

DEFINITION, MEASUREMENT AND RECORDING IN THE  
EXTENSIVE LIVESTOCK INDUSTRIES

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INTRODUCTION

If I have any authority to stand before such a gathering to expound my views, it is as a breeder of some forty years practice, who started with a veterinary training, albeit always orientated to production - management and genetic - rather than to "fire engine" veterinary practice.

I have always been subject to the constraint that any breeding program must be carried out in a viable economic, whole farm, context. When I started it was accepted that one man caring for some 1,500 to 2,000 dry sheep equivalents was doing an adequate job. Today I would suggest an economically viable work load is 10,000 D.S.E. or more.

There is to be detailed discussion later of the technicalities of definition, measurement and recording by others who are far more expert in this field. I accept and do not propose to restate the conference theme and definitions. I will discuss some more general aspects of the climate or context within which we must operate in the extensive livestock industry.

Stud breeding is a highly competitive occupation and therefore any stud breeder will very carefully investigate any aid that might give him some advantage over his competitors. Hence for a scientist to charge stud breeders with disinterest in, or failure to adopt, his scientific advice probably means that such advice has not had adequate field evaluation or management integration.

I make a plea for more consultation at the planning stage between scientists and breeders. I recall that, a good many years ago now, in the early stages of some major work on the heritability of characteristics and selection systems in sheep several informed breeders made a plea for a control group based on selection by a syndicate of average ability breeders. This plea was ignored and years later we witnessed the great embarrassment of an able scientist who at a major conference had to admit that the only controls to the selection system was no selection at all. Industry had no yard-stick with which to compare the proposed system with normal practice. As a result, years of work never had the impact on, or acceptance by industry, that they might have had. A little more communication at the planning stage could have avoided this waste.

BREEDING AND SELECTION SYSTEMS

For whom are we developing these systems? In the main it is for all commercial breeders and the bulk of stud breeders - those who seek to produce more animals of higher productivity with minimal demands for resource inputs (labour) etc.

To this end we should define the characteristics that are of most commercial significance. Then we must devise selection methods for those

which are proved to be significantly heritable and management techniques to provide the others.

At this stage we must try to define a "good" or desirable animal. I prefer the War Office definition: "A good animal is one having many good, few indifferent but no bad points" (British War Office). If then we mate such animals and select for retention the better progeny, we can expect to make steady progress in those characteristics. In that no animal is perfect we hasten our progress by applying a degree of corrective mating - using a sire strong in the points where the female is weakest - but all within the definition of a "good" animal; that is, we tolerate indifferent but no bad point.

This system slowly lifts the quality of successive generations but seldom produces the outstanding animal that periodically has had such a profound effect on almost every breed. It also in time tends to bring about a degree of genetic uniformity that may not always be desirable if we are to have the resources to meet changes in demand.

The odd outstanding animals that occasionally have such influence in any breed are usually the result of a different system of selection. There are some breeders of great ability and sensitivity who can take an animal with an outstandingly desirable characteristic but which also carries some fault(s). By skill in mating for a few generations they are able to produce an outstanding animal free of faults. The history of any breed has a place of honour for such men as Coates, Bates, Peppin or Pennyfather.

In such a system the culling rate is extremely high and hence such systems are confined to small groups in some studs and are not viable in commercial flocks and herds. Small as such operations are in numbers involved they are of very great importance in the stud industry. Lack of understanding of this has been one of the causes of some past conflict between stud breeders and scientists.

All stud breeding is to a degree a compromise, mostly between production and ability to survive, graze and reproduce. For example in the beef animal, if we could let a butcher rebuild what he considers to be the ideal carcass and we could then resurrect it, we would surely have an animal that could neither walk, graze nor reproduce. When defining and measuring characteristics we must be aware constantly of this compromise.

## MEASUREMENT

Measurement and recording involve substantial costs and therefore should be reserved for the commercially more significant characteristics that cannot be sufficiently accurately assessed subjectively. There is a tremendous range of personal skills between individuals and their ability to assess characteristics that others may only discern after objective measurement. In 1955 Moule made a survey of a wide range of people in industry and their ability to assess greasy fleece weight. He found a very wide range of ability - some had excellent ability to match the scales, other were sadly lacking.

It is critical that every breeder (classer) check his ability against objective measurement. If he has sufficient ability he may be competent to class a flock or herd within the available culling rate without the expense and delay of objective measurement. Maybe as he upgrades the standard of the flock (herd) he may need to resort to objective measurement as tolerances become finer. In the meantime he will have enjoyed a commercial advantage

over one who must use objective measurement to get comparable results. Whilst we may envy such a breeder his skills, it is important that because we don't have them we don't believe they don't exist or cease to strive to develop them in ourselves.

The less the personal subjective skills of any breeder the most important it is to devise systems of measurement and assessment for specific characteristics.

Objective measurement is not on its own a system of selection and breeding - it is just one more aid to the competent breeder.

The higher the standard of any flock or herd then the harder it is to make further overall improvement. Reports of spectacular improvement made in one or two generations by use of objective measurement indicate that the standard at the outset was low. It is not unusual in a beef herd starting to use objective measurement to, within two generations, market as much beef from three cows as had been from four. It takes much longer to produce as much from two as was originally produced from three. Thereafter each successive gain becomes smaller and it becomes difficult even to maintain the production of the herd and meet other criteria necessary. At this stage it may be necessary to try some five carefully selected bulls before we get a herd improver.

Some recent claims of great improvement in production achieved in group breeding schemes would indicate that the initial standard was not high.

#### CHARACTERISTICS FOR MEASUREMENT

Shortly you will be involved in defining the characteristics that should be assessed and recorded. These fall into four main groups:

- a) Those that can be readily measured objectively, e.g. body weight, fleece weight, milk produced, butter fat, etc.
- b) Those that are not measured in degree but are readily recorded, e.g. effective fertility or lamb reared to weaning.
- c) Those that cannot be measured objectively and require an assessment either for the presence or absence or for degree, e.g. temperament, in beef cattle. This is of great commercial significance in most management systems but requires a subjective assessment or score. The method of scoring should be standard as far as is possible but must be appropriate to the particular management system on that property.
- d) Some characteristics are bans or disqualifications. This might be simply the presence of pigmented fibres in a merino sheep or might be that the sheep shows evidence of having suffered blow-fly strike. This latter criteria we have found to be highly significant and heritable to the extent that removal of all such sheep each year has within a short period had an important effect on the economics of the enterprise.

Equally important in an economic context is the ability to calve or lamb without any supervision. I am sure that you will give as much attention to such criteria as to simple measurement of aspects of production.

Any records are only as good as the integrity of those who observe and record them. This applies equally to accuracy of pedigree, date of birth and measurement of production. The subsequent processing of these records by an institution in no way launders them to a state of respectability.

It is important for the acceptance of performance recording that any system concentrate on the determination of ranking within a comparable group under normal commercial management conditions and not develop pressures to modify management to produce better looking figures, e.g. concentrate feeding, deliberate under-stocking, etc.

It is equally important that any recording organization does not attempt in any way to make, infer or even facilitate comparisons between animals from different groups. Figures of absolute weight gains can be readily misused, for example, and should be strictly confidential between institution and breeder and should not be quoted to a third party. The percentage weight gain gives the ranking in the group which is the proper basis of comparison and does not encourage the making of invalid comparisons.

#### OPTIONS AND FLEXIBILITY OF SYSTEMS

Recording should be limited to those measurements or observations that can effectively be used in a breeding plan. Each breeder should be able to apply his own options - some place more importance on one factor than another. Some have management programs that permit of more measurement and recording than others. As demands change or new requirements develop, we are then more likely to have available a pool of desired genetic material than if breeders are restricted in their options for recording.

Thus it is important that no recording organization become dictatorial or inflexible as to what a breeder may record. There should be provision for recording results of screening programs such as chromosome screening or blood testing for conditions such as mannisidosis. Such information can be very valuable if not essential in some breeds. This information is relevant between groups as well as within.

There is a need for close co-operation with Breed Societies in such matters. Breeders should be encouraged to participate in such screening rather than compelled.

Not all breeders can afford or have the resources to mount the same level of recording. Any system should encourage some recording and hope to encourage more. For example a sheepbreeder who has had no involvement with objective measurement in his flock and is prepared to record greasy fleece weight and fibre diameter should be encouraged so to do. The fact that at this stage he is not prepared to accept the additional cost of yield determination should not exclude him from a program. He may initially be able to subjectively differentiate yield sufficiently to the limits of the available culling rate. He will probably in due course by commercial pressure be induced to include this measurement.

#### ELEMENTS OF A GOOD SCHEME

Any organization that sets itself up to administer a recording scheme will in the long run be far better off to have the competition of another similar organization. Competition stimulates progress and quality of service. Management must apply itself to devising the best method of servicing the

needs of breeders. It must not unduly influence or restrict breeders. Circumstances, demands and economics are forever changing. The breeder must make the choices of his aims and the organization must provide the service, not direction. In the past much progress has been due to a wide variety of ideas and aims between breeders and anything that restricts this is likely to be counter-productive in the long-term. The economics of supply and demand will largely determine the breeder's choice of priorities and factors to be recorded by virtue of the cost involved related to eventual resultant sales.

Any scheme must have as many in-built controls for accuracy and rejection of human errors as is possible to include in the computer program. Human errors such as the transposition of figures can to a degree be eliminated by a program that in the first instance rejects unlikely results - be it weight gain, gestation period, etc. for further scrutiny.

One of the most important roles of a recording institution is to foster and encourage standard bases for recording so that there is uniform understanding of the meaning of results and records mean the same thing to all people. Whether or not observations are processed by the organization or by an able farmer himself is less important than the adoption of a common basis for any measurement and such corrections as may be appropriate, e.g. correction for age of dam or sex of calf, etc.

Organizations should be very careful to maintain credibility. As will be discussed later, entry into the field of advice on breeding, no matter how well intentioned, can mean that one wrong steer can prejudice the whole reputation of the recording organization.

We have already discussed the fact that valid comparisons can only be made between animals of a comparable group. However, from these records a sire or dam performance record can be built up, based on progeny run under the one management system, that permits comparisons between sires or dams and for which accuracy increases directly as to the number of progeny involved.

Once animals have been classed into a breeding group on performance, they should only be culled from it for below average performance or the recognition of a specific ban or unsoundness.

It is important that genetically separate characteristics should not be compounded together in records. For example, weaning weight which is largely indicative of the milking ability of the dam is quite separately inherited to post-weaning weight gain, which indicates ability to convert pasture to body weight and foraging ability (hours grazed). Any attempt to compound these results into one ranking at any specified age will give different results according to the age specified - the younger that age the greater the effect of weaning weight and vice versa. If given each ranking separately the breeder has the freedom to make his own assessment and selection for his particular enterprise.

#### PERFORMANCE vs SURVIVAL

Animals are run under a very wide range of environmental conditions. In many areas survival and ability to give optimal production with minimal husbandry may be economically far more important than high performance in good seasons and conditions. In one area minimum fat cover on a beast may be desirable for carcass quality but far less desirable when survival is considered over a normal range of seasons. With the increasing pressures for minimum labour inputs that I mentioned at the outset, we are likely to see

more selection to maintain an optimal production with less labour in-puts and this optimum may be significantly lower than the maximum possible.

## ROLE OF INSTITUTIONS

There are very good reasons why a recording organization should be independent from any teaching or research institution. The prime aim of the recording body must be to service the needs of breeders to give them the most effective and efficient service possible at the best possible cost. Any restriction or direction of breeders should be confined to the mechanics of recording procedures, and in no way restrict their breeding programs or selection criteria. I stress that the breeder must be free to establish his own priorities for selection so that he may progress towards his particular ideal animal that in his judgement the industry will require in the future. The future of our extensive livestock industries lies in the hands of these breeders who are prepared to put their commercial future at hazard to back their judgement.

The role of research, teaching and extension lies with separate organizations to the recording one. Researchers may have access to statistical material from the computer but they must first convince breeders of the economic validity of their findings and recommendations before seeking to include their ideas in a recording program.

This in no way seeks to belittle the important work of the researcher, rather does it establish for him a working relationship with the breeder - one in which he will be seen as trying to help rather than the way he is too often seen today as trying to direct and impose his ideas on breeders.

As already stated, there are obvious benefits in dividing the national recording for the extensive livestock industries between at least two organizations to provide comparison and competition to service breeders better. Their operations should be controlled predominantly by breeders supported by top level experts in computer programming, recording procedures and processing, and with the advice of scientists working in the field of livestock breeding.

## THE FUTURE

Australia, by virtue of its wide range of environment, isolation and natural selection pressures has a wonderful prospect of becoming the stud farm of the world. However, in the long term this could all be at hazard if, with the very best of intentions, we set up what may become a monopolistic scientific bureaucracy that might limit or misdirect the efforts of our livestock breeders.

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