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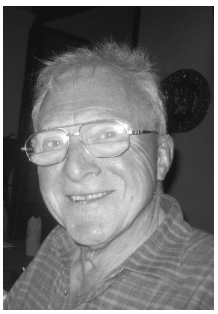

Animal Welfare with Special Reference to Cattle and Education

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Abstract

Animal welfare has a special significance for the veterinary profession. All veterinarians in the UK and many other countries make an oath to advance the care of animals. Animal welfare has both legal and ethical connotations, the former promoted through national laws and regulations or in EU, increasingly through Brussels directives.

The phrase "From Farm to Fork" graphically illustrates the range of those directly interested in farm animal welfare, from the farmer – producer through to the consumer in the supermarket. Numerous national and international bodies act as pressure groups in promoting their own views on the best practice of animal welfare or wellbeing.

Controversial areas include objective versus subjective assessment or value judgements , species variation (e.g. horse versus mouse), national and cultural customs (bullfighting in Spain, dog-fighting in Kandahar, Afghanistan) economic considerations and mandatory versus voluntary regulation.

The Five Freedoms (5Fs) are rules covering the basic needs of farm animals, be they dairy cows or broiler chickens. To meet the welfare needs an assessment of animal feelings (sentience) is required to judge their Quality of Life, and little research has been done in this area.

Experimental animal procedures are usually strictly controlled by law, with restrictions in the experimental licenced facility (often an institute or university) and centrally, in the UK by Home Office inspectors. The principle of the Three Rs (3Rs), Replacement, Refinement, and Reduction, introduced by Russell and Burch about 50 years ago, has led, following worldwide adoption, to continuing critical assessment of the needs and methodology of experimental procedures.

In cattle, the advent of farm assurance schemes, whereby the supermarket controls the standards of animal husbandry on its supplier farms through regular visits by inspectors to the dairy farm (milk, butter, cheese, possibly beef) has also led to improved and enforceable standards.

Lameness in dairy cows persists nevertheless as a major welfare problem in many units. Improved flooring, good bedding in enlarged cubicles, regular use of footbaths,

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and better tracks have improved the welfare standards. The recent interest in competent foot-trimming has stimulated the introduction of a certificate of competence for trimmers, which could eventually reduce the lameness problem. Stockmanship is believed to be a weak link in the cattle welfare chain. Rejecting a mandatory scheme for the examination of stockmen, the FAWC is encouraging voluntary learning programs which include on-farm instruction from veterinarians and others, along with computer programs. The funding of such stockmanship ventures is likely to be problematical.

Introduction

Welfare encompasses the animal's health and general physical condition, its psychological state (sentience) and its ability to cope with any adverse effects of its environment.

The new British veterinary graduate must make this oath or promise to the veterinary governing body, the Royal College of Veterinary Surgeons (RCVS): "My constant endeavour will be to ensure the welfare of the animals committed to my care"1. This oath is expanded in the ten guiding principles of veterinary behaviour and action, the first of which states "You will make animal welfare your first consideration in seeking to provide the most appropriate attention for animals committed to your care"1. Many other countries have a similarly phrased oath. A veterinarian by virtue of his training is therefore in a special position to promote and ensure the highest standards of animal welfare. Many others e.g. animal scientists, social scientists, psychologists and economists, form part of a multidisciplinary team approach to welfare but have not had the same specific professional training to cover this field.

This paper covers some general points of animal welfare, then aspects of one species, cattle, and finally discusses the education of those involved in advancing and improving the welfare of cattle.

Many people are concerned with the promotion of good standards of animal welfare and increasingly of food animal welfare. In the European Community members of the European Parliament (MEPs) report that the most frequent queries from the public refer to animal welfare, often animal transport and slaughterhouse procedures.

"The Five Freedoms"

One foundation stone of the welfare of farmed animals, such as cattle, is the term the "Five Freedoms" which are

1. freedom from hunger and thirst – by ready access to fresh water and a diet to maintain full health and vigour;
2. freedom from discomfort – by providing an appropriate environment including shelter and a comfortable resting area;
3. freedom from pain, injury or disease – by prevention or rapid diagnosis and treatment;
4. freedom to express normal behaviour – by providing sufficient space, proper facilities and company of the animals' own kind;
5. freedom from fear and distress – by ensuring conditions and treatment which avoid mental suffering.

This framework was devised by the Farm Animal Welfare Council[2], forms a logical basis for assessing animal welfare within any husbandry system, and is supported by DEFRA[3].

These Five Freedoms may seem obvious, but present problems[4]. They appear to be framed in rather negative terms. They are ideals. In any conventional dairy farming system, there is inevitably some distress or limit to normal behaviour, for example entry to the milking parlour. Cattle being transported, usually by road, over thousands of kilometers in Europe may have limited intermittent access to water, are unlikely to have " a comfortable resting area", rarely have sufficient space, and are liable to be afraid during their travel.

Limited steps have been taken to approach these ideals. The export of young calves from the UK has been forbidden and is therefore illegal. Unfortunately the market gap has been conveniently filled, from the viewpoint of the continental veal farmer, by the import of calves from South America, which involves a far longer sea journey than across the short North Sea crossing, and considerably longer periods of discomfort, fear and distress (among the "Five Freedoms"). Steps are currently (2008) being taken financially to encourage British dairy farmers to retain and rear dairy breed beef calves and to export them to veal market countries at a later age.

Similarly, following establishment of the Five Freedoms, the UK government objected to the keeping of calves in pens so small that they were unable to turn round. This has been reversed and, apart from the first week or two of their lives, calves must be housed in small groups i.e. "have the company of their own kind". Here we see a difference between a recommendation (advice), which may or may not be carried out, and this government Order, which has legal status. If not carried out, then the farmer (or stockkeeper) can be prosecuted.

The Five Freedoms have nevertheless been widely accepted. One of the most advanced countries in terms of animal welfare standards, Sweden, is currently introducing a legal ban on the keeping of cows in tied stalls, and has introduced a massive expansion of buildings for loose-housed cattle. Such steps have not yet been undertaken in many other EU countries.

Humane Techniques in Animal Experimentation

The concept of humane experimental techniques will appeal to many natural scientists. A major contribution to this field was "The Three Rs", promulgated by Russell and Burch[5] in their book "The Principles of Humane Experimental Technique", which was stimulated by Charles Hume, the director of UFAW (Universities Federation for Animal Welfare), who had the brilliant idea of starting a general study of humane techniques employed in actual experimentation.

"The Three Rs" are Replacement, Refinement and Reduction, the origin and history of which has been reviewed by one of its authors[6]. This concept was initially not recognised as important, but from the eighties onwards organisations in many countries and continents, including the USA, Germany, Japan and the Netherlands have been specifically dedicated to promotion of the Three Rs. What do they mean today? The European Science Foundation (ESF) strongly endorses their principles: "Efforts ought to be taken to replace the use of live animals by non-animal alternatives; to reduce the

number of animals used in experiments to the minimum that is required for obtaining useful results, and to refine procedures so that the degree of suffering is minimised"[7]. The Declaration of Bologna said that the Three Rs "should serve as a unifying concept, a challenge, and an opportunity of reaping benefits of every kind – scientific, economic and humanitarian"[8].

a) Replacement

In some experimental models techniques such as tissue culture, organ cultures and more recently genomics, proteomics and molecular profiling have effectively, efficiently and humanely reduced particular forms of animal experimentation (see CAAT websites[6] such as http://caat.jhsph.edu and http://altweb.jhsph.edu). Replacements are generally eagerly welcomed by researchers as saving expenses and often time. Fifty years ago the huge advantages of tissue culture for virology were listed[6] and it was written: "the animal virologist has every cause to rejoice at his liberation from the hazards and uncertainties of animal experiment". A European Centre for the Validation of Alternative Methods (ECVAM) is concerned solely with validation itself, and its acceptance by regulators, and holds regular workshops to discuss recent advances.

b) Reduction

This is defined as "reduction in the number of animals used to obtain information of given amount and precision". Two major points are that the study population should be as uniform as possible (the greater the variation, the more variable the response) and, secondly the necessity for expert statistical advice before an investigation is started, so that the design is correct[9,10].

c) Refinement

The Third R, Refinement was originally envisaged as simply minimising pain, distress and discomfort. It became clear that a better aim was positive, optimal well-being[5.] Deviations from optimal, in terms of light and sound, may have considerable effects on animals and play havoc with experimental results. An example is the caging of monkeys in isolation, which causes a decline in the number and function of the T cells so vital for immunity[11]. The identity of such deviations combines good science with humane science. The result has been worldwide refinements in animal (monkey) husbandry which correct such deviations.

Another example of refinement is the development of techniques to improve the collection of blood from experimental animals. Two alternatives to restraint are telemetry and (reward) training animals to present a limb.

Refinement also encompasses the assessment of pain and distress in clinical practice as much as in experimental work, and its control by proper use of anaesthesia and analgesia, a huge area with dedicated individuals who have made major advances in the last decades.

The need for refinement in humane endpoints of experimental studies, as in toxicity testing and the potency of biological products has led to critical study of the LD5O (lethal dose for 50% of sample), so that physiological, biochemical or immunological variables can be defined to show the effect of the poison or infection before suffering starts. Its obviously scientifically preferable as well as more humane[9]

Experimental Procedures

In the UK experimental procedures involving animals are regulated by the Animals (Scientific Procedures) Act 1986, and the Home Office Inspectorate comprising 29

veterinary or medically qualified scientists[12]. They spend almost half their time visiting licenced premises. The remaining time is occupied granting experimental workers firstly a permit to conduct experimental studies at a named place, and secondly reviewing proposed projects for which a specific licence is sought.
Such applications must be submitted by the supervisor of the research group and by two other senior scientists not involved with the project. A local animal welfare committee of the UK institution or university must invariably review the project before its submission to the Home Office. A Home Office inspector is entitled to visit an establishment without advance warning to inspect the experimental animals and the relevant procedures. A valuable role of inspectors is to circulate information on failed experimental methods, many of which are not reported in the scientific literature[12] .
Sometimes pressure from organised groups of lay persons, protesting about experimental work is extreme. Direct intimidation of animal experimenters working in Huntingdon Life Sciences, a commercial facility near Cambridge, England, resulted in prosecution and conviction of some persons for inflammatory and illegal activities.

Farm Animal Welfare Overview

Turning to one domestic species, cattle supply milk and meat to an ever-expanding world population, currently 6 billion but likely to expand to 9.5 billion in the next 25 years. The trend in many countries has been towards larger dairy herds, and massive beef feedlots (USA, South America). Pressure is twofold, firstly economic (profit margins are often small) and secondly environmental (society, pollution, climate change).
UK Organisations
Numerous organisations are concerned with the promotion of animal welfare in all species including cattle. Some are national and well known (e.g. Royal Society for the Prevention of Cruelty to Animals – RSPCA, the largest such organisation in the UK), Universities Federation for Animal Welfare (UFAW), the agricultural arm of the government (DEFRA), Humane Slaughter Association, Soil Association (promoting organic farming methods and products), Compassion in World Farming, International Fund for Animal Welfare, and the British Veterinary Association- Animal Welfare Foundation {BVA-AWF}.

Europe

Similarly Europe has many such organisations. The OIE (International Organisation for Animal Health was formerly the Office International des Epizooties) was originally concerned with collection and dissemination of epidemiological information on important infectious animal diseases, but today is also involved in animal welfare information in the EU and worldwide, and has close contacts with Brussels.
The EU has published a Community Animal Health Policy (CAHP) with four main goals, one being “to promote farming practices and animal welfare which prevent animal health related threats…..” . Other European organisations (e.g. Eurogroup for Animals) provide advice and expertise on animal welfare to the European institutions such as the Council of Ministers, European Parliament countries (membership now 27) and the European Commission. The European Union, currently trying to spread agricultural

animal care regulations uniformly across Europe is finding its task daunting, as Western Europe is often in dispute with Southern Europe (Italy, Spain and France) countries which have a larger agricultural infrastructure. Incidentally, the EU has so far been unable to formulate any legislation to cover animal welfare in companion animals such as dogs and cats due to marked differences in attitude in northern and southern EU countries, (e.g. on cruelty which is "an offence to cause unnecessary suffering").

USA

In the USA the animal rights and welfare movement lags behind European thinking on farm animals. Americans tend view welfare from a production parameter perspective, (e.g. rate of growth), but US consumers are increasingly intent on food animals being humanely raised[13.]
Dr. Golab, director of the animal welfare division of the AVMA, presented testimony to the US Congress in May 2007 (http:/agriculture.house.gov/hearings/statements.html) on welfare of animals in agriculture and posed two questions:

a) What role should consumers' preferences play in animal welfare decisions? Her answer was "the obligation and challenge, for all of those who are really concerned with animal welfare is to ensure that consumers, in their desire to protect the welfare of animals, are clearly appraised of the advantages and disadvantages that each system and animal care practice provides ".
b) How welfare-friendly is the United States and how does it compare with other countries? She answered that though health and welfare of US agricultural animals "has never been better, doing a great job in health, safety and performance, but not as well in meeting the behavioural needs of some animals in some US production systems". In comparison with Europe where philosophical differences in measures of welfare affect the approach to care, and while behavioural health may be good, physical health and performance may be adversely affected in the US.

Developing Countries

In developing countries scarce resources are understandably more directed to tackling human than animal problems, resulting in poorer animal welfare. Other adverse factors in developing countries include poverty (a chronic shortage and an inability to pay for feed, and no access to animal health services), poor stockmanship skills, and different cultural attitudes to animals[14]

Cow Comfort

Two vivid personal examples of the extremes of "cow comfort" may be given. Both involve a dairy herd in a collecting yard prior to milking. In one case, a personal check to discover whether any cows were showing early signs of bovine spongiform encephalopathy (BSE), I had to push my way through this by-no-means overcrowded yard. The "flight distance" would have been less than two yards. This herd, in essence

was unstressed by the presence of a stranger. In the second case the overcrowded collecting yard had two "downer cows" in it, and attempts were being made with a forklift tractor to raise one for removal to an isolation box. The second cow, struggling to rise, was being knocked by excited herdmates, and was a sad example of cow discomfort.
Mention of "cow comfort" involves the need for an appropriate number of cubicles for a loose-housed dairy herd. It should be at least 5% greater than the total of cows, e.g. 105 for a 100 cow herd. Nothing gives a stockman greater pleasure during his last check at night than to see every cow lying down in cubicles, obviously content in a newly designed and well-bedded dairy barn. The advent of perforated rubber matting for cubicles and walkways offers many advantages[15]. Easy drainage and slip resistence are two positive features. Cows take longer and more confident strides, and are not liable to move away when mounted by another cow during oestrus manifestation. On one Swedish farm ("Eriksrud") the calving interval was an ideal 365 days, and was attributed, at least partially, to excellent heat detection on the slatted rubber mats, that have the disadvantage of being expensive.
Larger herds have preferably introduced down-calving heifers to such flooring about a month prepartum, and have kept this group separate from the mature cows for the critical first 4-6 postpartum weeks.
Cubicles should be big enough for the larger-framed cows bred today. Cubicle divisions should not interfere with any attempt to stand up. The ideal division is either a cantilever design or the replacement of the lower bar (found in the outdated "Newton Rigg" design) by a tight cord, easily cut in an emergency involving a jammed cow, and equally easily replaced.
Obvious signs of a lack of "cow comfort" include dirty cows standing too long in the cubicles, lying in the passageways and general restlessness leading to slips, and repeated injuries to hocks and knees.

Mandatory or Voluntary Regulation?

Involuntary (i.e. legal, mandatory) regulation requires verification (is it feasible?), regulatory management and oversight which is very expensive, scientific and medical input, and substantial set up and execution time[16]. For example the US American Welfare Act 1985 amendments have only recently been implemented 20 years later. Voluntary approaches are preferable, tend to be market-driven, and involve fewer individuals, so improvements can be made more quickly and relatively cheaply[16.]

On-Farm Welfare Assessment

On-farm welfare assessment or audit has been widely introduced in the UK over the last 10-20 years alongside herd health schemes.. Farm assurance schemes require external, independent assessment in the dairy industry. Such schemes have become the final objective of all livestock welfare science endeavours[17,18] as they must be above all meaningful for the end-user, the consumer customer. The on-farm steps must be practical, quick to perform, cheap and repeatable. Such schemes involve considerable education of the farmer and obligatory compliance[19].

Education

Education, whether basic or continuing, about animal welfare issues in farm animals, and specifically concentrating on cattle, can again be based on the phrase "from farm to fork". The interested parties therefore include:
a) Farmers and stock persons (the producer)
b) Veterinarians and veterinary students[20], and related animal scientists;
c) Other agricultural scientists and advisers, e.g. nutritionists, building advisers;
d) Other groups involved in cattle production, such as lorry drivers, abattoir personnel, foot trimmers
e) Consumers/including supermarket customers
Numerous pressure groups aim to influence each of these interested parties. This paper considers only two groups, the veterinary profession and the producer.

Veterinary Students and Animal Welfare

To what extent does education affect our attitude towards animals? In veterinary students it should influence their treatment of the individual animal. But of greater importance is their long-term role as future policy-makers and opinion formers[20]. Studies in Britain and Australia have found that many veterinary students perceive their education as a rite of passage from "tender-minded" pet owner to "tough-minded" clinician, with a reduced belief about animal sentience[21]. This apparent hardening of attitude towards animals may help individuals to cope better with veterinary work, but may threaten their attitudes to animals in their care.
Apart from a variable emphasis throughout the undergraduate course, UK vet students regularly have the opportunity at a weekend vacation course not only to hear from practitioners about practice management, but also to participate actively as role models in ethical problem-solving exercises, in which an experienced practitioner typically plays the role of a "difficult" client. One scenario may be the presentation of a "battered" pet, the possible victim of an attack from a drunken owner or friend. What should be the attitude and approach to the client by the consulting veterinarian? Should such cases be reported to the police for possible prosecution ("for causing unnecessary pain and suffering to a dog")? Should further enquiries (how?) be made to discover whether a person in the household, usually a woman, is also being assaulted? To what extent can or should any confidentiality be maintained in such a scenario? In reality, when such cases are brought to the police, and an individual is brought to court charged with an offence, intimidation of witnesses may lead to the case being dismissed for lack of evidence.
The obligation of veterinary students to spend some months in extramural education with practitioners ("seeing practice"), including farm animal work, affords them an unrivalled change to study and discuss farm animal welfare. Two simple examples are mentioned.
Calf castration[23]
This is one of the commonest surgical procedures. Its necessity has been increasingly questioned on scientific, economic and humanitarian grounds. Castration results in a slowed growth rate, at least in the immediate post-castration phase. In the UK castration

of calves over 2 months old can only be done under anaesthesia or analgesia. In the USA anaesthesia is optional, but consumer pressure there may eventually result in it being made compulsory. Enforcement of such a federal regulation will be difficult. Some large animal clinical teachers in the USA do not provide analgesia, claiming that lack of analgesia is the norm in practice. But unintentionally, such an attitude teaches students that veterinarians should not set standards of animal welfare. Such actions can be considered a disservice to animals, students, the profession and society[22].

Dehorning of calves and older cattle[23]

Dehorning of growing and mature cattle should rarely be needed. Cattle are best disbudded as calves at about 1-2 weeks old, preferably under local cornual block analgesia with a disbudding iron. If done by a stockman, he or she should be instructed in the technique of cornual block, testing for its efficacy, and of correct placement of the hot iron.

Dehorning of grown and mature cattle should always be done under effective cornual block. Unfortunately in some areas it is performed with a guillotine action shears (Keystone) without analgesia, resulting in considerable pain, distress and haemorrhage, as well as the risk of fly strike. Such deliberate cruelty must be condemned.

Stockmanship

"Stockmanship is the single most important influence on the welfare of farm animals"[24]

Its three essentials are:

a) knowledge of animal husbandry; b) skills in animal husbandry, particularly problem detection and resolution; c) personal qualities, i.e. affinity and empathy with animals, dedication and patience[24]. This recent report admits that farming in the UK has a poor image and status, and suggests that basic elements of agriculture including humane caring treatment of farm animals should always be incorporated into the school curriculum for pre-16 year olds, perhaps under the subject of "citizenship".

Later stockman education is then preferably by in-house or on-farm training[24]. Certificates of competence, such as exist in the UK for pig husbandry, should be extended to other farm species. Currently less than one in a hundred stockmen takes up training and certification opportunities such as National Vocational Qualifications or National Proficiency Tests[24].

The report rejects the concept of licensing of stockmen but supports the development of improved accreditation schemes, which require sufficient suitably skilled trainers.

Conclusions

Animal welfare is essentially about the quality of life of animals. Great differences in attitudes to animal welfare exist throughout the world. Policy decisions on welfare also involve (apart from seeking to reach the ideal standard of the Five Freedoms) value judgements based on factors such as environmental, cultural, religious, social and economic considerations which must be weighed against each other. The result becomes the baseline of required animal welfare standards which is evident in the national legislation seen today.

Veterinarians should be leading advocates of the highest standards of animal well being. This effort necessitates the expenditure of considerable time on education of the farming community and the individual stockman to increase pride in creation of an environment in which cattle, for example, have minimal stress and hassle and therefore can achieve optimal production. Veterinary practices can introduce short courses (e.g. neonatal disease control, foot trimming, mastitis) prevention and practice newsletters for stock persons. While the best farmers will attend anyway, real incentives must be found to attract the majority who are not immediately interested. The value of farm walks, in which individual dairy farms can be inspected freely, and in which honest question and answer sessions are encouraged, cannot be overestimated. In comparison the local agricultural show, while not to be ignored as a social occasion, may contribute relatively little to better animal welfare, though some practices have found their own stands there to be useful educational aids.

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Web Sites

Association of Veterinarians for Animal Rights (AVAR):pam@avar.org
AVMA: www.org/issues/animal_welfare/policies.asp.
AWSELVA : www.awselva.co.uk
Eurogroup for Animals: www.eurogroupanimalwelfare.org
European Voice: www.europeanvoice.com
Farm Animal Welfare Council: www.fawc.org.uk
Health and Consumer Protection D-G, European Commission: http://ec.europa.eu/food/animal/diseases/strategy/index_em.htm
Soil Association: www.soilassociation.org