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UTILISATION OF NEW ZEALAND WOOLS

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Very little information is available to wool producers about the use normally made of their clips. What fabrics are woven from the £16,000,000 worth of wool produced in this country each year? In actual fact, it is not easy to answer this question precisely because many lines of wool are suitable for several alternative uses. It is not possible to follow special lots of wool through sorting, blending with wool from different sources, and through many different factories or processes to the finished fabric. The exact destination of any particular clip, or part of a clip, depends upon market conditions, supplies of labour and machinery, and the abnormal demands or lack of demands for certain types of cloth brought about by wars, booms and depressions. Wool consumption, however, tends to fall into certain broad trends of uses; short fibres can never be used in place of very long fibres; coarse fabrics are fundamentally different from fine wool fabrics, while wools with serious defect can seldom be substituted for high grade raw material. The purpose of this bulletin is to indicate the general direction of these trends and their bearing on farming practice.

Many changes must be wrought upon the fleece to convert it from a loose collection of fibres standing side by side, to an end to end arrangement in strong threads suitable for weaving or knitting. As pointed out in Agricultural Bulletin No. 167—"Wool, Its Use in Manufacture"—two different methods of effecting this conversion are available to the wool manufacturer. These produce yarns, and hence fabrics, of fundamentally different structure. In the first system—the woollen system—long fibres form the centre or core of the yarn, and the shorter fibres point in all directions. This gives a soft, fuzzy thread without great

strength, suitable for blankets, rugs, tweeds and flannels. In the second system—the worsted system—short fibres are first removed and the longer fibres are laid parallel and twisted. This gives a firm, smooth yarn of great strength suitable for hard wearing serges, and fine fabrics for suits and costumes. Speaking very broadly, the woollen system of yarn production is designed to make best use of cheap, short fibred wools, while the worsted system uses the longer and more valuable, raw material.

Although fibre length plays an important part in deciding the methods employed in wool manufacture, fibre fineness largely determines the softness, or handle and many other valuable properties of the final fabric. So important is the average fibre fineness of a wool sample that the term "quality" is often applied solely to this one feature of the material. Fine wools are said to be of high quality. For many purposes this use of the word is apt to be misleading because garments made from fine wool, while soft and warm, do not withstand hard wear and tend to shrink rapidly on washing, unless the wool has been specially treated.

#### Merino Wools

Merino sheep, which grow the finest and most valuable of the true wools, produce only approximately two per cent of the Dominion's clip. The best merino wools come from Australia, where, in general, conditions are ideal for growing sound, long stapled, regularly crimped, snow white fleeces, free from serious dust and dirt contamination. Merino wool goes to make the finest and softest of all wearing apparel. When processed on the worsted system it gives us luxury underclothing, fine coatings and the greater part of cloths used for

men's suitings, as well as the better quality knitting wools and fine hosiery. Woollen spun merino yarns give us cashmeres, delaines, fine flannels, billiard cloths and fine dress and coating materials.

#### **Corriedale and Halfbred Wools**

Much more important than Merino wools in New Zealand are those grown on the Corriedale and Halfbred sheep of the South Island. Very often these go into fabrics which set out to imitate, at a cheaper price, cloths made from finer wools. Such fabrics can usually be recognised by their harder handle and more lustrous appearance. Typical Corriedale and Halfbred wool fibres are half as coarse again as those found on the Merino, and this difference is responsible for the harder handle, because the coarse fibres do not bend so easily. In this case soft handle, although a good indication of power to retain warmth, would be a false guide to ability to withstand hard wear.

#### **Romney Wool**

In general, coarse fibre wools go to make strong fabrics of great wearing ability, to be used where appearance is a secondary consideration. This applies particularly to the bulk of New Zealand's wool clip, which is derived from sheep of predominantly Romney blood. Romney wools are about twice as coarse as the finer lines of Merino, and nothing can be done to change the characteristic handle of fabrics made from them. Even the best and most beautifully grown wool of this class still possesses a relatively coarse fibre, which sets a limit to the sort of fabric which can be manufactured. There is a saying about a silk purse and a sow's ear which applies very aptly to the utilisation of the stronger grades of wool. At the same time many types of cloth can be made successfully only from strong wools. Such fabrics as saddle tweeds and battledress, though lacking in softness and perhaps in appearance, have great strength and wearing power. In addition, of course, they have the advantages common to all wool goods — of warmth, ability to give out heat when wetted, great capacity to absorb moisture, elasticity, and resistance to burning. Among specific materials made from strong crossbred wools on the worsted system might be mentioned uniform cloths of all descriptions, warm working clothes,

cheap hard wearing serges for school children's clothing, cheap knitted goods and heavy working socks, and certain types of linings. From the shorter fibred material, manufactured on the woollen principle, we get sports tweeds, blankets and rugs as well as cloth for overcoats and army greatcoats.

#### **Strong Wool Breeds**

Small, but appreciable quantities of very coarse wools are grown in this country by Lincolns, Leicesters, and strong wool Romneys. Where the fibres are long these wools go into speciality fabrics such as bunting and filter press cloths, as well as into furnishing materials, cheap socks and other working clothing. Short fibred wool of this type goes to make carpets, coarse tweeds and blankets, horse covers, and certain types of felt.

#### **Skin Wools**

Freezing works contribute a relatively large quantity of wool to the New Zealand clip. Skin wools, or slipes as they are called usually have less than 12 months' growth and the short staple makes special machinery necessary for processing. Slipe wools often have a proportion of Southdown blood, which makes them of special value to the knitwear trade. One reason for this is that Down-type wools are more springy and give a soft, spongy type of yarn. Another reason is that Down-type wools are considered to be less subject to shrinkage on washing.

Tendency to shrink is another characteristic of wool goods which is related to fineness. Fine fibres stretch and contract with relative ease, especially when wet. When the fibres move, their surface structure comes into play, and they wander, in much the same way as a worm crawls, from one thread of yarn to another. This causes entanglement and results, ultimately, in the felted structure which is characteristic of badly washed wool goods. Blankets made from fine wools are an expensive luxury because they shrink so much when washed. The relatively coarse fibres found in crossbred wools, by contrast, are not so easily deformed when wet. Though lacking in softness, blankets, working socks and heavy duty knitwear made from stronger wools have a longer useful life. This still applies when the comparison is made with goods containing finer wools subjected to

some, at least, of the anti-shrink treatments. Of course, the tickle, which is disliked by people with sensitive skins, is more pronounced when the raw material contains coarse fibres. Even the tickle, however, is claimed by some authorities to be advantageous, because it stimulates the skin and promotes circulation.

It is clearly not possible in a bulletin of this length to touch more than the high spots of such a wide subject as the present one. One general principle, however, does emerge. It is that the major portion of our clip is used in fabrics where durability and service are the main requirements. This conclusion must be considered in planning our sheep breeding and farm management programme because it establishes the factors which make for excellence in crossbred wools. It seems obvious that soundness, or freedom from breaks and tenderness, must be given attention before worrying over a little harshness, or a small amount of hairy fibre. A further point is of interest here. All but the very shortest fibred strong crossbreds are still long enough for combing if market conditions demand it. At the same time, wool that is bad for one purpose is first class for another. This combination of facts, coupled with the use of crossbreds in relatively rough cloth, results in only a small premium being paid for quality in the broad sense of the term, i.e., within fineness grades. The sheepman growing strong crossbred wools can safely work on the principle that the most profitable wool for him to grow is the one which gives him the highest weight of clean, scoured wool per sheep, and per acre of country in use. There is, however a qualification to this. Under harder environmental conditions, which are more suited to the production of finer wools, the principle can only be applied within count or fineness grades. Although at the present time the premium paid for fineness is not great, it is sufficient to compensate for loss of weight in finer fleeces but within any given fineness grade, the advice is particularly sound, because research has shown that the heaviest fleeces tend to be the most desirable from a buyer's point of view. For example 10 pound fleeces of 46s quality are, on the average, worth more per pound on a clean basis than 7 pound fleeces of similar count, and the grower gains both

ways. Similarly among halfbreds of say 56s count, 8 pound fleeces are more valuable per pound, than 6 pound fleeces.

#### Artificial Fibres and Future Prospects

The uses of New Zealand wools, too, have an important bearing on the artificial fibre problem. Although in the future there is little doubt that man-made fibres with all the valuable properties of wool will be produced, at the present time most "ersatz" materials are lacking in durability. They cannot, therefore, compete directly with the major portion of our clip. It is possible, also, that the handle and appearance of fabrics made from crossbred wools will be improved by the admixture of a finer staple-fibre. This will increase the range of materials in which our product can find an outlet. It must be remembered, however, that some crossbred wools are used because they are cheaper than Merino wools. If the price of fine wools is kept low by competing materials, the demand for crossbreds must suffer in sympathy. It seems likely, too, that the availability of large quantities of cheap substitutes may reduce the possibilities of wool prices soaring to phenomenal heights, as they did after the last war.

The uses of crossbred wools have a further important bearing on possible future market trends. In wartime, growers of coarse crossbred wools tend to receive a premium above the peace time value of their product, because strong wools are in demand for uniforms, warm, hard wearing underwear, army blankets and great coats and even for certain munitions. Fine wools, on the other hand, tend to suffer because of reduced civilian demand for the less utilitarian fabrics. At the present time (March, 1944) there are indications that war demands are falling back to a maintenance level and it is likely that stocks of coarse wool will commence to accumulate. Under post war conditions such stocks may not be as easy to sell as the stocks of fine wools which have been built up during the war to meet rehabilitation needs. Even in 1942, South American crossbred wools of super style 40/44s quality fleece were selling for as little as 9½d on an uncontrolled market. Shipping clearly plays a part here, but the disparity with controlled prices in Empire countries gives cause for

serious thought. It seems likely that the world price of strong wools may fall considerably, and breeders might well consider now, the possibility of utilising a finer wool ram on their flocks in the near future.

This advice is given with very considerable reserve, for forecasts of trends in wool prices are notoriously unreliable. The effect which a wool-starved Europe will have on prices is not easily predicted and in the long run there is the probability of increased wool consumption in backward countries to be considered. Just what part economic controls will play has not yet been made known, but it seems certain that both war-ravaged Europe, and the newly developed markets will demand a cheap product. This might absorb a surplus of cross-breds, but it might also be met by increased production of synthetic materials. In either case, the indication is still towards a lower price for the stronger grades of cross-bred wool.

Unfortunately, it is impossible to get reliable information about wool stocks, while vague newspaper statements give no indication about the composition of "strategic stock-piles" in terms of different wool types. Decisions about the ultimate post war disposal of such stocks must be taken now if plans are to be laid so that the programme can develop without delay. Adequate publicity for these decisions would enable wool producers, in turn, to plan their breeding and management policies to best advantage and with the minimum disruption of the national economy.

#### Conclusions

- (1) Fine wools are utilised for high priced luxury cloth while strong wools of the sort mainly grown in New Zealand go into fabrics required for durability and hard wear.
- (2) Because of the coarseness of the fibres, even the most beautiful strong wools, from a breeder's point of view, cannot in general be used to make high quality cloth.
- (3) Fleece features affecting cheapness of production and fibre durability are more important, in most New Zealand wools, than features affecting harshness of handle or finer points of quality in the broad-sense of the term. This makes fleece weight of prime importance in breeding.
- (4) Research has recently shown that on very much of our sheep farming country, fleece weight must be considered in relation to fineness grade. Even under present market conditions the premium paid for finer wools compensates for appreciably lower fleece weight.
- (5) Artificial fibres are not likely to compete directly with New Zealand wools in the near future, but the New Zealand grower will be indirectly affected if a reduced price is paid for finer wools.
- (6) Strong crossbred wools may be difficult to sell soon after the end of the war, suggesting that now might be the time to consider using finest wool rams consistent with efficient meat production.
- (7) New Zealand wool growers should take steps to discover, as accurately as possible, the amount and composition of existing raw wool stocks, and the extent of control which is planned for the Post-War wool industry, so that management and breeding programmes can be rationally planned.

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Copies of this Bulletin may be obtained from the Secretary, Canterbury Chamber of Commerce, P.O. Box 187, Christchurch.