre-manufactured woven or bonded cloth in the case of tufted or bonded carpets. Basically, carpet components can be split up into three complementary parts:

1. Basic cloth which supports the pile woven or bonded simultaneously with pile insertion or separately.
2. Pile forming yarn - to walk on.
3. Secondary back materials, latex or cloth to secure the pile in position and to give the cloth handle and stability.

Wool as a fibre has its stronghold in woven carpets sector where 643m Kg was used by carpet manufacturers in the eight main wool consuming countries in 1979. The Tufted sector is making steady progress also, and used 46.9m Kg of wool in the same period.

World Market

Japan

During the first three months of the year, unpredictable weather and cut price "sales" traditionally have an adverse impact on the Japanese women's wear market. But new lightweight wool is proving popular with customers during this "trans-seasonal" period and a joint promotion between the IWS and a department store chain aim to keep it that way. IWS Japan has helped Seibu with 21 stores throughout Japan put together a "Cool Wool" collection with merchandise selected from sixteen leading manufacturers. Wool hand knitting yarn is finding an expanding market among the young people of Japan, thanks to a series of joint promotion campaigns between IWS and the Handknit Yarn Promotion Association.

Europe

The "Cool Wool" programme which began in Europe three years ago is now well established and claiming increasingly large share of Spring/Summer clothing market. In Australia, Germany and Switzerland "Cool Wool" has established a firm place at the top end of the Spring/Summer market more than 100 manufacturers have included "Cool Wool" in their ranges.

In Britain, major London stores featuring IWS publicity material include Harvey Nichols in Knightsbridge, Simpsons of Piccadilly and Dickens and Jones in Regent Street.

Dutch designer, Van Gils has increased the "Cool Wool" garments in his Spring/Summer collections by 50%. "Cool Wool" yarns for the knitwear industry have been released in Europe showing at the Italian "Pitti Filati" textile fair in Florence.

Younger customers are being specially catered for with pure new wool products from several of Italy's leading manufacturers and knitwear stylists. Basile, a quality clothing manufacturer has produced a less expensive wool collection called 'Basile 2' aimed directly at the 18-30 age group, while Knitwear producers Luciano Soprani and Missoni have both created special young peoples ranges at reasonable prices. Wool has moved into sporting clothing with a range of socks, leg warmers, scarves and pullovers designed by Missoni and manufactured by Malerba.

The leading menswear manufacturer in Scandanavia, Oscar Jacobson has launched its new Spring/Summer collection which strongly features "Cool Wool" qualities in suits and jackets and trousers. The Jacobson company in 1984 had a turnover of \$17.8 million with more than 40% of its products exported - mostly to Britain and sold by such top stores as Austin Reed. Borjie Bergtsson,

managing director said:

"Wool is a wonderful material to work with but you must have the same demands of quality all the way through the production process - from raw materials to marketing. And you must have the right wool from the beginning to reach top quality".

1. 1/2



The Austria-Germany-Switzerland branch of the IWS chose a desert theme to stress the cool qualities of wool.



The elegance of Woolmark clothes. Just two of the outfits promoted by Seibu and IWS Japan for Spring and Summer.



...A touch of Oscar Jacobson style.

CHAPTER 7

IRISH WOOL

Irish Woollen Industry

Irish wool is grown as a by-product - meat being the import product from the sheep, therefore little care is taken by the farmers which makes Irish wool poor in quality. Although Irish manufacturers of both cloth and carpets would obviously prefer to use Irish wool, its poor quality, inconsistency and irregular deliveries makes it uneconomical. Deliveries of Irish wool which had been wet to make the consignment heavier and objects like bicycle frames entwined to add bulk, to Youghal Carpets made it necessary for the Company to import the bulk of its needs from New Zealand. Irish wool growers are not encouraged to produce good wool because of low prices offered by the merchants. The wool they produce will inevitably have dye on it from branding. In Ireland the merchant makes the profit not the wool grower. Another disadvantage is we have no scouring plant in Ireland. In Australia and New Zealand for example the wool growers send their own wool to be scoured and then sell it to the merchant at a much better price. However, as in the catch 22 situation, there is not enough wool produced to constitute the set up of a scouring plant. So in fact, the term 'Irish Wool' is an illusion but kept alive for the export market like America.

There are four vertical weaving companies in Ireland. Castleisland (Ulster Carpet Mills), Foxford, Co. Mayo, Dripsey, Co. Cork, Mills of Lucan, Dublin. These companies buy their wool in and mix it with Irish wool.

The IWS in Dublin headed by Mr. Douglas Bain formed the Wool Weavers of Ireland Society. Mr. Bain's idea was that all the Irish weavers should come together and sell collectively at the international shows, he believed that they could compete more

successfully as a group than as small insignificant companies, and help keep the illusion of Irish Wool real. The Society meets twice a year to discuss colour trends and fashion story forecasts, with the help of consultants and research the Society can compile a fabric story considering the use of their individual types of wool for the textile fairs - Interstaff, Premiere Vision etc. Since the founding of this society 'Irish Wool' is in the top ten percent of the world market and their overall exports have increased 300%.

Ireland exports most of its wool products due to lack of funds for large scale promotion and education of the quality and advantages of wool over other natural and man-made fibres.

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navy blue, apple green.

DRIPSEY WOOLLEN MILLS, COUNTY CORK

Dripsey is a vertical woollen mill, which means manufacturing from fibre to fabric. Having complete control of all stage of manufacture means therefore great versatility as regards design and colour. This is followed up by an excellent stock service.

The Mill itself was established in 1840 and since then it has progressed to the stage where it gives constant employment to 33 men and 10 women. Most of the 43 employees live in a self contained Model Village near the Mills which is situated in a beautiful valley 13 miles west of Cork. It is a tribute to the skill and versatility of the employees, that such a variety of products, as furnishings and apparel tweeds, blankets, travelling rugs, and knitting wools are made. Dripsey exports to Britain, France, Italy, Holland, Greece, USA, Canada, Japan, Australia and New Zealand. Dripsey also hold eight gold medals awarded for Fabrics shown at the International Textile Exhibition held in California.

Dripsey Blankets are very well known in Ireland. They are manufactured in a variety of sizes and colours with whipped ends or satin bound in matching colours. Recent developments include the Woolmark Cellular Blanket, which, while being exceedingly light, provides considerable heat in winter and comfort in summer. Dripsey blankets are indeed luxurious, long lasting and excellent value for money. The Cellular Blanket is shrink resist treated and is naturally flame resistant. Their main attraction being that they give warmth without weight and are often used as a bedspread. Dripsey Woollen Mills were

the first to meet the high standards of Bayer of Germany in the manufacture of Dralon Fabrics, which they initially undertook to make in 1965.

Today their range of colourful Filter Nest Dralon Curtaining Fabrics have been further extended with some exclusive designs by Kilkenny Design Workshops. The range is now the most comprehensive offered by any Irish manufacturer. Another new addition to Dripsey's range of household textiles are the new Woolmark Kilkenny Designed Bedspreads.

Colour Consultants delight in using Dripsey textiles because of easy co-ordination. The wide selection of shades and the facility to match customers own shades allow the arrangement of some very attractive schemes of colour combinations through harmony and contrast. It is on the quality of its products that Dripsey Woollen Mills look to the future with confidence.

The Manufacturing Operation:

The fleece wool is first classed into its various qualities, Coarse, Medium and Fine. Then the fleeces themselves are sorted and all discoloured pieces and doggings removed.

Coarse Wools - used for Furnishings.

Medium Wools - used for Blankets, Heavy Tweeds.

Fine Wools - used for Apparel Tweed.

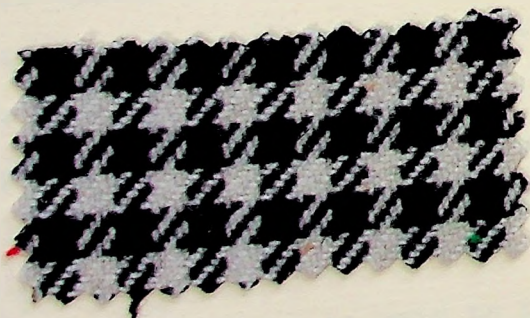
After sorting, the wool is scoured. It is then dyed to the required shade. It is then blended, colour to colour, to produce the typical tweed shades and mixtures. Next the wool is carded - combed out into almost individual fibres and all the

colours are mixed thoroughly together. After carding the carded web is split up into individual threads and are given the necessary amount of twist to make a yarn. The yarn is then made up into a warp and weft. After the cloth is woven it goes for finishing where first of all it is examined for faults and these are rectified. Then the cloth is scoured and afterwards milled or felted, depending on finish required. It is then dried and set in its width and length. Then it is sheared to remove excess fibre from the face of the cloth. Finally the cloth is steamed and pressed and rolled up for delivery to the customer. Blankets, travelling rugs, or fleecy fabrics are not pressed but instead they are put through a machine which raises the nap on the surface of the cloth.



Caption from above postcard

"Follow the white sheep's path to Killarney to see the best of County Cork. Wend your way beside the River Lee to Dripsey home of the Woollen Mills. There you will find an enticing display of tweeds, sportscloths, suitings, cellular blankets, rugs, furnishing fabrics, table linnen and hand knitting wool."



Wool Samples from Dripsey.

CASTLEISLAND WEAVING CO., PORTADOWN, N. IRELAND

The Ulster Carpet Mills employs 600 people engaged in dyeing, spinning, carding and weaving wool-rich yarns into high quality carpets, upholstery fabrics and tweeds which are in demand by interior designers and couturiers round the world.

The success of this private company, making 10% of total UK Axminster output, and its two wholly-owned subsidiaries, Castleisland (ladies coatings and upholster fabrics) and Walker Caledon (specialising in men's thornproof tweeds) which are exporting 70% of all they produce to the top designers in France, Germany, Italy, the U.S. and Japan, does not happen by chance. Throughout the main mill in the town centre, and at the latest factory at Seagoe - bought from the government five years ago and already doubled in size - there is evidence of good management and forward planning. In the past year, more than £1m worth of new capital equipment has been installed, including two Hemmer combined scouring and milling machines, dye vats to boost quantities of the dyed wool for the tweed department, and a computer for the dyehouse to measure yarn and dyestuff and then create colour recipes. It also operates a pass/fail system so that the dyer knows when colour is matched. With this new equipment Ulster Carpet Mills now has one of the most advanced dyehouses of its kind in the world. The company carefully plans the purchase of new plant to ensure greater production, but some old and proven units are retained, often sited beside the new additions.

It is obvious that great attention is paid to the involvement of everyone in the company's progress. As well as an informative quarterly internal magazine, UCM Review, giving information about equipment being installed, compliments from customers, details of special orders, exports, etc. as well as company gossip, most recently "quality circles" have been established. At present

operated in the weaving, mending and tweed departments, production problems are considered by those concerned and possible practical solutions suggested. Studies have been conducted into time wasted "waiting for splitting" and "time lost on the mending tables" and management has been delighted with the resulting detailed and thoughtful reports. Small details are not forgotten. At intervals signs remind everyone of the value of the wool they are handling at that point in production with carpets "top of the league" at £20-£30 per square yard. Samples of all the tweed designs are kept for several years and there are pattern books with detailed drawings of every one of the hundreds of designs ever produced. These can be particularly useful when a period comes back into fashion, such as the current vogue for the 1930s.

In the latest UCM Review appears the reminder "Nothing, absolutely nothing, is more important than quality. Any future progress will be determined not by how many carpets we produce but by how well we produce them. More than ever quality must be our watchword". Watching the despatch department carefully unrolling and checking carpets for the final time before sending them off to customers, or laying out body carpet side by side to ensure good pattern matches, would encourage any carpet fitter who takes a pride in his work. And, talking to top carpet fitters the next day in another part of Ireland, UCM has an excellent reputation with them.

Although the carpet section must be the biggest user of wool working with 23 wide gripper looms, 21 body looms (including four new 36" Crabtree looms) eight wide spool looms and two face-to-face van de Wiele Wilton looms for 24 hours each day, it is the Castleisland tweeds which attract attention in so many fashion magazines. Described as manufacturers of typical Irish tweeds, the designers, under the guidance of Mr. Brian Hazard produce a wide range of textures, colours and types of very sophisticated tweeds, 70% of

which are exported outside the UK and Ireland, mainly to France, Germany, Italy, the US and Japan. Regular customers include Perry Ellis and Anne Klein (in New York). Kenzo and Coureges (Paris), Armani and Basile (Italy), Hugo Boss (Germany), Betty Jackson and John Rocha (London). In addition many of Dublin's top fashion houses such as Henry White, Paul Costelloe, Jimmy Hourihan and Brian Tucker use the Castleisland tweeds. Eighty per cent of the wool used to make these high-fashion tweeds is produced in Ireland. Ladies' fashion tweeds are not the only market supplied by Castleisland, there were some striking checks in black, white and grey intended for men's jackets in Japan. Even with two shifts per day and four new Dornier looms, the plant has problems in keeping up with the demand for the products which illustrate the enormous improvement in Irish tweeds in the past few years. To help them keep abreast of these trends the directors and designers travel extensively and, at times, exhaustively to meet customers, see new developments and gather information. As many customers requested tweed fabrics to go with the carpets, Ulster Carpets is one of the few carpet manufacturers in the country which can offer complementary upholstery fabrics made by Castleisland. Brochures for the contract market suggest how possible groups of colours in tweeds can add to the appeal of particular carpets.

Owned by Ulster Carpet Mills since 1980, Walker Caledon resulted from the amalgamation of two old and well known Northern Ireland companies, the Caledon Weaving Company and William Walker of Banbridge. It is now under the direction of sales and design executive, Mr. Abe Greer, and specialises in the production of the traditional Irish men's tweeds.

In 1938, the late Mr. G.W. Wilson, father of the present directors and son of a successful wholesale cloth merchant in Belfast, started the carpet industry in Northern Ireland to help alleviate the

serious unemployment in the province. Two firms were established, Damolly and Co. in Newry and the Ulster Carpet Mill in Portadown, which was bought with 12 acres of land, for only £1,200! With the outbreak of war in 1939 it became impossible to get jute and cotton for carpets. It was decided, therefore, to diversify in 1941 by returning to Mr. Wilson's old trade, the weaving of cloth for blankets, khaki, denim, etc. Like the rest of the carpet industry, the difficulty of obtaining raw materials after the war was a great problem, but it was overcome at Ulster Carpet Mills by making carpets with 100% wool pile and a wool backing.

Each of the three Wilson brothers is joint-managing director and responsible for a different aspect of the company's work. Mr. Walter, the chairman, takes a particular interest in the production of carpets, Mr. John energetically promotes and encourages the production of tweed and Mr. Edward looks after the very efficient running of the three plants (shortly expanding into four when an adjoining former canning factory is taken over). They all give the impression that UCM's team is led very much from the front. Keeping a knowledgeable eye on their activities is one of the industry's personalities, Mr. Tom Peattie, who joined the late Mr. G.W. Wilson as general manager of the company in 1943. Mr. Peattie's original allegiance to the linen trade is shown in the director's diningroom where a row of famous 18th century prints show all the processes in the production of linen.

Mr. Peattie is better known as chairman of the Wool Weavers of Ireland. Since the early 1950s he has been interested in the idea of the leading Irish spinners and weavers joining together for mutual support and promotion. For many years he was chairman of the Northern Ireland Weavers' Association which, because of its unusual geographic situation, received very little support from outside and had to compete for markets as a separate entity,

without the trading protection often afforded to neighbours. Since the whole of Ireland has become part of the EEC, tariffs, etc. are standardised and five years ago Mr. Peattie's dream was realised and the Wool Weavers of Ireland came into being with himself as chairman, supported strongly by Mr. Douglas Bain of the International Wool Secretariat in Dublin, and by Mr. Tom Redington. Three new members, Magee Weaving Division, Convoy Woollen Company and Emblem Weavers will add weight to the corporate activities of the industry and widen the range of fabrics offered at joint promotions of the Wool Weavers of Ireland.

Fabric Design

In January the design team begin to prepare for the new collection. Design ideas are researched and developed from first-hand information gained in the course of travel and through contact with customers. Castleisland's colour story is built up from advance information on colour forecasts from International Wool Secretariat, CTT and any other available data. Fabric styles are discussed and then the hard work begins. These ideas have to be resolved into a coherent, relevant collection.

Fabric Styling

Fabric styling is a result of the combination of, and interplay of colour structure and quality. Each design is made in a number of colourways. This always includes some patterns in classic colour combinations since however wonderful current colour influences may be there never fails to be demand for more neutral classic types. Structure refers to the type of weaves, it may be plain weave, common twill, or something more elaborate. The quality of the cloth is determined by the cloth weight and the composition and yarn type. All these factors need to be considered in order to produce a suitable style for the particular

market.

Patterns are produced for the company's agent, and for the trade shows. Autumn marks the beginning of a new selling season, the first showing of the latest collection being at Premiere Vision, Fabrex, Interstaff etc.

Since Castleisland produce fabric of coating, and heavy suiting, they can only concentrate on the Autumn/Winter clothing market.

Fabrex Rustic Mood

Soft, colourful tweeds made the strongest impact at the Fabrex Fair, Olympia, London last week where record attendances were reached the first day.

Over 3,000 visitors at the biggest ever fair formed their first impressions of the autumn/winter 86/87 fabrics and firms offering traditional woollen qualities in updated colours were doing a brisk trade.

The Northern Ireland tweed specialist, Castlisland hit on exactly the right mood and buyers were literally pushing past each other to order sample lengths.

The much sought after look is almost hand woven in appearance with large scale open checks and running stitch effects complemented by Donegals and the whole family of flecked, marled and jaspé fabrics.

Balancing the explosive electric blue, jades and violet colours was a quieter story in earthy shades of beige, sand and brown - a theme labelled "Gentleman Farmer" by the French Mill Saic Velcorex which summed up the rustic but refined feeling. (Fashion Weekly October 17 1985).

For Autumn/Winter - 86-87, Castleisland are incorporating the colourations forecast by International Wool Secretariat to their

collection.

The Main Categories are:-

Group 1 - "Metallic"

Time honoured neutrals specially designed to give a masculine/feminine look utilising off white, beiges and subtle greys in classic styles. Can offer many options by harmonising with "Cartoon".

Group 2 - "Opulent"

Rich deep colours expressing refinement and wealth. Principal colours are blues and greens, which are mixed together with a view to partnership with "Explosive" series.

Group 3 - "Explosive"

High powered, strong, vibrant colours to compliment "Opulent" or "Cartoon" shades. Large scale designs to give maximum impact.

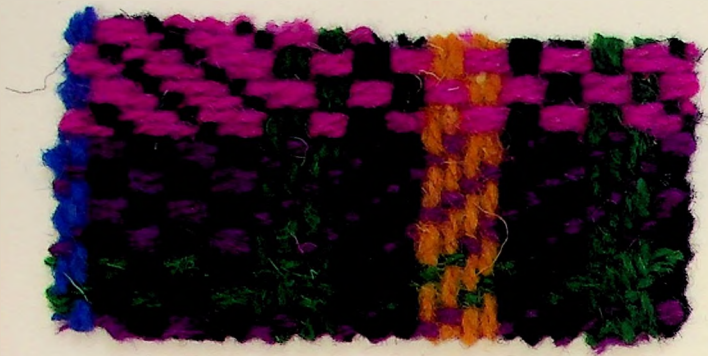
Group 4 - "Cartoon"

Straight from disneyland, soft, tender colours, very "retro". Ideal for the young and young at heart. Blend with light neutral "Metallics".

Group 5 - Black-White-Grey

Although not forecast by International Wool Secretariat, we feel strongly that this trend will continue in many markets, and could well prove useful to neutralise the stronger colours in "Explosive".

Alcudia



Wool Samples from Castleisland

LEXICON OF WOOL TERMS

A

ADELAIDE WOOL: Obtained in and around this city in Australia, the wool is a high merino quality which is slightly lower in quality when compared with Port Philip and Sydney wools raised in Australia. It can spin to 60s or 70s worsted counts and finds use in high-quality worsteds made from very fine, choice fibers.

AFRICAN WOOLS: Refers chiefly to wools from the Union of South Africa—Orange River Colony, Natal, Transvaal, Rhodesia. These very soft, fine, white merino wools are much sought for by woolen and worsted mills all over the world. Native breeds of sheep furnish much of the annual yield of African wools and it should be borne in mind that this stock is apart from the merino-type wool. Low yield and inferior quality, along with careless handling, mark the characteristic of wool from the native sheep.

ALBATROSS: A fine, lightweight, soft material made of good-quality worsted yarn. Plain or rather open fancy weaves are used to enhance the crepe feel and surface effect.

ANDALUSIANS: Made from Spanish merino wool and comparable grades, these fine worsted dress goods made in England come in a variety of twill constructions and fabric weights.

APPAREL WOOL: Broad term used chiefly for tariff purposes, which embraces all wools except carpet and pulled wools. Apparel wool finds much use in blankets, felt, upholstery, and similar materials.

ARGENTINE WOOL: Merino, cross-bred and carpet wools are raised in Argentina, the chief wool nation in South America. Lower grades are often in-

festes with burrs and other vegetable matter to the detriment of the fleece. Chief shipping center is Buenos Aires. Argentine wool is much used in America. New Orleans is the port of entry.

ASTRAKHAN: Spelled in a variety of ways. It is a pile cloth of coarse structure that shows an interesting, curly face. Gives appearance of natural fur. The product originally came from the region of Astrakhan, Russia. The curly, looped effect resembles that noted in Persian lamb.

AUSTRALIAN MERINO: A very high grade, distinctive breed developed from several various strains. Australia, since the days of the famous Captain Macarthur, who was known as the father of the sheep industry in Australia, 160 years ago, has constantly improved the quality of its wool.

Sheep in this class are large in stature, thrive well in large flocks, and have the stamina to withstand drought and dry vegetation better than other breeds. The fleece is very dense and averages 8 to 10 pounds in weight. Staple length is 2½ to 4 inches. This high-quality stock can spin from 60s to 90s count.

AWASAI: An ideal carpet wool from Mesopotamia and very popular among carpet manufacturers in America.

AXMINSTER: A cut-pile woolen fabric, 7 tufts to the weft inch inserted throughout guiding tubes into cotton chain warps and bound with a heavy Kraftcord of jute weft filling and binding yarn carried by a needle thrust to weave a 3-shot construction. Unlimited in use of colors in design, the Axminster weave is identified as rollable warpwise but not weftwise.

B

BABY COMBING WOOL: Fine, choice wool fiber which ranges from 1½ inches to 2½ inches in staple length. The French method of combing is used to make high-grade worsted yarn from the stock.

BAGDAD WOOL: Dark carpet wool from Mesopotamia; much used in the United States.

BALE: A compressed pack of wool of a convenient form for transit, varying in weight from 150 pounds to 1,000 pounds, in the countries of production. Australian bales weigh about 300 pounds. Argentine bales 1,000 pounds. Burlap is used as the covering.

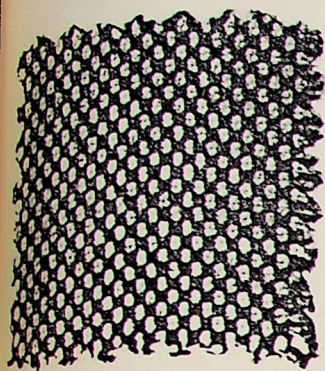
BALMORAL: A strong, heavy, British woolen fabric made on a twill weave; stripes of red, blue, black and grey feature the material.

BARATHEA: Fine textured material of broken filling character. Made of silk, nylon, or rayon warp and woolen or worsted filling. Other combinations may be used. High-quality stock is used in making this cloth. Used as mourning materials and in cravat cloth. Cloth is black as a general thing.

BEAVER CLOTH: A heavily-napped, face-finished overcoating which has the softest feel and the longest nap when compared with the other cloths in its group—melton, kersey, and broadcloth. The grade of wool used accounts for the high quality of the goods—a 64s or better of ½-blood wool.

BEDFORD CORD: The practice of adopting English localities for the names of many cloths, not necessarily of local make, is again resorted to in naming this material. Cloth has longitudinal cords that run in the warp direction. Used for coatings, suitings, riding habit cloth, and uniform material. Generally of wool.

BILLIARD CLOTH: The highest grade of material made from the best of stock—Saxony, Silesia, or Australia merino wool. Two up and one down twill weave is used. Cloth must have body, substance, evenness, and smoothness. Set in the reed at 144 inches and is finished at about 72 inches. Dyed green and its use is obvious.



Birdseye worsted fabric.

BIRDSEYE: When applied to a worsted fabric it implies a clear finish, a simple material, the face of which is marked by small indentations produced by the weaves used to suggest the eye of a bird.

BLANKET: This cloth is named in honor of the man who first used it as a covering for warmth and sleeping purposes, Thomas Blanket (Blanquette). He was a Flemish weaver who lived in Bristol, England, in the 14th Century. The cloth is made of wool, worsted, or cotton, or man-made fibers combined in varying percentages in the construction. Material is heavily napped and fulled. Used for bed covering, robes, steamer rugs. An essential cloth to people in the Temperate Zone.

BLOOD: A term used in connection with various fractions ($\frac{1}{2}$ -blood, $\frac{3}{4}$ -blood) to denote the percentage of merino blood in a certain sheep. In common practice today the term denotes any wool that is of the same fineness as the wool grown on such a sheep. Full-blood merino implies that the wool comes from the offspring of a merino ram and ewe.

BLUCHE: See **BOUCHE**.

BOLIVIA: Cloth is usually a cut pile, with lines or ribs cut in the warp or in the diagonal direction. The height of the pile varies much. Bolivia is used for stockings, coatings, and has appeared in suiting cloth.

BOTANY YARNS: Fine wool, rated at 60s or better in classification, is used in these high-quality worsted yarns.

BOUCHE: A plain weave, fine French woolen fabric left in the undyed state. Used as a shirting material, this cloth is much used by the clergy of southern France. Sometimes called Bluché.

BOUCLE: From the French name meaning "buckle or ringlet." A staple

suiting fabric on the order of worsted cheviot with drawn out, looped yarn construction. These yarns have a "ring appearance" on the face of the goods.

BOX CLOTH: A heavy, coarse, buff or tan-colored melton used for overcoating and habit cloth.

BRADFORD SPINNING: English method of spinning wool into worsted yarn. The wool is thoroughly oiled before it is combed, which produces a smooth lustrous yarn used for worsted suitings. This is distinct from the French system, which is dry spun.

BRAID WOOL: Wool grading term more or less synonymous with luster wool. Compared with merino stock, it is low in quality and is used in medium- and low-quality clothing, carpets, robes, blankets, and low-priced uniform fabric.

BREECH WOOL: See **BRITCH WOOL**.

BRIGHT WOOL: A common term applied to wool raised east of the Mississippi River, where the farm system of sheep raising is popular. Contrasted with semi-bright and Territory Wools, bright wool is light in cast, contains less dirt and other foreign matter, and is a clean type of fiber.

BRITCH WOOL, BREECH WOOL: Wool from the lower thighs or hind-quarters of the sheep, usually the coarsest type found in the fleece. It has considerable length but is very irregular and of little value. This wool is used in cheap suitings and coatings, windbreakers, ski cloth, mackinac material, and carpets.

BROADCLOTH: In the same group of face-finished fabrics as beaver, kersey, and melton, popular broadcloth runs from 10 to 16 ounces per yard. An ideal weave to use is a 2-up and 1-down twill, with the goods woven face down. Some of the material may be made with a plain weave. The material is set very wide in the reed of the loom to allow for the great shrinkage in order to obtain the proper width. Higher qualities of the goods are form-fitting and ideal for women's wear tailored suitings, where drapiness and clingingness are essential.

BRUSHED WOOL: 1. Knit or woven fabric which has been brushed, napped or teaseled. Used in some garments, scarves, sweaters, trimmings.

2. Term in the pulled-wool trade which

implies fibers taken from scrubbing or brushing that is given to the stock in order to remove burrs, shives, grit, dirt, and other foreign matter. This treatment is given to the wool when it is on the pelt.

BRUSSELS CARPET: Named after this important city in Belgium, the carpet was developed after 1700, when Belgium became the rival of England in making carpets. Brussels is a staple which is made in body, border, and stair carpet sizes. There are 6 to 10 piles to the inch in texture. Tapestry and Body Brussels are in the Brussels group of fabrics.

Brussels is made with three-ply or four-ply woolen yarn. Tapestry is a printed carpet made with woolen or worsted yarn.

Within recent years, carpeting called Brussels, made with a cut-pile structure, has found favor. There is a wide range of carpeting under the name and the variety and color patterns vary considerably.

BUFFALO CLOTH: Mackinac cloth has replaced this once-popular material. This cloth was heavy in weight, made from twill weave; the finished cloth had considerable nap. Found usage in the cold sections in winter. Fabric weight ranged from 20 to 30 ounces per yard.

C

CAPE WOOLS: General name given to wool obtained in Natal, Orange River Colony, Transvaal, Rhodesia, and Cape Colony, the states which comprise the Union of South Africa. These high-quality fleeces are in great favor in this country because of their excellent working properties during manipulation; they are much sought for use in the heavier woolen materials.

CARACUL CLOTH: Heavy woolen fabric woven to resemble Persian lamb. Used for women's and children's coats, capes, muffs, etc. Named for the Persian lambs found in Russia. See **KARAKUL**.

CARPET WOOL: Any wool that cannot be classed as carding, clothing, or combing wool. It is the poorest of the four major types of wool. It cannot be combed and is often difficult to card. The wool is much used in carpets, rugs,

cheap clothing, mackinac and windbreaker fabrics, and in low-priced apparel for adults. Most carpet wool used here is imported because the manufacturers in this country have caused the wool growers to elevate domestic carpet wool to the point where most of it, because of scientific cross-breeding, is now used in making fabric for the apparel trades.

Some popular foreign carpet wools much used here include Aleppo, Awassi Karachi, Buenos Aires, Cordova, Joria, Kanchar, Scotch Blackface, Tibet, and Yeaner.

CASSIMERE: Suiting and trousering material of various compact weaves and color effects. Popular, staple cloth. Hard-worsted yarn is employed. May be made with worsted warp and woolen filling. Can be made of a cotton warp with worsted or woolen filling. Cassimere is rather lustrous, harsh in feel, and light or medium in weight. Shines with wear. May be classed as a serge with pattern effect.

CAVALRY TWILL: A strong, rugged cloth made with a pronounced raised cord on a 63-degree twill weave. Woolen or worsted yarn is used.

CHALLIS: Soft, lightweight worsted cloth made of plain weave. Is of medium to high construction. May be dyed or printed. Originated in England about 1830.

CHEVIOT: Rough woolen suiting and overcoating cloth. Similar to tweed in construction. Name is derived from the

fact that hardy wool from the Cheviot Hills of Scotland is used in making the cloth.

CHINCHILLA: The name of a rodent whose fur is mixed with other textile fibers in making cloth of high quality. The cloth of today does not resemble the pelt of the animal. The knotted-face, modern overcoating takes its name from the town of Chinchilla, Spain. The present-day type of chinchilla cloth was first made in the United States.

CHLORINATED WOOL: Chemically treated woolens whereby shrinkage is decreased and dyeing properties increased, especially in the case of fabrics that are to be printed.

CLEAR FINISH: Cloth in the woolen and worsted trade finished so that no nap or fuzz remains on the face of the goods.

COUPURE: French for "cut." The cloth is a cashmere, cut so that the lines cut through show the twill in the lengthwise direction of the cloth.

COVERT: Twilled, lightweight to medium-weight top-coating cloth. Usually made of woolen or worsted yarn with two shades of color, say, a medium and a light brown.

CREPE, WOOLEN: From the Anglicized French word *crêpe*. Originally a mourning cloth that showed a crimped appearance. Popular dress-goods cloth, woven or knitted.

CRIMP: The natural waviness found in wool fibers. Uniformity of waviness in-

dicates superior wool, a decided asset. The more the crimp, the finer the wool.

CROSS-BRED WOOLS: In this country they are obtained from breeding a long-staple sheep with a short one. Much cross-breeding is done all over the world. Several new types and qualities of wool have resulted from sheep crossing and there are now approximately 200 cross-breeds that have been developed from the forty distinct breeds extant today.

D

DARTMOOR: Hardy, British mountain sheep which, however, are raised chiefly on the moorlands at present. Rather free from kemp, the stock is about 40s quality.

DECATING, DECATIZING: Pressed woolen or worsted cloth is wound on a roller and placed in a heated boiler equipped with a vacuum system. Steam is passed through the cloth from the inside to the outside layers and then the treatment is reversed. The vacuum pump takes out the steam on completion of the treatment. The operation sets the material, enhances luster, and gives some assurance against shrinkage.

DECREASED WOOL: Wool from which yolk, suint, and other foreign matter have been removed by the naphtha method.

DELAINE: French for "of wool," the term originally meant a high-grade



Photograph of clear-finish cloth, showing absence of fuzz or napping on the surface of the goods.

women's dress goods. Today the word is used to imply a high-grade combing wool used in the best worsteds.

Delaine wool is raised in Ohio and adjacent states; one of the best wools grown here. Incidentally, delaine wool does not necessarily have to come from delaine sheep, a merino type raised in the United States.

DISTRICT CHECKS: Patterns designed to indicate the family lineage of members of the various Scottish clans.

DOESKIN: Used for trousering, broadcloth coating, waistcoat cloth, and riding fabric. The material is of fine quality, medium weight, smooth face and compact, and is made of wool.

DONEGAL TWEED: Hand-scoured, homespun, herringbone, or twill-woven cloth that was originally made in the county of this name in Ireland. The fabric is popular rough-and-ready material which does not possess high texture.

DUVETYN: Used in the millinery trade and in women's wear. The six-harness irregular satin weave is used, or it is possible to use a 7- or 8-end satin construction. Originally the cloth was made of cotton warp and spun silk filling. Other combinations are used as well. Cloth ranges from 10 to 20 ounces in weight in woolen duvetyn, and is stock, plain, or piece dyed. Material is face-finished to give a plush appearance.

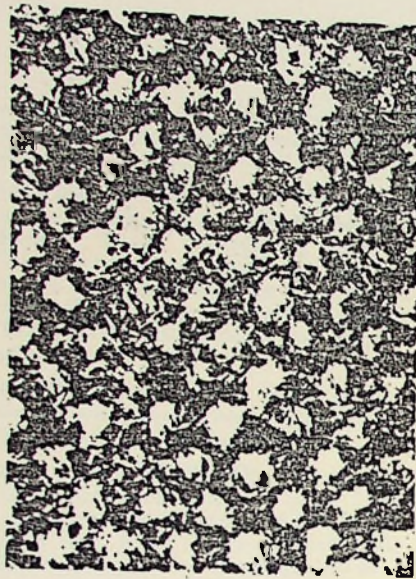
E-F

ELASTIQUE: A 63-degree right-hand twill weave is used to make this narrow and wide wale, diagonal-line fabric. It is made of woolen or worsted yarn, sheds very well, and gives excellent service.

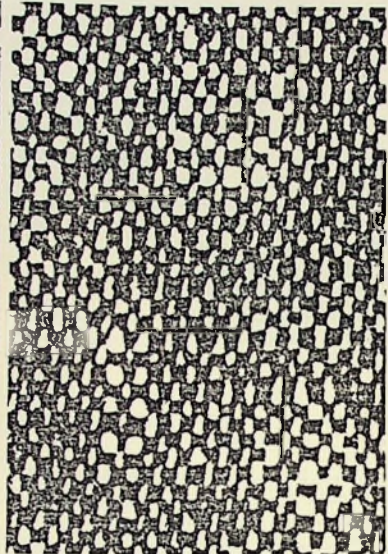
SPONGE: The name means "sponge." It is a woolen dress-goods cloth that is very soft and sponge-like. Texture is low, about 20x20. A plain warp and novelty yarn filling is used, or the reverse can be used to advantage. Cloth may be bleached before dyed.

FELT: A felt cloth is made with no system of threads, but is constructed by an interlocking of the fibers of stock to be used.

Felt fabric is made by subjecting the



Donegal Tweed (enlarged photo).



Glengarry Tweed (enlarged photo).

stock to be used to heat, moisture, water, pressure, and in the case of derby hats and other stiff felts, shellac. The amount of shellac to be used depends on the stiffness of the material that is wanted.

Leading felt cloths are—felt hats, the most important felt item; banners, pen-nants, slippers, linings of many types, piano hammers, erasers, insoles, etc.

Any and all types of stocks, substitutes, wastes, etc., find their way into felt cloth.

FLANNEL: Loosely woven cloth of simple weave which the dull finish tends to conceal. Cloth is found in standard blue and in fancy effects, chiefly in stripe form. Material is used for suitings, uni-form cloth, outing material and in night wear. Flannel cloth originated in Wales. There is considerable variance in weight and texture in this cloth.

FLEECE: A heavy, compact, long-napped overcoating much in use today. Interlacings are well covered by the nap. Range from low-quality to expensive high-quality fabrics.

FRENCHBACK: A cloth with a corded twill backing of different weave than the face of the cloth, which is clear finish in appearance. Back yarns are usually cotton.

FRIEZE: Heavy woolen overcoating with a rough, fuzzy, frizzy face. Cloth

is said to have originated in Friesland, Holland.

FULLING: A process in the finishing of woolen cloth. The cloth is dampened and beaten under heat which causes shrinking, increases the weight, and obscures the weave of the cloth.

G

GABARDINE: Construction is a 45- or 63-degree twill. These weaves give the characteristic, single-diagonal lines noted on the face of the cloth.

GARNETTING: The process of recovering the fibers from hard-twisted thread wastes, rags, clippings, etc., especially of wool. The object is to break up the material thoroughly and return it to a fluffy fibrous condition so it can be reused in blends, or in some cases alone. A garnett is used for the treatment.

GERMANTOWN: A coarse, four-ply worsted knitting yarn with a slack twist. Term must not be used except to describe yarns made in Germantown, Pa.

GLENGARRY: 1. An English tweed cloth of the homespun and tweed group. Made from woolen yarns of the "hit-or-miss" type. This fabric often admits of the use of some so-called waste stock and low-quality fibers.

The Inverness or cape-overcoat.

A Scotch cap.

WELSH PLAID: The trade interpretation shows that it is a four-and-four and two-and-two color effect weave in both warp and filling directions. The fancy overplaid, seen in an overplaid, is missing in a Glen plaid.

WELSH URQUHART PLAID: Woolen worsted suiting or coating material made with the ever popular plaid or overplaid effect from two or more colors. Most combinations are made of three colors at least.

WELSH WOOL: Wool from the live sheep with yolk and suint intact.

WELSH CHECKS: Men's and women's wear dress goods used for street and sportswear. Three colors of yarn are used in making the cloth. The warp and filling make a natty combination in the cloth. Men's wear fabric may have a smaller check than women's wear cloth. Men's wear cloth could be laid out in warp and filling, as 6 blue, 6 brown, 6 green, in warp and filling arrangement. Women's wear cloth could be constructed as follows: 12 light brown, 12 dark brown, 12 green, in warp and filling. Warp sizes do much to determine the check sizes.

H-I-J-K

HAIRLINE STRIPE: Narrow striped color effect that resembles a hair.

HALF-BLOOD: A theoretical American designation of wool compared in fineness with full-blooded merino wool as a standard; it is supposed to be between a $\frac{3}{4}$ -blood wool and a $\frac{3}{8}$ -blood

wool in classification. Half-blood is inferior in all respects to $\frac{3}{4}$ -blood, but is superior to $\frac{3}{8}$ -blood.

HARRIS TWEED: Under the terms of the British Board of Trade and the Federal Trade Commission, Harris Tweed refers only to woolen fabric hand woven on the Islands of the Outer Hebrides off the Northern coast of Scotland. This includes among others the Islands of Harris and Lewis.

HEATHER: A popular flower in the British Isles; it is the basis of the yellow dye used in dyeing Harris tweeds.

HEATHER MIXTURE: Named for the Scotch heather, it is a blend yarn used in the knitting trade, and in homespun and tweed fabrics. Stock-dyed, basic-colored slivers, slubbings, and rovings are drawn, drafted, doubled, redoubled, and finally spun into a yarn which will show the shade of the color or colors which predominated in the original blending, oiling, and mixing of the stock. Used in suiting, topcoating, some overcoating, cap cloth, mufflers, socks, stockings, knitting yarns.

HERRINGBONE: Used for suitings, topcoatings, overcoatings, sport coats, dress goods in men's and women's wear. The cloth gives a weave effect in fabrics that resembles the vertebral structure of the fish known as herring. The cloths are staples and always in demand. All herringbones are broken-twill weaves but all broken-twill weaves are not herringbones. The latter should balance perfectly to be called a herringbone and not a broken twill. Many types of stock, color, and weaves are used.

HOMESPUN: Originally an undyed woolen cloth spun into yarn and woven in the home with the rather crude ma-

chinery used by the peasants and country folk the world over.

HOPSACKING: The real hopsacking is a coarse plainly woven undyed stuff made of jute or hemp fiber, otherwise known commercially as burlap and serving among the hop growers as well as general merchandise shippers as bagging. The name has also been applied to a class of staple and fancy rough woolen cheviot apparel cloths in basket weaves which resemble the original in effect.

HOUND'S TOOTH CHECK: A medium-sized broken check often used in tweeds, clear-finish worsteds, etc.

ICELAND WOOL: The wool from Icelandic sheep that have an outer covering of long coarse hair and a fine wooly undergrowth. This undergrowth is used for sweaters and shawls.

IMPERIAL COATING: A worsted fabric woven with 2-up, 2-down twill weave from fine Botany worsted yarns. The construction is about square and the threads are closely set, giving a firm, durable cloth but of a somewhat hard handle. Usually dyed navy blue and showerproofed.

IRISH TWEED: White warp and dark shade filling of blue, grey, brown, or black feature this popular, rugged men's wear fabric. Used for suiting and coating.

JERSEY: A plain knitted fabric originally of wool but now made of cotton, rayon, silk, etc. Formerly all jersey was made on circular machines, but rayon jersey is now commonly made on tricot machines.

KARAKUL: Originally an Asiatic breed of sheep, the long carpet wool obtained from the fleece has made it a favorite in Texas. Lambs of the breed, one to three days old, are skinned and called astrakhan or broadtail. Shrinkage is about 35%. The name comes from the village of Kara Kul (Black Lake) in eastern Bokhara.

KEMP: See DARTMOOR.

KERSEY: Originated in Kersey, near Hadleigh, Suffolk County, England. Present-day kersey is heavily fullered or milled, and has a rather lustrous nap and a grain face. Luster is caused by the use of luster, cross-bred wools such as Lincoln, Leicester, Cotswold, Romney Marsh, etc.

Hound's Tooth Sports Coating (enlarged photo).





Champion A-type (U.S.) Merino Ram.

LAMB'S WOOL: Wool shorn from lambs up to seven months old. Soft and possessing superior spinning properties when compared with wool from older animals. Lamb's wool has a natural tip which is lost after the first or virgin clip has been taken from the sheep.

LANOLIN: A complex chemical substance, fatty in nature and chiefly a mixture of cholesterol esters obtained from grease wool. It serves as an emollient for the skin of the sheep and for its fleece. Purified sheep grease under the name of lanoline or lanolin serves as the basis for grease paints, ointments, skin creams.

LEICESTER WOOLS: In this group are also Lincoln, Cotswold, Romney Marsh, and Cheviot wools, spoken of as Long British and Long Crossbreeds and are raised throughout the world. The rams weigh from 235 to 300 pounds, ewes from 175 to 250 pounds. Fleece weight is from 7 to 16 pounds. The fiber length ranges from 4 to 16 inches, while the fiber diameter is from 1/700 inch to 1/650 inch; there are from 800 to 1,000 serrations per inch in the fibers. Numbered at 40s to 44s.

These hardy luster wools, which have the tendency to reflect light rays, are used in homespun, tweeds, cheviot, and shetland fabrics for outerwear.

LINCOLN SHEEP: Possessing the largest staple of any wool grown, this popular long-wool breed originated in Lincoln County, England. Probably the world's largest rams are Lincolns; they weigh from 300 to 375 pounds. Rich pastures are essential for these sheep, which are much used in cross-breeding. Fleece weighs from 12 to 16 pounds.

Lincoln is in the luster wool group with Leicester, Cotswold, Romney Marsh.

LINSEY-WOOLSEY: Cloth made of linen and woolen yarn. Cotton may be used instead of linen. Either stock is always the warp. Animal fibers always are the filling. Cloth is of loose structure, coarse, and often highly colored. It originated in England and was much in use in the Colonies at one time. More or less obsolete now, some of the cloth finds use by the rural folk in outlying districts.

LONDON SHRUNK: Hot-and-cold water treatments given to worsted fabrics in order to obtain definite shrink-

ing percentages; all worsteds should be London-shrunk prior to cut-make-and-trim.

LUSTER WOOLS: A group of five major wools which originated in Great Britain but now are grown all over the world. There are many sub-types because of cross-breeding. These wools are: Lincoln, from county of that name in England; Leicester, from Leicester County; Romney Marsh, from Kent County; Cotswold, from Gloucester County; Cheviot, from the ranges of Scotland. The wool fibers reflect the rays of light, are rugged, harsh, hardy, and make ideal yarn for homespun, tweed, cheviot and shetland fabrics, coating, sports togs, and cap cloth of the English type.

M

MACKINAC OR MACKINAW CLOTH: An extra-heavy cloth used in cold climates. Used as blankets, shirts, mackinaws, reefer cloth, underwear, and lumberjackets. An ordinary grade of wool is used and varying amounts of shoddy and wastes find their way to this cloth. Much of the cloth is in plaid design. The material is given a severe treatment in wet finishing and it is napped on both sides, the weave being covered up because of the rigid treatment. Cotton warp is often used. Filling is softly spun yarn so as to ensure results wanted in finishing operations. The weight of the material ranges from 14 to 28 ounces or so per yard. Miners, lumbermen, hunters, fishermen, trappers, and cow-punchers use much of the fabric. Named for Mackinac Island, Michigan.

MARCO POLO SHEEP: A high-type species of the genus, this wild sheep, *Ovis poli*, comes from the Pamir Plateau and other Central Asia sheep-raising areas. The animal is large in stature and has considerable horn-spread.

MEDIUM WOOLS: 1. Those wools which average in length between long and short wools. Short wool ranges from

1 to 6 inches; long wool is from 6 to 12 or more inches in staple length.

2. Sometimes refers to the general quality of wool and includes wool that is high $\frac{1}{4}$ -blood, $\frac{3}{8}$ -blood, and low $\frac{1}{2}$ -blood wool. Medium wools grade between 50s and 58s in quality.

MEDULLA: The central portion of an organ or tissue; e.g., the central part of a wool fiber.

MELTON: There are four cloths in the group—beaver, kersey, melton, and broadcloth. Melton is a heavily felted, hard, plain, face-finished cloth. It is used for riding, box-driving, hunting cloth, and in overcoatings. One of the most serviceable cloths for outerwear. In garment making, melton in lighter construction is used as "under collar cloth." The name of the cloth is said to be that of the originator of the material, but very likely the name comes from the famous Melton Mowbray fox-hunting area of Leicestershire, England.

MERINO: The very fine quality of wool of the so-called merino sheep of Spanish origin. Hence a cloth of such material. (The Spanish word "merino" signified roving from pasture to pasture, said of sheep; probably from the Latin *major*, greater.) The term "merino" is now applied also to knitted woolen fabrics, notably undergarments constructed of yarns with an admixture of cotton to prevent shrinkage in laundering.

MILL ENDS: Mill remnants or short lengths of fabrics.

MOSCOW: Overcoating of the shaggy, napped type, heavy in weight. Cloth gives warmth and somewhat resembles heavy shetland cloth. Name is given because of the fact that the cloth is in favor in Soviet Russia as well as in other cold sections of the world, where it is used for winter wear. There are many types and grades of the cloth, ranging from very cheap quality to highly expensive.

MOUTON: A short to medium length fur with a dense pile, the trade name for

processed, sheared sheep. Usually dyed
beaver color, or darker brown, beige,
grey, and, occasionally, red, green, and
blue. Wearing qualities, good. Judged
by density of pile, softness, and pliability
of felt. Found in Australia, Argentina,
South Africa, and parts of America. For
sports, business, and school wear.

N-O

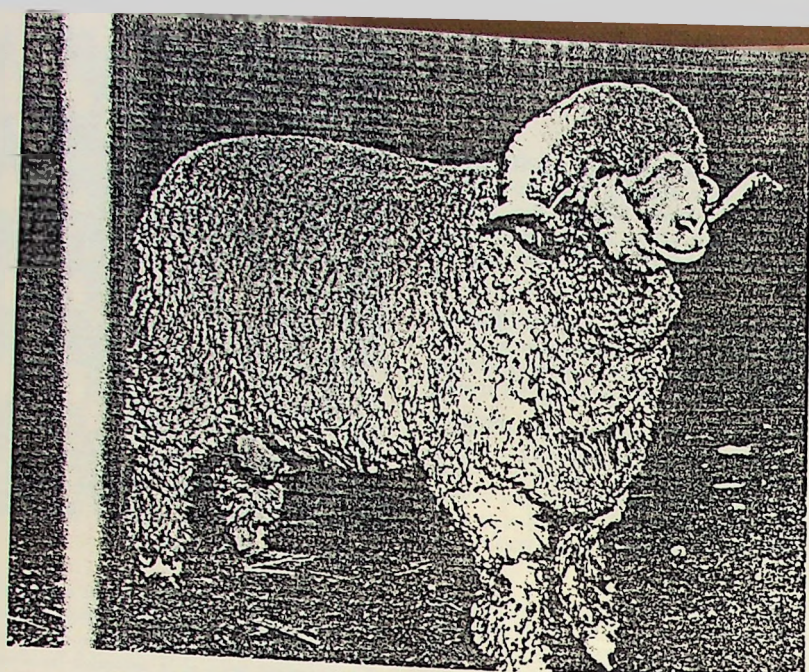
NAPHTHALATING: A process by
which virgin wool is gently cleansed in
three baths of naphtha and then rinsed
in clean flowing water. No soap or alkali
solutions are used; raking, forking,
and excessive handling are eliminated.
The wool retains its original life,
strength, and resiliency.

OXFORD MIXTURE: Usually a color
effect in dark grey noted in woolens and
worsted. The degree of shade is gov-
erned by the mixed percentages of black
and white stocks used. Mixing takes
place prior to the carding and spinning
of the yarn. Its reference to Oxford,
England, has suggested calling the
lighter weight mixture cloths by the
name of Cambridge, the rival university
of Oxford. Oxford and Cambridge are
the two oldest universities in England
and are known all over the world. The
colors of the schools are dark blue and
light blue respectively. Hence the use of
dark and light Oxfords or greys under
these two names. In this country much
grey cloth is given the name of Oxford.

P

PAISLEY CLOTH: Originated in the
Scottish city of that name. It is a dis-
tinctive material made of worsted yarn.
Scroll designs cover the surface of the
goods; colors run from red to brown and
orange shades. Small spots of other
colors are interspersed to bring about a
more brilliant motif. The cloth is popu-
lar for coverings, shawls and throws.
The mixture of colors used makes this
Jaquard cloth a characteristic fabric.

PEPPER AND SALT: Apparel ma-
terial of fine, speckled effect. The ap-
pearance of the cloth suggests a mixture
of salt and pepper. Cloth is made in
shades of grey, brown, green, and blue.
The effect is obtained by the use of two-



Rambouillet Sheep.

colored twisted yarns, ordinarily in
black and white or by the intricacy of
the weave with two or more solid-color
yarns.

PIN CHECK: Worsted suiting that
has a small, figured effect about the
size of a pinhead. Color effects are used
in making the design and the finished
fabric shows a cloth studded with the
minute pin checks.

PLAID BACK: A light, medium, or
heavy overcoating made on the double-
cloth principle—two systems of warp
and filling, with a binder warp or filling
arrangement. The underside of the cloth
is a plaid—a series of cross stripes that
form a dull or vivid effect. Weight,
warmth, and the covering up of the inter-
lacings are features of the material.
Plaid backs take the place of linings in
some cloths used for coating material.

PLUSH: Woolen or worsted pile cloth,
the pile being one-eighth of an inch or
more in height. Plush has many well-
known uses and is an exaggerated form
of velvet. The term is from the French,
peluche. This, in turn, is taken from
the Latin, *pilus*, which means hair.
The cloth is compact and bristly. Made
in silk, cotton, mohair, and combinations
of fibers, as well as in wool or worsted.

PULLED WOOL: This is obtained
from the pelts or hides of dead sheep. It
is inferior in all respects to fleece wool,
which is taken from live sheep. The
stockyard centers produce pulled wool.
However, the packing houses are inter-
ested mainly in the carcass; the wool is
of secondary consideration. They dis-
pose of all this stock to textile plants.

There is more pulled wool produced per
year than first-clip wool. Pulled wool is
used with better grades of fleece wool to
make woolens and worsteds.

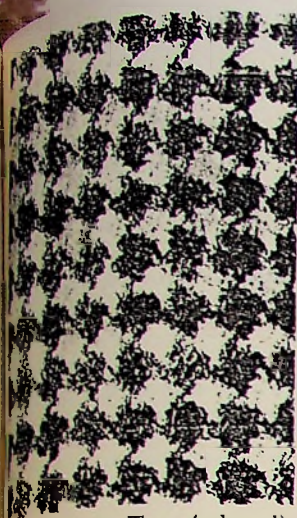
R

RAMBOUILLET: This breed, the
largest and the strongest-bodied wool
sheep, is a pure descendant of Spanish
merino, imported by France in 1785.
Rambouillet were brought to this coun-
try in 1840; today they constitute about
27% of all sheep here. Rams of this
hardy breed weigh about 250 pounds,
ewes about 140-170 pounds. A ram
fleece of a year's growth will weigh 15
to 25 pounds of fine wool which will
sort to 64s or higher. Fiber length is 1½
to 3 inches. Shrinkage averages about
60%. Range sheep have blood of the
Rambouillet or other merino breeds.

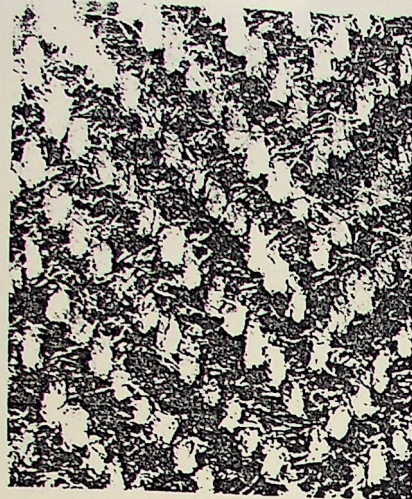
RECLAIMED WOOL: This broad
term implies wool obtained from the
following sources: clippings, old and
new woolen or worsted rags, tailor's
clippings, reprocessed wool, remanufac-
tured wool, shoddy, mungo, extract
wool, etc.

REPROCESSED WOOL: Woolen
fibers obtained from woven, knitted, or
manufactured goods which, however,
have never been used by the consumer.

REUSED WOOL: Fibers obtained
from garments worn by consumers. The
cast-off apparel finds its way to the gar-
netting plant where the material is re-
turned to the fibrous stage. Shoddy and
mungo are the names applied to the un-



Saxony Weave (enlarged).



Shetland Weave (enlarged).

and felted fiber residue following the carding operation which breaks up the garments and produces the fibers.

WILSON MOUNTAIN SHEEP: Similar to the argali sheep, this "bighorn" type of sheep ranges over the western coast of North America, the United States, and Mexico.

ROMNEY MARSH: Originating in the marshes of Kent County, England, this hardy breed of sheep is now popular in America, Australia, New Zealand, and South America. The wool is not as long and as lustrous as Cotswold or Lincoln wool of Great Britain; however, it is denser, finer, and grades from low 1/4-blood to 1/2-blood. There is much variation in Romney, which shrinks about 70%.

S

SALISBURY: Popular white English breed; made of woolen yarn. It comes in varying weights.

SAXONY: 1. A soft-feeling, well-finished Cannel made from Saxony wool.

2. A high-grade, finely twisted knitting yarn used in the better type of fabrics.

3. The high-grade Class One wool of the Saxony wool group.

SCOTCH BLACKFACE: A well-known breed of sheep which produces much long carpet wool. The fibers are very strong, rugged, and ideal for use as "carpet fiber" in the manufacture of rugs and carpets. The sheep are wild, hardy, and stand the rigors of weather very well.

Blackface is raised on the moors of Lancashire and Yorkshire, England, in Scotland and on the Hebrides, Orkney, and Shetland Islands. It is now raised to advantage in Oregon.

SCOTCH TWEED: Made on a 2-up and 2-down twill with white warp and stock-dyed filling or vice-versa. The stock colors are usually rather vivid in order to give contrast in the fabric. Fiber staple in the yarn is usually variable and is irregular in appearance; often this shagginess seems to add to the looks of the material. Always popular, the cloth is used in suiting, topcoating, sport coating, some overcoating.

SERGE: Popular staple, diagonal worsted cloth, dyed in piece and may be made in mixture or fancy effect. It is possible to stock-dye or yarn-dye the material, but piece-dyeing is preferred. The name is derived from the Latin *serica*. This would imply that the cloth was originally made of silk. The weight of serge runs from 10 ounces upwards and it is one of the most staple of cloths. Made of wool, worsted, cotton-worsted, and in other combinations.

SHARKSKIN: A term which has become very popular in the textile trade; it has a very broad meaning, since it was first applied to high-grade worsteds made from a 2-up and 2-down, color-effect weave arranged in the warp and the filling, one colored thread and one white thread. The finish on the goods is smooth because of the yarn and texture used. Despite the fact that the cloth comes in light weight, it has a very substantial feel, gives excellent wear, and sheds dirt readily.

SHEARING: The operation of leveling the nap on cloth is much used in the woolen and worsted trades. Shearing regulates the height of the nap or protruding fibers found on the surface of goods.

SHEARLING: English term for yearling or a one-year-old sheep. Also means short wool pulled from the skins of sheep prior to slaughtering. See PULLED WOOL.

SHEEP: An animal of the ruminant or chewing-the-cud genus, *Ovis*. Closely allied with the goat, sheep are raised for mutton and carcass. Compared with the goat, it is fleshier, less active, generally has no horns, and possesses a thick coat of fiber.

SHEPHERD'S CHECK OR PLAID: The cloth shows black and white checks or plaids. Other color combinations are used as well. The design originated in plaids worn by Scots shepherds. In producing the check the warp and filling arrangement is four black and four white, ends and picks. The weave should begin with the "raisers" up in the lower left hand corner of the weave.

SHETLAND: 1. A suiting fabric made wholly or partly of shetland wool. The cloth has a raised finish and a rather soft handle. Very popular for suiting and sportswear.

2. A soft knitted fabric made of shetland wool.

SHETLAND WOOL: This sheep produces fine, lustrous fiber and the real wool is the undergrowth found under the longer fibers. It is not shorn, but is pulled out by hand in the spring of the year. Comes in white, brown, and grey casts and is classed as a costly fiber.

SHODDY: This term refers to re-worked wool fibers, of which there are two sources:

A. Fibers recovered from new rags or tailor clippings which were never part of a worn garment.

B. Fibers recovered from old rags which were part of worn garments.

In either case, reprocessing tends to weaken the fibers. It is significant to note that a good shoddy made from high-grade woolen rags may be of better quality than a lower-grade fleece wool.

The shorter-fiber shoddy is obtained from felted material and is known as shoddy.

SHROPSHIRE: This county in England is the home of this popular British Down breed. Noted for both wool and mutton production. Staple is about 3 inches, the fleece weight averages 9 pounds and the quality ranges from 50s to 56s.

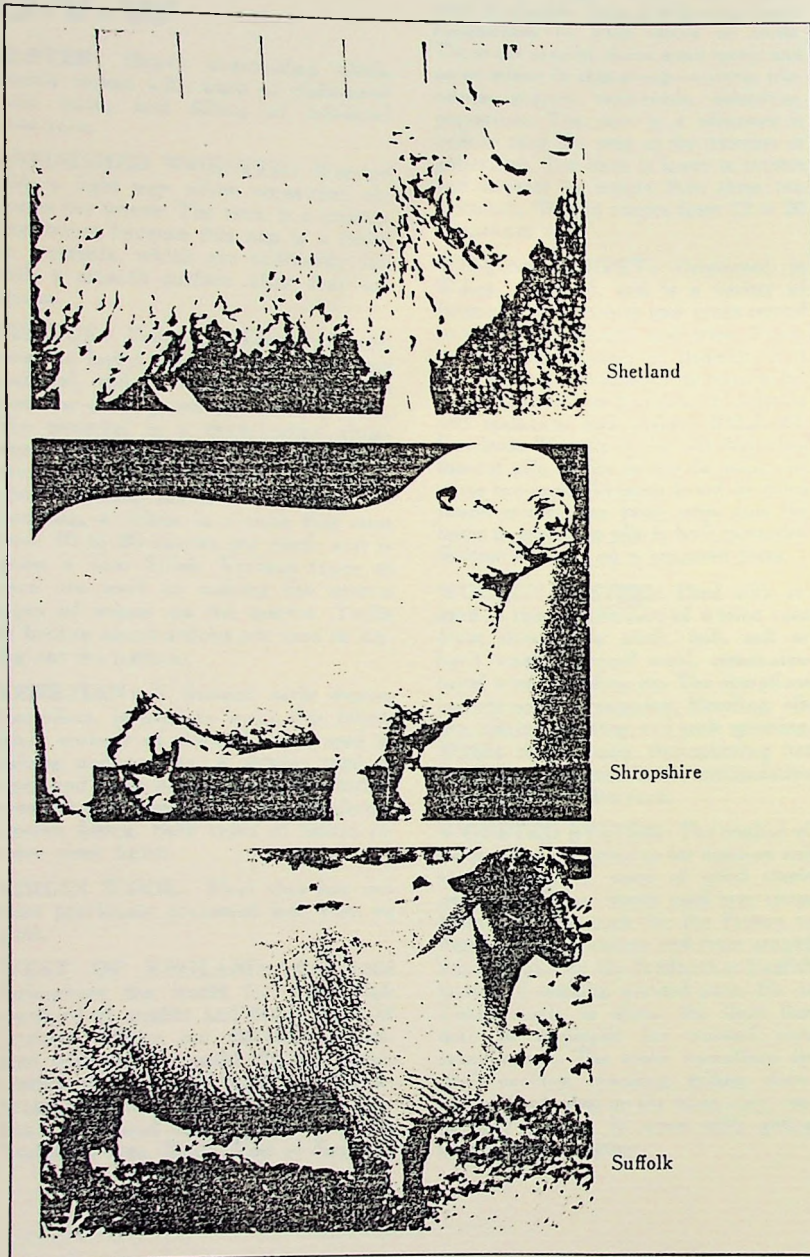
SILVERTONE AND GOLDTONE: A weaving cloth made from woolen or worsted warp with woolen filling. Fabric is shock-dyed and weight goes from 20 to 24 ounces per yard. Material is heavily napped. Construction may be single or double. The cloth gets its name from the fact that strands of gold- and silver-colored threads are worked into the face of the material. This produces a gold or silver sheen to the fabric which is usually attractive.

SPONGING: A part-shrinkage, by dampening with a sponge, by rolling in moist muslin, or by steaming, given to woolen and worsted cloths by the clothing maker before cutting to ensure against a contraction of the material in the garment. "London shrunk" is a cold water treatment, of English origin, and is frequently applied and guaranteed by the cloth manufacturers themselves.

SUFFOLK: British Down breed of sheep derived from crossing Southdown rams with Norfolk ewes. The medium wool obtained sorts to 1/4-blood or low 1/2-blood; fibers are of moderate length and the fleece weighs about 9 pounds. Shrinkage is about 40 per cent.

TATTERSALL: A heavy, fancy woolen weaving of "loud" appearance. Also used for overcoating and some suiting. The name is taken from the famous mart for thoroughbred horses in London.

TERRITORY WOOL: A term well known for its various meanings. Originally it meant wool raised west of the Mississippi-Missouri rivers—then known as Indian Territory. At present the term means wool raised west of the 100th meridian but exclusive of wool grown in California, Oregon, and Texas; these



Shetland

Shropshire

Suffolk

three wools have special designations. Incidentally, other wools in this Territory Region are quoted individually.

Territory wool is chiefly of the fine type

and it shows heavy shrinkage and low yield. Much of the wool is dull, dark, and dirty in-the-grease but it scours to a good white. Other names for this wool include Western, Range, Modoc.

THREE-EIGHTS BLOOD WOOL: A classification used in the Blood numerical value—about 56s; below 1/2-blood wool and above 1/4-blood wool in the Blood System of Grading used in some parts of the United States.

THREE-QUARTER BLOOD WOOL: A classification used in the Blood System of Grading Wool; comparable with 3/4-merino stock and rated just below XX wool and above 1/2-blood wool.

TOP: Found in worsted stock in all-worsted or worsted-mixes. Top is made up of fibers taken in the combing operation. It comes in slubbing or sliver form that is wound into a ball effect a foot or more in thickness and two or three feet in diameter. It resembles a cheese in appearance. The fibers in a top are parallel and of the same length. They are smooth, uniform, even, and have no foreign matter to speak of. The short fibers taken from the combing operation are called noil. These are used as a substitute fiber and may be high or low in quality.

TOP DYED: Wool fibers dyed in the form of worsted top and then processed in the colored condition.

TRICOTINE: Of the family of whipcords, coverts, and gabardines. Made from a 63-degree twill that gives the characteristic double twill line on the face of the cloth. A good weave to use in making the material is 3 3 1 1. Other

1 1 2 1

weaves of similar nature may be used.

TROPICAL: Fancy suiting material of plain and rather open weaves. It is a lightweight worsted of the semi-staple group. Fabric is ideal for summer and tropical wear, and somewhat resembles Palm Beach cloth. Weight goes from 6 to 12 ounces per yard. Warp and filling are of high counts, usually 2/60's or better. Material is skein- or piece-dyed, and clear finish is given. Tropical mixtures and heathers are popular cloths in the tropical range and these cloths are stock-dyed to give the desired pattern effect. Also a popular "blend" fabric.

TWEED: Similar to homespun, cheviot, and shetland in many respects. Strictly speaking, the only real difference should be in the weave. Homespun should be made on a plain weave, tweed on a twill construction. The name comes from the

Tweed River, which separates England from Scotland, or possibly from the Scottish word 'tweel,' or twill.

U-V-W

ULSTER: Heavy overcoating cloth, loosely woven with warp of right-hand twist yarn, and filling of left-hand twist yarn.

UNFINISHED WORSTED: Worsted with a light nap which somewhat obscures the weave. The term is a misrepresentation because this nap is a finish on worsteds, which are ordinarily left with a smooth surface after they are woven.

VELOUR: From the Latin, *villosus*, meaning hairy. Cloth is used as coating material, and in velour check form is used for dress goods and coating cloth. The material is a thick-bodied close-napped, soft type of cloth. The name is used rather indiscriminately and is applied to suiting fabric as well. Generally speaking, a velour is a cloth that runs from 10 to 20 ounces per yard, and is given a face finish. Various types of yarn are used in making the several types of velour on the market. Twills or broken constructions are used in laying out the pattern.

VENETIAN: A five-end satin weave, face-effect, is used to make this fabric made entirely of worsted yarn; used in suiting and coating. A similar type of cloth and made of the same construction uses two-ply worsted yarn and single-ply woolen filling. Both types of fabric receive clear finish.

VIRGIN WOOL: Wool that has not been previously processed into yarn or cloth.

WEST OF ENGLAND: Renowned throughout the world for their high standard of quality and finish, West of England fabrics are distinctly associated with the Cotswold district, which centers in and around Stroud and Trowbridge. However, the West Riding fabrics of England come chiefly from the Yorkshire area. Much West of England

fabric has the characteristic window-pane design.

WHIPCORD: Dress woolen or worsted of fine and high texture. The twilled yarn is sharply defined with some fancy suggestions to whip lashes or cords. There are several cloths, some major and some minor in this group—coverts, tricotines, poirets, twill-cords, chicotines, piquettes. The yarn in a whipcord is bulkier than the yarn of the tricotine or gabardine. The cloth is lower in texture and heavier in weight than these two materials. Weight ranges from 12 to 20 ounces per yard.

WILTON CARPET: Originated in Wilton, England, and is a variety of Brussels carpet, which now ranks second to chenille in quality and price. Woven in the same manner as Brussels, it is possible to cause some of the yarn to become "buried" in the back in order to add resiliency and quality. Wilton differs from Brussels in the fact that when the cut pile of the former is made, flat wires are used; Brussels is cut by using round wires; the knife edge cuts the loops to make the pile in both instances. Wilton is made on a jacquard loom.

WOOLEN SYSTEM: Used with regard to the manufacture of woolen yarn from short-staple stock, noil, soft or hard wastes, reused wool, remanufactured wool, reclaims, etc. The operations include sorting, scouring, blending, oiling, mixing, carding, and mule spinning. Within recent years ring-spinning has made some progress in the manipulation of wool into woolen yarn.

WORSTED SYSTEM: The method of manufacture resorted to for medium and higher types of wool of good staple properties. Fiber length used may range from 1 1/2-inch staple for the French or Franco-Belgian system and from around 2-inch staple for the Bradford or English system of making worsted yarn. Six or 7-inch staple is about the limit that may be employed for worsted yarn manufacture. The main operations include carding, combing, gilling, drawing, and spinning on the mule, ring, cap, or flyer frames. In some mills gilling may precede combing.

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Irish Wool Council - Mr. Cunningham

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ACKNOWLEDGEMENTS

I would like to thank Dr. Nicola Gordon-Bowe for her help and encouragement during the writing of this essay.

I would also like to thank Castleisland Weaving Co. for sponsoring me in my Degree Collection.