



## History Lessons

My head hurts and my heart sinks. Nothing to do with sport or politics, but a bulging email collection of data and images of new buildings where animal health is in trouble. How do we manage to get it so wrong sometimes, when we have so much information at our fingertips? Or is that the major problem? That our current situation is exacerbated by the difficulties in filtering the useful information from the useless? Maybe we should pay more attention to past experience. Today is always a good time to ask the question “what can we learn from the past? “

The layout and construction of farm buildings is a balance of resources and desired function, with elements of form introduced occasionally. Livestock buildings have a challenging set of requirements because the contents are dynamic and require daily intervention of labour. They are not storage facilities but living accommodation for animals. Design of facilities will accommodate the house, the bed, the feeding and watering, the effluents, the sick and when done well, the labour. My current focus is to ask if we are still doing all those things?



*Fig. 1 East Lochside, Farm Steading, Aberdeenshire*

Fig 1 shows a typical medium sized farm steading from the late-19<sup>th</sup> century, from the earlier days of the centralisation of facilities which occur in modern farms. Storage of feed is above the livestock, with a midden for farmyard manure close by. All materials were moved between and within buildings by manpower, with good design making the most of the topography, the expected impacts of wind and rain, the need for water in specific locations, and gravity to be useful where it can. There are separate spaces for separate functions, and whilst considerable human effort was required to put hay and grain in the various lofts at harvest time, the six-month task of feeding livestock through the winter would be helped by gravity, for free. Labour made a far bigger contribution of resources for food production then than now, and good design acknowledged the value of labour inputs.

The increase in herd and flock sizes in UK agriculture has been accompanied by a substantial decrease in labour resources. Daily tasks previously carried out by manual labour have been displaced by one or maybe two people on a farm, plus machinery. Nobody will miss the physical

rigours of manual labour on farms, but in the process of evolving into our current systems we have walked into an un-designed animal health and welfare nightmare.

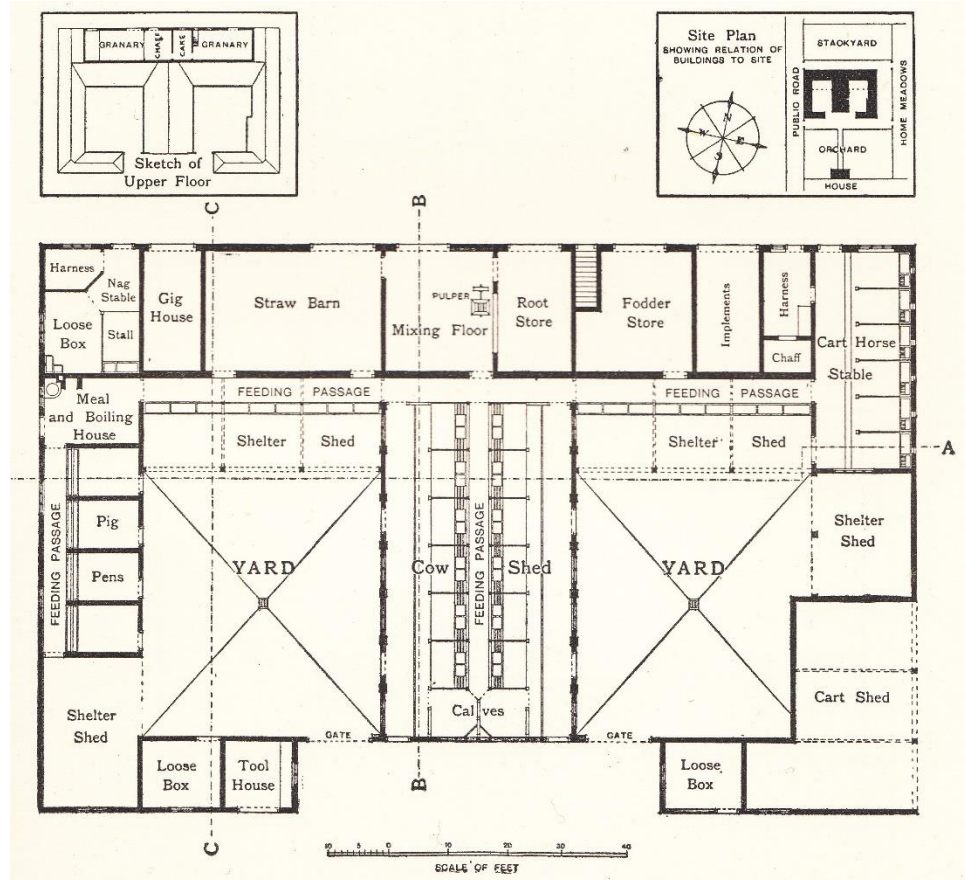


Fig. 2 Arrangement of buildings for a farm of 250 acres (SCMA, 1912)

Fig.2 shows the layout of accommodation for a mixed farm of about 250 acres, with an array of discrete spaces around two yards, with some storage on an upper floor (TSCMA, 1912). The separation of animals into smaller groups of similar ages will have had significant positive impacts on biosecurity; the control of spread of infections. Small group size facilitates the observation of individual intakes of feed and water, and the physical signs of health and symptoms of disease in those individuals. The field barns of mid-19<sup>th</sup> century are very positive for isolation, but not so handy for labour (Fig 3.) Repeated close contact with humans would mostly (but not always) create a familiarity that would seldom create even sub-clinical stress levels in livestock. The daily task of shovelling and barrowing manures from many small rooms and buildings is not something we would repeat, but there were some important advantages of the old ways. Farmyard manures had a higher 'value' in the livestock systems of 19<sup>th</sup> century agriculture than is sometimes apparent today, with the result that manure management can be treated as an afterthought in some modern designs. A lack of design detail in waste management is seen in excessive labour cost moving muck with machines on a daily basis, for ever, compared with using a broader view at the design stage. Large volumes of wastes in one location can cause higher levels of negative impact, such as sedimentation in large slatted tanks, air quality issues, and localised diffuse pollution. These are all examples of design failure and they all impact negatively on animal health and welfare. Buildings need to be designed to be cleanable, with available time as a major design factor.



*Fig. 3 Field Barn. Edale, Derbyshire. Photo: Andrew Critchlow*

The requirement for labour in the form of many persons spending many hours in livestock buildings is no longer a design requirement. This is progress. But looking back to 150-year-old designs we should not ignore some of the inherent risks to animal health and welfare that will have changed, and not for the better. A traditional layout may have 36 cattle in one room, the byre, another cart shed for calving cows and maybe a sick pen, and then three or four separate air spaces for various different ages of youngstock. A basic 2020 knowledge of epidemiology will inform us that this is a dramatically lower risk for spreading disease than the large, multi-spanned, 5m eaves height, concrete and steel edifice that is pictured in my inbox. The design issue is that when livestock buildings are created with cost and not value as a primary outcome, and the long-term risks are not understood, there will be failures.

The science is very clear on livestock buildings that are constantly stocked, and/or contain a mix of ages within the same airspace. The risk of chronic and acute diseases, particularly enteric and respiratory diseases, is significantly higher than buildings or spaces within buildings that can be managed on an all-in all-out basis. And here comes the design punch: how do we currently design buildings with regard to labour and muck? Most UK livestock farms use tractors designed for field work to clean out buildings, with machinery that requires high eaves heights, large areas of concrete, simple pen designs and flat floors, for a task that may take 20 minutes per pen and happen 6 times per year. In Europe the use of small machinery for livestock production is common practice, but UK agriculture considers it 'expensive'. Large area pens will require rapid turnaround times between batches, which too often equates to inadequate time for effective hygiene procedures. If we keep putting large numbers of livestock into unclean facilities, the R number can be expected to rise. A now familiar story.

The design solutions for modern livestock systems should include an appreciation of what is needed for sustainable production and to allow labour to practice good stockmanship, including the provision of good hygiene. Providing six smaller pens compared with four bigger ones of the same total area may cost more to build, but pens that can be cleaned properly will always make more money than those that cannot.

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