

Llama Evolution and Development: Past, Present and Future

I am a strong advocate of studying history. I believe it is essential to be informed of the past in order to make sense of the present. I also believe that studying the past helps inform when speculating about the future or planning for it. Having recently completed an in-depth natural and socio-economic history of the llama and attempted to assess its role in contemporary culture (to be published in book form shortly), here I attempt to draw out the lessons I believe it has taught us and suggests for the future.

In summary, history has shown us that change never stops and that some trends go full cycle with a beginning and end. Llamas may be a case in point. Llamas emerged as an identifiable type of South American camelid through controlled selective breeding and domestication of the wild guanaco. Over many generations, it was bred to have a single coat and also distinct colouring, but primarily to be suited to fulfilling a specific purpose - obediently carrying cargo in caravans across vast distances and mountainous terrain. After the Spanish Conquest of the Inca Empire (1532-1572), 90% of the camelid population was killed (along with 95% of the Incas) breeding discipline disappeared and the llamas remaining permitted to randomly interbreed with their cousins (alpacas, vicuna) producing many variations in appearance including size, fleece, and colour. Some breeding programmes aimed at meat production, others at fleece (quality and/or volume), some as allrounders. In more recent times, as some former uses have diminished and others come to the fore, some of these hybrids have been further selectively bred to produce more distinct phenotypes aimed at the new markets and breeding true in future generations. By the 20th century, the llamas' forebearer, the guanaco, almost became extinct. Today, through various preservation initiatives, it has managed to survive as a protected wild animal but now the llama having lost its purpose to many traditional Andean populations and is rapidly declining in number and if the trend continues could be in danger of disappearing from its native habitats of South America.

What history teaches us is that the past and present, and by implication the future, is almost inevitably driven by the political economy, especially in a capitalist society. Most crucially, it determines the value of most things in society through managing supply and demand. Cultural

events and changes, can have some impact but only usually at the margins or secondary level. As a commodity, llamas in society are subject to the same principles.



Figure 1- Llamas grazing in their natural habit on the Bolivian Altiplano

https://www.freepik.com/premium-photo/group-llama-andes-foothills-bolivian-altiplano-south-america_3757688.htm

Whilst the traditional llama grazing lands of the Altiplano may be too remote and hostile to be threatened for alternative uses such as housing, food and industrial production (other than perhaps mining for precious materials or drilling for oil), far more significant to the llamas' survival in the Andes right now is preservation of the traditional populations and their way of life. This is seriously under threat primarily because of the changing climate and the cultural influence of the modern western world. Foreign aid to this part of the globe is focussed on education and training and the employment of knowledge and new technologies to enable such communities to become sustainable, standing on their own two feet economically. That demands production of saleable goods (such as cheese made from cow's milk, because llama meat is not sought after in any quantity further afield) and for these products to be in excess of immediate needs in order to trade surplus for the essentials to support it. Already this has resulted in increasingly rapid, radical changes to the proportion of an adults' time and energy devoted to farming (it is instead directed to more commercial and in some cases leisure activities) and in farming practice itself, including the crops grown and animals reared. A hardy variety of wheat introduced by the Europeans has replaced traditional cereal crops like maize. Sheep, along with cattle and goats are now more valued and out-number camelids in many of these communities. Whereas some of these traditional Andean communities relied entirely on their llama herds, today, most llama herders complement their activities with some level of cultivation and seasonal migration (Flores, 2007). In some regions, Andean herders do not have

llamas and alpacas anymore but rely entirely on other domesticated animals. For instance, most Aymara families living on the shores of Lake Titicaca currently own sheep, cattle, and donkeys and have completely excluded camelids from their agricultural enterprise. Another example involves the Uru community of Chipaya located on the northern shore of Salar de Coipasa where during the second half of the 20th century sheep and pigs were common and camelid herds were rare (Flores, 2007). Generally, communities located closer to urban centres have a predominance of cattle and sheep because of comparatively higher prices for their meat. They also produce more offspring (llamas rarely give birth to more than one young of course) and over shorter gestation periods than llamas (approx. 150 days for sheep, 283 cows, to 330 for llamas). For these and other reasons, llama herders have been marginalized to the highest, less hospitable reaches of the Andes, where neither cultivation nor herding other domesticated animals is feasible. Whilst llama meat remains the main source of protein for these rural communities, there is a taboo against the consumption of llama and alpaca meat in many urban centres because of racist stereotyping that associates camelids with indigenous peoples (Sammells 1998). Perhaps similar to eating rabbit in the UK which has become regarded by some as meat fit only for gypsies and poachers.

There is also growing evidence to suggest change in the physical environment which in turn may contribute to the llamas' demise in South America. It is outside the remit of this article to enter detailed debate regarding climatic change and its consequences in terms of soil erosion and fertility but these are clearly issues for some areas. A report from the German government agency GTZ in 1988 asserted that 75 % of the Central Valley of Tarija was eroded and that 800 ha. of farmland were being lost annually (GTZ 1988). It is not so much the extent but speed of change that is contested in the literature. Preston (2016) found little evidence to support such rapid change but confirms that livestock densities have fallen by as much as 30 % (Preston 2000) and that the importance of cattle within these increased from 18 % to almost 40 % (Preston 1998). This is, in part, related to the invasion of non-indigenous plant species of unpalatable weeds reducing grazing potential of the lands. This in turn can cause the remaining palatable grasses to be over grazed and as a consequence result in soil erosion.

The less contested changes are the socio-economic-cultural ones. Global mass production, transport, distribution and communication systems are aggressively marketing and making new food, clothing and other products and services cheaper and more accessible to feed the

insatiable human appetite for fashionable consumerism. Education and new forms of telecommunications are increasing exposure to the developed world and this is changing beliefs, habits, interests and priorities, life styles and most significantly hopes and aspirations, especially amongst the impressionable youths. Better educated, younger generations are choosing to migrate to urban areas to better themselves, seek alternative life styles and generally improve their life chances. In some regions of rural Bolivia, as much as 43 % of the population had gone to urbanised parts of Argentina over the period 1969–93 (Preston and Punch, 2001). With such levels of migration amongst the young, the very future existence of traditional cultures and llamas on any scale is under serious threat.

It is not one-way traffic, of course, one feeds the other. The once isolated communities with surplus resource or spending power for the first time, are becoming markets for popular merchandise produced elsewhere, including what might be deemed luxury or even undesirable items (e.g. sportswear and cigarettes).

Dependency on the llama for transport diminished centuries ago with the invention of the wheel, introduction of the horse (unknown to the Inca Empire) and more recently rail and road. Before long, fashionable western clothing made from man-made fibres may be trending and cheap, diminishing also the llama's role in textiles. The only commercial purpose left appears as a limited source of meat amongst their own (for reasons mentioned ??? later/earlier) and possibly leather. Although history showed us the highly significant role llamas played in religion; ritual killing, whatever the purpose, does not generally have a place in civilised society and the teachings of 'newer religions' that have infiltrated some of these communities (the Spanish, for example, introduced Catholicism) so that sacrificial role too is becoming redundant. Increased understanding of science and its application is helping the more educated populations to realise that their fertility, that of their animals and the land is not going to be impacted by slaying their prized animals.

So, there is overwhelming evidence that the traditional rural Andean way of life is under threat and that the llama is becoming less critical to the lives of those who choose or are forced through lack of opportunity, to continue this way of life. Also, that the llamas that remain are having to compete with their wild ancestors and/or European breeds of domesticated animal for an adequate share of the diminishing forage and fertile land on which they feed and from whence they came. Under these circumstances their numbers overall seem almost certain to

continue to decline and potentially disappear, perhaps leaving only their ancestral species, the guanacos, to survive in the wild. This would mean the llama had come full circle, evolved to meet a need and disappeared again now that need has passed and if left to roam alongside its forebearers and eventually bred back to the guanaco.

Tourists to some of these communities might be forgiven for thinking their survival is not under such threat without realising the fact that it is they, the foreign tourists exchanging money for traditional hats and ponchos etc., who are artificially upholding some of these local economies and cultural traditions. It is not dissimilar to what is happening in some other parts of the world where surviving communities are effectively, living museums.

South America, up until the *Covid* crisis had been experiencing a boom in tourism recently. Hitherto, it had been relatively ignored (unfashionable, few connecting air routes) or feared (drug trafficking, bandits, etc.) as a tourist destination but now seems to offer a distinctly different, novel adventure holiday that for some carried with it an added status value. (Everybody has been to Majorca!) Recent popular TV travel log programmes by Michael Palin (*Pole to Pole*), Ewan MacGregor and Charlie Boorman (*Long Way Up*) have both drawn attention to the physical and cultural merits of South America and included photo/video shoots posing with llamas in rural settlements. Likewise, the very popular *Race Across the World* broadcast in 2020 was based on a journey through the continent.



Figure 2- Shot from Long Way Up with Ewan MacGregor

It is not all doom and gloom in the llama world, however. A more positive note is that the spread of basic literacy, vocational education and husbandry know how through various foreign aid programmes has led to better-understanding of basic science, promoted sound practice (inc. selective breeding) and efficient farming techniques. History had suggested that much of the earlier (undocumented) wisdom was lost as a consequence of the upheaval arising out of the Spanish Conquest a few hundred years ago.



Figure 3 - An Indian family tend to their flock using modern medical practices

So, going forward, we will probably see not just fewer llamas in SA but less variety. Fewer cross breeds and more true bred offspring aimed at increased meat or wool production, if these continue to have a purpose. The danger here is that the *Ccara* or *Classic* llama, the original type, with no real utility or economic role remaining may lose popularity and disappear altogether.

As to whether the llama will take on a new role as a ‘sentimental pet’ amongst the more affluent semi urban dwellers, I have little idea. I am not sure about the role, if any, of pets in such societies but would be interested to explore in future. The horse, once a vital mode of transport of people and goods in the UK seems to be so deeply entrenched in the British mentality it has survived in popularity and status beyond a utilitarian purpose. It has also been put to a wider variety of purposes such as therapy and in a more leisured society various sport, despite remaining taboo as a meat source in the UK. Perhaps there are parallels to draw upon.

II

The same socio-political-economic forces apply in Australasia, Europe and North America, albeit in slightly different ways and possibly time scale. In terms of demand in the developed world, it is also doubtful llamas have a commercial future as providers of meat or fibre on any significant scale. Ethical stances based on questionable animal welfare practices have diminished the demand for meat. Of the meat eaters remaining, poultry or white meat is often the preferred option and few of these so minded humans can bear the thought of consuming

anything resembling a horse or companion animal. Whilst there may be a niche market for natural and especially fine natural fibres, man-made fibres now dominate the textile market for the masses and especially throw-away societies. So, what, if any, future market is there for the llama in the West and how does history guide us?

History has shown that a llama's worth or price, is essentially determined by the size of the gap between supply and demand. It was the llama's rarity and novelty value, that made it a sound 'social' investment for Lord Derby who imported llamas all the way from South America in 1836 to adorn his extensive paddocks, exhibit his wealth and stand out among fellow aristocrats. Similarly, with newspaper magnate William Rudolph Hearst in the US in the 1930s, they were a symbol of social standing and wealth. I may be doing the llamas injustice, but it was probably this motive that underpinned the *Llama Gold Rush* in North America and the UK in the 1990s, fuelled by profit driven entrepreneurs who saw the market potential of llamas which they could supply and control. Similarly, in the UK, it was a llama owner from the world of finance who imported and organised the first open sale of llamas (in over a century) although prices and numbers never reached the same dizzy heights as in North America. This is not to suggest no one saw or appreciated the intrinsic benefits of llama ownership or that the profit motive applied to everyone breeding or importing them but huge sums were made by some individuals who quickly moved on. At the time there was great talk of a burgeoning llama industry. Three commercial magazines (*Llamas*, *Llama Life*, *Llama Banner*) came into being each carrying considerable advertising and seldom comprising less than 100 pages. Feed and equipment companies emerged, as did a number of specialist camelid veterinarians, books and instructional CDs published and there was great optimism that the industry would prosper. This was not to be the case. Mass importation, poor, even corrupt breeding and selling practices crept in causing prices to plummet and before long many llamas became surplus to requirements and unwanted by anyone leaving the so-called industry fell on its feet. The lessons history taught us was this pyramid model of selling soon implodes. Only a select few, quick of the mark, profit and the remainder get their fingers burnt unless supply is tightly controlled.

Falling prices and even overall numbers, however, need not be regarded entirely negative for they can have some positive consequences. From a llama's point of view, it may help shift the focus from being primarily economic commodities of some form or other (meat purveyors; novelty items, financial investment opportunities, etc.) or beasts of burden to socially valuable

animals with their own intrinsic values and merits. Few existing owners need telling of how endearing they can be with their calming, mischievous and otherwise entertaining behaviours.

It also has benefits in terms of placing llamas within reach of a wider populations. Perhaps not the lower socio-economic groups for reasons explained earlier but certainly the middle and professional classes. Commenting on buyers at auctions in the US, during the boom years, breeder Mark Smith wrote:

You used to go to the major sales and shows, and people would come in these Class A motor homes. These people owned manufacturing plants, their own jet planes, whatever.

This is no longer the case and they are certainly no longer the preserve of the English aristocrats as they once were or well-heeled Americans and exchange hands at much more affordable prices. Unfortunately, we are currently experiencing a serious downturn in the economy with businesses closing and people losing their jobs, aided and abetted by the *Covid* pandemic so, at least for a while, perhaps fewer people who would otherwise have bought llamas recently are in a position to do so. What the immediate future of the national economy looks like none of us really know, partly because this crisis is unprecedented. What history does tell us is that the Government will have to find money from somewhere to fund its agenda and when this is the case, beyond borrowing, it always increases the tax burden on the individual.

Critical to assessing the future market is measure of its scope, size and durability which history shows us is down to a number of factors, including the demographic to which llamas tend to have appeal and in what capacity. In terms of ownership, demand amongst the enlightened will rest primarily with the strength of both the national economy and household budgets for these will determine affordability of animals, land, disposable leisure time and competition for use of that. Pet ownership, especially of the larger and more exotic types, tends, not surprisingly, to be commensurate with disposable income. Llamas will never be pets for the poorer socio-economic groups because land, especially in suburban Britain, is becoming increasingly scarce and as a consequence extraordinarily expensive. Similarly, necessary insurance cover, feed, housing and veterinary costs are not insignificant costs and unlikely to reduce especially public liability insurance in our ever increasingly litigious society.

More flexible working patterns such as working from home and flexi-time you might think would make looking after such pets as llamas more feasible but some individuals are claiming

the reverse because of the state of the economy. The shortage of jobs, the need to show commitment beyond duty to stay in them, the breakdown of home/work barriers has actually reduced disposable leisure time for many. Irrespective of this, competing demands for our leisure time outside of work and domestic life have also mushroomed and been aggressively marketed through the widening and highly influential forms of telecommunications. This includes a wide range of physical and cultural activities. Take up of these beyond affordability tends to be related to age, image, health, education and geographical location. It is not therefore surprising that llama ownership, as a whole in the UK, has tended towards a specific demographic – white, middle aged, retired/semi-retired, active, female, well educated, rural dwelling/aspiring individuals.

If history reliably helps predict the future, it is likely there will always be individuals seeking business opportunities from keeping llamas, directly or indirectly. The days of making big bucks fast, and all that went with it, have now passed and is unlikely will return in our time. The primary motivation to make a living out of llamas in future is likely to be in order to make keeping llamas, for whatever purpose, affordable.

For such businesses to prosper and endure the llama obviously needs to retain a level of popularity which history shows to be determined by image and supply. History, however, also shows us that a capitalist economy is dependent on most things only being in vogue for a limited time. New products and markets have to be created to feed and sustain it. In the Western World, the llama replaced the unicorn as a popular cultural icon for young children and it in turn will inevitably be replaced by something else whatever that might be. (Recall how the *Tamagotchi* stole our children's hearts around the turn of the century! Who could have ever forecast that?) This should be regarded as a serious threat to the future of the llama. Its image has to remain positive and be for ever changing ('re invented') in order to open up new markets and create new products/services. Here, I believe we may be at a critical point, even cross roads in history. Throughout the history of the Western World, the llama has been presented primarily as something rather quirky, weird and unpredictable. Unless this changes, it is unlikely to have as wide appeal as it could otherwise have. Photographs of South American Indians with their llamas express pride and appreciation of their animals. Pictures laughing at or with llamas may have helped court attention and publicity for the llama in the past, but now it needs to change. Rather than permitting the popular media contrive and share shots of llamas looking mad or crazy, escaping or spitting needs they need to be encouraged to take photographs expressing their beauty and intelligence, ability to bring calm, joy and do good

(and this does not necessarily include giving their owners kisses). That said, even positive images of say nicely groomed llamas witnessing a marriage may have a limited shelf life since the novelty will inevitably wear thin and once it becomes passé, demand will disappear.

Also important for sustainability of some types of llama related businesses is geographical location and its juxta position in relation to other like businesses and visitor attractions. Proximity to urban centres and highly populated areas may not be critical because of the profile of those who are likely to be attracted to llamas. Traditionally, these are more likely to be quiet, animal loving young children and their adult parents seeking an outdoor, rural, tranquil experience, not noisy teenagers and young adults stimulated by the excitement and buzz of the city, crowds and bright lights. Llama related businesses set in or near to national parks, forest trails and even the grounds of country estates seem to have a synergy because of a high visitor turn over. Not many trekkers are repeat visitors. Not surprising therefore, that several of today's businesses are where previous ones existed. For example, 15 years ago, there were llama trekking companies in rural Wales, Scotland, North Yorkshire and the South West that no longer exist. Too many similar such businesses within an hours' travelling distance of each other, especially in less attractive locations and there is a danger the market will become saturated.

Trawling through past issues of *Camelid Chronicle*, one wonders what became of many BLS members, llama breeders, trainers and therapists who once advertised their services in its pages but no longer belong or operate. In other words, why such a high turnover? A cursory history of these would appear to suggest that few of them (with the odd exception, of course) were in operation for more than a few years, between 5 and 10. This may be about timing – victims of the collapse of the llama *Gold Rush*, the passing of a popular trend but I suspect also relates to the demographic profile of owners. These were more often than not, individuals coming towards the end of their working lives establishing small scale business enterprises as almost a hobby. Of course, not all llama businesses had the intention to remain such for long but were part of a longer-term strategy - leverage to win planning permissions. A number of newspaper articles hinted at this.

To survive, the llama 'industry' must be based on a longer-term model than pyramid selling. It needs to be flexible and ever changing, creating new products, services and demand whilst at the same time controlling supply. All in order to address the inevitable challenges it will face

in terms of national and personal wealth, individual tastes, disposable leisure time, fads and fancies, etc. This requires effective marketing and where in competition with one another, identifying niches to pursue or added value to offer in order to win advantage. A review of some businesses has shown that this has been achieved via providing additional facilities like overnight accommodation, catering or a wider range of animals. These niches could be construed as mini pyramids I suppose, but this is not unique to the llama industry and applies to all businesses as fashions change, brands become popular and fade. Some businesses latch on to these, reinvent themselves and prosper; others fail to pick up on them, change and go to the wall. Surely, some of you saw *Trouble Shooter* John Harvey-Jones on TV or if you are too young to remember that documentary series, how about Alex Polissi's *The Hotel Inspector*! Whilst on the TV theme, it would be interesting to hear how some of the new business ideas for llamas would be received by the entrepreneurs in the *Dragon's Den*.

Although few would have predicted a llama being given a role keeping peace on the streets of Portland Oregon during the race riots of 2020 or calming students ahead of their exams at Berkeley, the future of **the majority** of llamas in the UK will surely be quite simply as companion animals or pets. They cannot compete with household pets such as cats and dogs for obvious reasons and so their main competitor for our human affections has to be amongst the equine species (horses, ponies and donkeys). Llamas endearing personalities (meek and mild, comical, intelligent, sensitive), self-sufficiency and relatively low maintenance make them a better option for many of us but they do not have the same long-established tradition and social status attached. A practical problem for many of we llama owners is having to explain ourselves to friends and family, colleagues and associates, why we keep llamas. Their loaded question based on an assumption that they have to be productive and deliver some form of financial gain. Some seem surprised to hear that they are not bearers of great fortune and can be kept for similar reasons you would keep a cat or a dog.

Whatever its future purpose, as is happening in South American countries, this will impact on the type of llama that proves most common and popular in breeding and sales terms.

In the UK, my best bet is that like in South America it is the *Tampulis* or *Woollies* that will prevail. Whilst *Ccaras* have a reputation to be the best trekkers, trekking businesses in the UK seldom pack their animals or walk for more than a few miles (1-2 hours for most). *Tampulis* are more than capable of this. More importantly, it is the soft, cute, teddy bear look that appeals most to most, be they pet lover or not. Additional to aesthetics, they generally consider them

less threatening and more cuddly than their *Ccara* cousins. There may be something of a resurgence in demand for the short-haired, clean shaved, athletic look of the *Ccara* as it becomes a rarity, for as history has shown us, exclusivity has a special status for some. It may be the case that the *Ccara* is already becoming a rare animal in the UK. Mary Pryse, of long established *Catanger Llamas*, wrote of how difficult it had been for her to find a quality *Ccara* male in the UK to add to her breeding programme (personal communication 2019). I think this rarity value will be the special appeal of the *Suri* llama in the UK in coming years for there are very few keepers bothered about using its wool. Finally, on the subject of aesthetics, it should not be forgotten that whilst beauty will always reside in the eye of the beholder, human taste can be very fickle and sometimes easily persuaded, otherwise, how on earth did I and many others become convinced that long hair and sideburns, flared trousers and platform souled shoes were the cool way to look in the 1970s? Apparently, history has shown how what the majority of people in the world regard as the ugliest looking dogs perpetuate because they can still be cute, adorable and desirable to own by some. I have already assumed this to be the case in respect of demand for the *Suri* and so my imagination is open to almost anything coming into vogue in future! Perhaps green llamas I do not know but I guess it should not matter to me personally, so long as they are technically sound, healthy and well looked after.

In North America, where stockman ship mentality and selective breeding has been practised longer, more extensively and drawn from a much wider gene pool and choice of phenotypes (as a result of importation), there is already more diversity amongst llamas and this is a trend that is likely to continue. Some breeders continue to go down the route of focussing on the *Classic/Ccara* look and others on 'wooliness'. But, within these categories and beyond the basics of having good conformation and temperament, some breeders place most value on athleticism and performance, others on fibre - be that in terms of structure (staple, crimp, etc.), texture (feel), look (lustre), coverage, volume etc. For some, what matters most is not so much appearance in the show ring but performance in the context they will be put to work. Some breeders are endeavouring to produce llamas that are gentle, calm and unflappable for work in therapy or as suitable pets for children and 4H programmes, driving carts, etc. Others on strength, efficiency of movement and good endurance to work as pack animals. These are not 'either ors' since some breeders have managed to combine several of these positive traits in in the one animal and this is a growing trend. The Rolfing's objective, expressed in their motto to 'breed beauty in the beast' is a fine example of this, producing a strong, athletic, efficient, beautiful looking llama with quality fibre which after several generations now breeds true and

is a proven animal in the workplace. You can readily identify offspring from that breeding programme.

Such diversity in llamas has helped promote a wider ownership and produce an animal well suited to the purpose for which it is being used. For these reasons alone, it bodes well for llamas to remain in demand in the US.

A concern for some is whether all these modern derivatives and distinct types of llama developed out of selective breeding in the past (such as the *Argentines* and *Rebano Escondidos*) will simply be lost in the midst of time. In other words, become just temporal stages in the process of evolution itself. As new uses and tastes develop do we need to take action to preserve them? The critical issue here is whether such evolution is necessarily progressive improvement. The dairy and poultry industries selectively bred intensively for specific traits over many, many generations but in recent years realised the need to breed back to some of the pure breeds in order to help correct what had gone wrong (eg. lameness in *Holstein* cattle).

So, we may in the future see far fewer llamas roaming the Altiplano or grazing the green pastures of England but the quality of llama we do see is likely to have better form, health and be well cared for. Fortunately, scientific knowledge has progressively increased over time and so too the understanding of owners and veterinarians. As a result, and as a whole, llamas now have access to better pasture, good husbandry practice (including nutrition) and veterinary care. Together with selective breeding and a widening gene pool, good husbandry, society has produced bigger and stronger, visually appealing, better tempered llamas suited for a wider range of purposes. There is nothing to suggest this progressive trend should not continue. With improved animals one can reasonably assume increased remuneration for breeders supplying an increasingly discerning market. Prices in both the US and UK have recently (2018-) started to climb for quality animals and this is a reflection of this. The high prices of the 1990s were simply artificial and the market is now finding its level.

Diseases, as always, will pose future threats and challenges. History showed us how the Spanish brought new diseases through introduction of their domesticated European breeds that almost wiped out llama populations in some regions of South America. The recent *Covid* and *Asian Bird Flu* pandemics are stark reminders of how new animal and human diseases can arise and spread like wild fire throughout the increasingly connected world. Both are significant to the llama because even if they do not threaten its health, they can threaten its affordability and welfare.

Climate change is a worry and new challenge for the world that some nations are taking more seriously than others. We have already touched upon the subject in respect of habitat in South America. Camelid vet Robert Van Saun warns of the impact climate change can have on the parasitic burdens of animal species and warns of the need for extra vigilance in the case of llamas. Certainly, the warmer winters and wetter summers in the *UK* has increased the number of liver fluke cases and several llama keepers have fallen victim to having their (infected and in conclusive) animals culled to prevent the spread of *Bovine TB* . Widespread use of antibiotics in animals poses one of the greatest threats to animal welfare in the future as strains of virus mutate and become immune themselves from current treatments.

I hope readers will now, if they didn't already, agree that history is not only interesting but helpful. It illustrates how political, social and economic trends can impinge upon, if not construct, cultures and have relevance to the llama both today and tomorrow.

The lives and traditions of primitive populations around the world have been faded out over time, exchanged for more modern western ways of living. So too, through no desire or fault of their own, breeds of animal have become no more than exhibits in zoos, or at worst extinct, due to loss of habit or purpose to man, despite their physical prowess, natural beauty, cuteness, intelligence and personality (witness the tiger and gorilla). Many moons ago, the primitive *Caledones* of Scotland, along with their oxen went out of existence. Maybe it is just a matter of time for the Andean Indians and their camelids to meet a similar fate. Even in Europe and possibly North America there is a danger that the state of the economy, personal wealth, competing attractions and demands, personal tastes, whims and fads may threaten its future. The llama is helpless. It cannot find new territory or purpose itself and so it is incumbent upon us, having sculptured its development in recent times to satisfy our tastes and aspirations to find and help it adapt to new habitats, find new roles, widen appeal and ownership to guarantee it a future.

The recent discovery of llama antibodies being helpful in combating the common flu bug and more recently *Covid 19* may have given the animal something of a life-line although one would hope not solely as industrial scale production animal. The jury is still out on the effectiveness/reliability of llama antibodies as a cure for human diseases but it could become the savior of the survival of the human species!

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