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Editorial

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Editorial

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In preparing literature reviews, only considering recent publications is a common problem amongst students but also academics. There is a wealth of information out there not just limited to the previous, say, 5 years that should not be overlooked. This view is influenced to an extent by a hobby of mine as an Agricultural Historian but also one of my very first referred papers was published in the Journal of Agricultural Science (Cambridge); subsequently I have ascended the ladder to be Senior Editor (Animals) and have had several opportunities to review previous content. It is thus entirely appropriate to reflect on the journal's undoubted success in presenting some of the definitive papers in the general subject area that really 'set the scene' for establishing fundamental principles and launching key concepts that have guided subsequent studies.

Understanding mechanisms surrounding rumen function and relating this to nutritional value of diets and raw materials has been an extensively studied subject and it is a pleasure to have re-read the paper by Ørskov & McDonald (1970) that has launched so many studies; citations are approaching 1500 which is a very eloquent demonstration of the international esteem in which this work is held. Animal trials are very lengthy, expensive and, consequently, do not lend themselves to rapid data generation. A recurrent theme in animal studies is developing *in vitro* predictive models to predict nutritional value. Keeping to the ruminant theme, Menke *et al.* (1979) pursued this concept in their paper, which identified a laboratory methodology that has become universally accepted. It is extremely difficult to estimate herbage intake and its subsequent digestibility in ruminants unless individual animals are confined which is, again, very laborious and does not allow for pasture-based studies. The use of naturally occurring inert markers present in plants has received considerable attention and the paper by Mayes *et al.* (2015) confirmed that n-alkanes would be particularly useful in this respect; the methodology presented has been employed widely in a large number of studies.

Rumen function is fundamental to the utilization of ingested plants, and rumen microflora (based predominantly on bacteria) are central to the fermentation of those compounds that are not digested by the animal's endogenous digestive enzyme system. Ruminants are thus able to thrive on those dietary raw materials that are not digested by non-ruminants. That said, some compounds present in plants are poorly fermented, which has led to considerable interest in exogenous enzymes. Two papers by Valdez *et al.* (2015) and Rojo *et al.* (2015) explored this theme not simply by assessing rumen function but also animal performance in terms of growth and milk quality. Other modifiers of rumen function have also received attention within the general categories of pre- and probiotics, commodities which aim to encourage proliferation of the more 'useful' microflora, thus improving the overall efficiency of fermentation. Yeast cells and extracts of their cell walls have received attention, as demonstrated by the paper of Opsi *et al.* (2013).

Traditionally, the diverse arms of agricultural scientists rarely met let alone devised joint programmes. As has been mentioned earlier, animals eat plants, so it is somewhat perplexing to note that in the past animal scientists talk infrequently to plant scientists. It is very refreshing to note that this barrier is being removed and some of my own recent research programmes have been joint ventures. However, modesty prevents me from giving examples, so I will refer to a paper typical of the need to communicate amongst research groups by citing the paper by Opsi *et al.* (2012) examining the variability in maize cultivars and effects on nutritional quality of maize silage; they also investigated other variables including agronomic aspects such as planting data, thus examining overall crop management. The interaction between grazing behaviour and stocking management was covered in a paper by Da Silva *et al.* (2013); farm management is a crucial aspect of food production systems that can be extended to include a national industry as described by Kelly *et al.* (2012).

The journal is very proud of its rigorous reputation in statistics and modelling. Applications to animal agriculture include, for example, assessing the implications of seasonality in milk production by Geary *et al.* (2012), life-cycle analyses on national milk production by Yan *et al.* (2013) and simulation of the costs of home-produced feeds in ruminant livestock systems by Finneran *et al.* (2012).

The influence of animal systems on the environment and climate change are extremely topical subjects and the journal has regularly published papers on these subjects. Returning to rumen fermentation, one by-product is the gas methane, which has significant global warming potential. Products which might have antimethanogenic influences are accordingly of considerable interest, including naturally occurring phytochemicals as described by Cieslak *et al.*

(2014) and tannins by Bhatta *et al.* (2013). Although known for publishing conventional scientific papers, we have in the past published themed events including a nitrogen workshop that examined means of reducing reactive nitrogen losses from grazed pastoral dairy systems presented by Monaghan & De Klein (2014), a topic that was the subject of a review by Spek *et al.* (2013), who examined milk urea concentration and urinary urea excretion. As is evident from the descriptions above, ruminants do tend to dominate animal papers; we however are very keen to consider papers on non-ruminants and it is thus fitting to include a paper on pig slurry characteristics by Sommer *et al.* (2015). The final paper is one which considers the environmental burden of all major livestock systems – beef, dairy, poultry, pork and eggs – as described by Eshel *et al.* (2015).

We hope that colleagues enjoy reflecting on the journal's past achievements by reviewing these examples and noticing the considerable breadth in our coverage of Animal Agriculture and its truly international nature.

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