

tion when it is where it is supposed to be and when it is doing what it is supposed to be doing. This positive reinforcement will produce better results than physical abuse.

8) Although the Komondor and Great Pyrenees are similar in many aspects of temperament, behavioral characteristics and working ability, at least two traits appear different between the breeds. More owners of Komondorok than owners of Great Pyrenees (78% vs 22%) rated their dogs as being aggressive to strange people. More owners of Great Pyrenees than owners of Komondorok (65% vs 15%) described their dogs as being able to quickly adapt to new environments or situations. Further research is needed to substantiate these apparent differences.

The following quotation from Connie Coppersmith of Pasco, Washington, an owner of several working Great Pyrenees dogs, is representative of the responses received to the questionnaire.

Question: In your estimation, how has your dog affected the number of predator losses you have had?

Response: Before the dogs, it was very common to see coyotes in the early morning either on the hillside beyond the corrals or actually in the yard. We live on the edge of the range land and in

the past we would always have to corral the sheep at night but this past summer our lambs stayed out in the pasture at night without one loss to coyotes. . . . We had a large range sheep operation until a few years ago when turned to farming. I wish we had known about these dogs then as our coyote losses were great.

Livestock guarding dogs are effective in reducing or eliminating predation of livestock in many situations. The use of dogs is not free from problems, however, and indeed, some people will not have the patience, inclination nor ability to rear a dog through the adolescent period which may last 18 months. Furthermore, there is no guarantee that even a dog of a recognized guarding breed will be an effective guardian when it matures.

Presently, there appears to be behavioral variation between and within breeds. Despite the problems, there is hope that current research will shed light on when and where dogs can effectively protect livestock from predators and what form and duration of training is required to bring the dog to an acceptable level of performance.

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Sheep Production in Australia

D.L. Michalk

Today, Australia has the largest sheep industry in the world, and pastoralists glow with pride when they consider the key role wool has played in the development of the "great land of the south". Unlike America where the French, Spanish and British shared in colonization, the British alone were responsible for introducing livestock and establishing colonies in Australia from the earliest penal settlement at Sydney Cove in 1788.

Sheep husbandry was initially promoted for meat production since the isolation of the continent from England meant that self-sufficiency in the supply of food was essential for survival. In spite of the enthusiasm and efforts of the colonists, however, the first attempts at sheep production were disastrous with only one animal surviving from the first flock. The industry remained small and fragile for the first decade of settlement, barely able to withstand the ravages of drought, flood, and attacks by aborigines. Once self-sufficiency was attained, the potential for further increases in meat production was limited since European markets lay

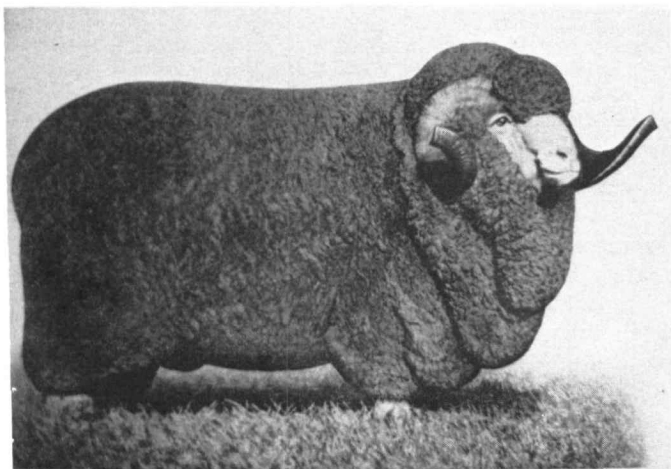
beyond the feasible range of wind-powered transports.

The direction of the industry was changed through the insight and efforts of one man, John Macarthur, an enterprising captain of the British soldiery. In spite of the early setbacks to sheep production, Macarthur firmly believed that sheep would perform well in the new country. Since the wool market was booming in England and since wool was sufficiently durable to survive the long ocean voyage, he decided to breed sheep specifically for wool. In conjunction with Rev. Marsden, he imported more sheep which included some Spanish Merinos from King George's Royal flock, the only animals of their type to reach Australian shores.

In 1807, Macarthur exported his first wool clip to England, where it attracted a good price and much interest because of its quality. By 1827, the colony was successfully competing with the Saxony wool-growers, who had dominated the wool trade for centuries. Within 40 years of Macarthur's first wool exports, New South Wales was producing more wool than any other country, a factor which stimulated exploration of the vast interior of the continent.

Attractive economics of production coupled with the adaptability of Macarthur's Merino to range vegetation caused spectacular increases in sheep numbers from 20 million in 1807 to 106 million in 1895. Initially, sheep were

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A typical Australian Merino ram showing the characteristic neck folds and straight woolled breech.

trailed from water-hole to water-hole in the Outback, but as water development was made possible by constructing surface tanks and tapping underground sources, lease arrangements were introduced. With formalization of land tenure, "squatters" became sedentary; barked roofed, slab huts were replaced by grander houses, shearing sheds appeared and barns proliferated. Holdings were fenced with materials from the ubiquitous *Eucalypt* and the climate allowed year-long grazing which was only interrupted by accidents of floods and drought.

Although the Australian pastoralist had the advantage over his American counterpart of confining his livestock year-long in well grassed paddocks, his management procedures did not capitalize on this advantage. In both countries, shepherds ignorantly mined the productivity of the range without allowing replenishment of its source. A series of good seasons and high prices created false optimism as to the stocking intensity that could be sustained by the pastoral resource, an optimism that brought the industry to the point of catastrophe. At the turn of the century, several years of drought reduced sheep numbers by 50% to 53 million in 1903. Fortunately, the recovery to the pre-drought population was slow, taking about three decades, a factor which minimized the damage caused by the interaction of drought and over-grazing.

While drought hampered the industry in the pre-World War II era, adverse economics have affected sheep numbers in more recent times. Low wool prices in the 1960's coupled with escalating fuel and labor costs, particularly shearing coats, caused graziers in better rainfall areas to diversify ranch activities into other avenues such as beef cattle, prime lamb production and wheat growing.

A recovery in wool prices, however, injected confidence into the industry which caused sheep numbers to reach a peak of 181 million in 1970. This recovery is attributed to a rationalization of the market system which has successfully and efficiently stabilized the price of wool on the basis of grade.

Present Status of the Australian Sheep Industry

While Australia grazes only 18% of the world's sheep, it produces more than 32% of the world's greasy wool, about 55% of all fine wool, and almost half of the total volume of wool sold on the international market. This sizable production of over 1,300 million lb accounts for 20% of Australia's

export earnings. The principal markets for Australian wool are mills in Japan, the European Economic Community, and the United States.

Besides wool, the Australian sheep industry produces almost 600,000 tons of lamb and mutton products annually, or 13% of the world's total production. A large proportion of this is consumed domestically with an average per capita consumption of 48 lb per year. This quantity, when coupled with the 147 lb of beef and veal, makes Australia's consumption of red meat amongst the highest in the world and about 60% more than the per capita consumption of the United States.

Meat not consumed domestically is exported as frozen or canned commodities, although more recently large numbers of live meat sheep are being exported, particularly to the Middle East. Since Australians prefer lamb, only 18% of the 240,000 tons presently exported is lamb, the balance being mutton, which is preferred by Middle East customers. This has allowed Australian meat exporters to develop markets in locations where competition with the more efficient New Zealand lamb producers is minimized. In addition to developing markets in the Middle East, Australian lamb and mutton is exported to the United States, Europe, Japan, and Canada.

Wool Marketing

Like the American producer, the Australian pastoralist has several channels through which he can market his wool, although two systems stand out from the rest. Local dealers or regional buyers operate on a small scale and purchase clips of small flocks directly from the grazier. The only advantage of this method is that the producer receives payment on delivery. However, only about 10% of wool is sold by private treaty, the remainder being sold through the public auction system. Usually a wool agent will arrange the time and selling location as directed by the grazier.

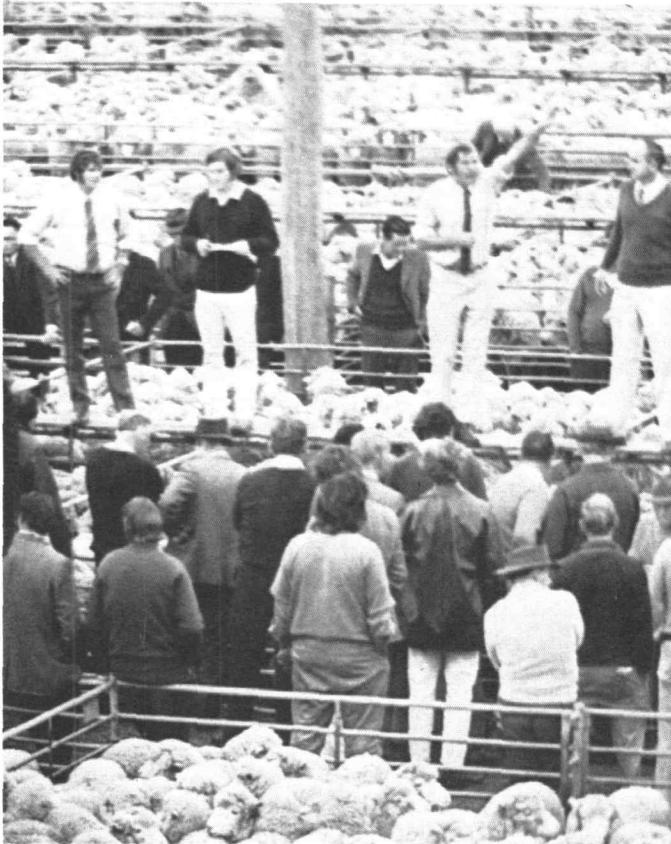
Traditionally, the auction system has operated as a free market of buyers and sellers, but due to deficiencies developing in the system, the Australian Government legislated the Australian Wool Corporation to re-organize the market system. The most immediate concern was to provide protection for wool-growers against unduly low prices resulting from temporary irregularities in demand at auction. The flexible reserve price scheme introduced by the Corporation has eliminated instability in wool prices, although it has not attempted to lift the price beyond a level determined by world supply and demand relationships.

To achieve this goal, the Corporation buys wool offered at auction which fails to reach the reserve price. However, the reserve price and wool stocks held by the Corporation are not disclosed, a policy which prevents pressure being exerted on the market system by buyers. This system does not preclude a pastoralist from fixing in his own reserve price, although the Corporation's price prevails in cases where it is higher.

Another important change in wool marketing is the application of pre-sale objective measurement of wool. To date, wool has been graded on subjective assessment, and the uniformity of lines has depended on the skill of the classer. However, research has shown that fiber diameter based on assessments of "crimp" is misleading and that objective measurement can take the guess-work out of classing.

By measuring fiber diameter and yield by objective means, the grower can modify his classing procedures such that for

each flock of sheep the majority of fleeces will remain in one main line. In addition, objective measurement enables the buyer to accurately purchase wool of an average diameter that is required for his milling purposes. With full endorsement of this system, buyers will be able to confidently buy on sample, a procedure that will hasten computer marketing of wool.



Most sheep in Australia are sold at auction where yardings of 20,000 animals are common.

Meat Marketing Procedures

In contrast to the American situation where private negotiations between buyers and sellers is the most common method of establishing price, the Australian meat industry, like wool, is centered around the public auction system. Although meat prices fluctuate in the same fashion as wool, the temporal nature of meat products has made price stabilization by a marketing authority more difficult to achieve.

While this problem of meat marketing is formidable, progress has been made towards rationalization of the system by the development of a carcass classification system. To date, assessment of quality has been determined subjectively, a procedure which has often led to passive confrontation between buyers and producers at auctions. As with the USDA system, carcass yield, grade, and cutability are major parameters in the proposed system, and current research is endeavoring to define these in terms of Australian requirements. Another forward step has been the implementation of sale by weight, since until recently livestock were auctioned as a unit rather than on a weight basis.

For breeding stock, direct purchase from other producers or special sales are employed in a similar fashion as in America. For rams, however, audio-sales and telephone negotiations are notably absent from the Australian selling system,

with producers preferring to select animals on their personal, pre-determined criteria. Objective measurement of the wool of rams has provided a useful yard-stick for purchasing sires, and will probably become more important in the future as the procedure strengthens its position in wool marketing.

Exportation of Live Sheep

Until recently, the exportation of live sheep from Australia accounted for a small proportion of foreign sales. However, the significant increase in the living standard of Middle East countries coupled with their inability to produce enough sheep for domestic supplies has created a multi-million dollar for the Australian industry. Contracts for two million sheep per year, more than half to be exported live, have been negotiated with Iran alone, and similar contracts have been confirmed with other oil-producing nations. Unlike the domestic market and traditional overseas markets, however, sheep for the Middle East must be in lean condition with less than one-half an inch of fat covering, although animals must be well fleshed.

In addition to the export of live meat sheep, the Australian Government has partially relaxed its ban on the exportation of Merino rams. This action has been taken in view of widespread industry support. Export approvals will be issued for 300 rams on a 12-month trial basis. The trial period should enable a reasonable assessment to be made of the benefits gained by stud breeders and the effects this may have on the Australian wool industry as a whole. This decision, however, has not been without controversy, with other sections of the community deploring the action. The Australian Council of Trade Unions has pledged it will impose a ban on the exportation of live Merino rams since they believe that the transfer of Australia's unique genetic lines to international competitors will provide them with the means to produce a product equivalent to Australia's top quality wool.

Sheep Production Research

As in any production activity, there is a need for constant research to formulate new technology and increase production efficiency. Because sheep products are important income earners for Australia, research in the industry is financed jointly by the growers and the Australian taxpayers. Pastoralists contribute by a compulsory levy of 1% of the gross proceeds of wool, while the government designates funds from tax revenue. The money is divided between production, textile, and economic research on the basis of submissions from federal agencies, State Departments of Agriculture, universities, and private research organizations. In addition, scholarships are provided for training agriculturalists, particularly at the post-graduate level.

Promotion of wool and meat products is carried out by the Australian Wool Corporation and the Australian Meat and Livestock Corporation. The Wool Corporation promotes the use of wool and wool products at the domestic level, while for overseas promotion the Corporation contributes significantly to the International Wool Secretariat, an organization which represents the interests of the world's wool producers.

Like the Wool Corporation, the Meat and Livestock Corporation obtains funds through levies on livestock slaughterings. Some of this money is distributed to research institutes, while a proportion is used for promotional activities in countries where export markets are established or where a definite potential is evident.