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The White Horse Press

Full citation:

Bankoff, Greg. "Bodies on the Beach: Domesticates and Disasters in the Spanish Philippines 1750–1898." *Environment and History* 13, no. 3 (Aug, 2007): 285–306.

<http://www.environmentandsociety.org/node/3301>.

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Bodies on the Beach: Domesticates and Disasters in the Spanish Philippines 1750–1898

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ABSTRACT

Disasters are simply a fact of life in the Philippines but their impact has largely been chronicled only in so far as it affects human society. Yet animals were also very much adversely affected by natural hazards especially domesticates often concentrated in large numbers as a result of their utility to human communities. This paper attempts to assess the extent of domestic livestock loss occasioned by natural hazard especially flood as well as the impact their deaths had on human communities. In particular, it applies the concept of vulnerability or whether the same factors that determine human exposure to risk on an individual or group basis such as age, gender, disability and occupation among others pertain to animals as well.

KEYWORDS

Philippines, history, animals, disasters, floods

Disasters are simply a fact of life in the Philippines; natural hazards such as earthquakes, volcanic eruptions, typhoons, floods, droughts, landslides, tsunamis and the like occur with such relentless intensity that they can be regarded as 'frequent life events'.¹ While these phenomena have historically been the source of much privation and suffering in the archipelago, their impact has largely been chronicled only in so far as it affects human society. Their severity is usually only assessed in terms of human deaths, injuries and missing persons and the damage caused to human property, principally dwellings, fields, orchards, roads, bridges and the like. Domestic animals are sometimes enumerated in this latter category but surprisingly rarely and then mainly in very unspecific terms. Yet animals were also very much adversely affected by natural hazards especially

the floods caused by the torrential rainfall that frequently accompanied the passage of typhoons. In particular, domestic animals such as carabaos, horses, cattle, pigs, goats, sheep, ducks and chickens, often concentrated in large numbers as a result of their utility to human communities, were exposed to harm and sudden death.²

Attempts to describe and assess the impact of hazards upon human communities has more recently become the subject of serious scholarly debate but little if any attention has been paid to the plight of animals.³ Even detailed studies on the history of human-animal relationships rarely make mention of hazards other than disease or human predation.⁴ This neglect is all the more remarkable given the dire outcomes the loss of livestock in the form of work animals, beasts of burden, and sources of protein had on rural populations in the past or indeed still has in the present. Quite apart from the distress inflicted on the animals, loss of livestock and poultry was a major factor, along with crop spoliation and damage to cultivated fields, that adversely impacted upon the immediate livelihood of farmers and also upon their long-term agricultural viability.⁵

The historical records that detail the disasters that overtook human communities in the Philippines are also peppered with accounts of how other species fared under such circumstances. Making use of such material and a more detailed case study from a community in Central Luzon struck by a typhoon in 1831, this paper attempts to assess the extent of domestic livestock loss occasioned by natural hazard especially flood as well as the impact their deaths had on human communities. In particular, it applies the concept of vulnerability or whether the same factors that determine human exposure to risk on an individual or group basis pertain also to animals. Was the vulnerability of domesticates exacerbated by enforced location in large numbers at sites decided upon by humans and were the relative levels of risk between and even within species different? Answering such questions about such actors in such a time and place, however, is fraught with difficulties consequent upon fragmentary data and 'unscientific' accounts that make statistical estimations unreliable and that preclude definitive statements. Nevertheless, the data are sufficient, even in an Asian colonial society whose history is little known outside the archipelago, to reach some suggestive conclusions.

THE NATURE OF HAZARD

According to any criteria, the Philippines are an extremely dangerous place to inhabit. One of the most comprehensive records on the occurrence of recent natural hazards even advised that the archipelago has experienced more disasters than any other country in the world since 1900.⁶ However, modern databases are always limited by their inability to provide a more extensive historical overview. Archival sources, on the other hand, have a greater temporal span and Spanish

BODIES ON THE BEACH

chroniclers have left an incomplete but suggestive record of hazard that stretches back to the beginnings of European settlement in the mid-sixteenth century.

Situated at the convergence of several tectonic plates, the islands are a place of extreme seismic activity. There have been at least 74 major earthquakes since records first began in 1599 as well as countless smaller ones. Saderra Masó's study of the last two decades of the nineteenth century recorded an average of 53.4 earthquake days a year or 4.5 per month. Extremely destructive earthquakes have



FIGURE 1. Map of Philippine Provinces in 1900

occurred in all major regions as well as in the capital, Manila, most notably in 1645, 1658, 1863 and 1880, when large parts of the city were laid to ruin.⁷ There are also 220 volcanoes, 21 or 22 of which are classified as active, and there have been at least 41 eruptions described as destructive between 1572 and 1993, an average of one major event every decade.⁸ Aside from the seismic activity, however, the Philippines is also prone to climate-related hazards especially in the form of powerful typhoons that sweep across the archipelago from the Southwest Pacific, mainly during the months between June and November. On average, over 20 typhoons each year, some with wind speeds in excess of 200 kilometres an hour, enter what is termed the Philippine Area of Responsibility and regularly devastate low-lying areas particularly of the eastern seaboard. There are a surprising number of historical sources on typhoons, known locally as *baguios*, testifying to their frequency and their impact on communities. These sorts of statistics, however, give little real impression of what the actual historical experience meant to a person in the past. Local histories, on the other hand, provide a much better insight into what people were subjected to and how communities fared under such circumstances. Thus the residents of southern Luzon were likely to face a major typhoon once every five to six years in the eighteenth century and once every four to five years in the nineteenth century.⁹

Along with the *baguios*, however, came rain, lots of it falling over a short period of time. While the meteorological phenomenon of repeated tropical cyclones makes a significant and necessary contribution to total precipitation levels, it is also partly responsible for the frequency and intensity of flooding throughout the islands. The 'furious typhoon' that struck the province of Capiz on 19 November 1835 was 'accompanied by a dense and cold rain that lasted from daybreak till seven o'clock at night with equal intensity'. Floods have historically been the source of much privation and suffering and were often more to be feared than the high winds. 'Almost always during typhoons', an official in Pangasinan noted in 1854, 'the floods are more terrible and destructive than the winds of the storm'.¹⁰ Again, local accounts testify to the frequency of such hazards. A list drawn up from such sources found in the Archive of the Manila Observatory constitutes a record of major floods that occurred between 1691 and 1900. While almost certainly incomplete, it does provide an indication of the primary causes, geographical predisposition and even the frequency of such events in specific areas. Moreover, local histories regularly refer to flooding in connection to the passage of typhoons that were held responsible for over 56 per cent of all such recorded incidences. Otherwise, floods were simply attributed to heavy rainfall, at times associated with the monsoons. Some idea of the impact flood had on local communities can be gauged by a closer scrutiny of the more complete local chronicles. The records for Nabua in Camarines (1691–1856) and those for Pangasinan (1768–1872) suggest how regularly people faced such situations. A person on average experienced a major inundation every nine to ten years in Nabua between the seventeenth and nineteenth centuries and once every

BODIES ON THE BEACH

five to six years in Pangasinan, a province that includes the extremely flood-prone Agno River delta area during the eighteen and nineteenth centuries.¹¹

Wind and rain, storm and water, typhoon and flood were what communities could expect. Document after document repeats the same litany of despair bemoaning both the frequency of the event and the scale of the destruction wrought. 'These phenomena are so unfortunately frequent in these latitudes', writes the Alcalde mayor (provincial governor) of Camarines Sur to the governor-general in October 1882, 'some occurring so unexpectedly that it is almost impossible to take the needed precautionary measures at those places where it might matter'. Another report describing the rise of the Abra river to a height of 25 metres above its ordinary level in September 1867 commented on how: 'Hardly a province of the archipelago, but at one time or another, has heard the roar of rushing waters and seen the flight of terror-stricken man'. So frequent were such floods that they actually shaped the morphology of local landscapes, filling in depressions and obliterating *esteros* (canals or streams) and covering everything in a rich layer of silt that might go far to explain why such areas continued to be the site of repeated human occupation. But flooding was not always beneficial: 'When they were exceptional and lasted too long, they covered the fields and destroyed the harvests, causing losses that were impossible to assess with any certainty'. Streams were turned into raging torrents in moments and rivers became walls of water that swept all before them causing immense destruction and transforming the lowlands into an aqueous world where the only sure means of transit was by boat. A colonial official, Francisco Plana, wrote how the towns and villages under his jurisdiction had literally been 'effaced from the map of this District'. Watercourses broke their banks within minutes and what had been but 'yesterday fertile fields and roads' were 'today converted into one immense lake'. In such circumstances, there was but one thing for people to do – fly. Take to the nearest high ground or hill at once 'abandoning everything'.¹²

The tally of destruction was immense. The local history of San Nicolas in Ilocos Norte describes a violent storm and flood that destroyed half the town in 1798. That of Pagsanjan in Laguna gives details of the overflowing of the Balanoc and Bumbungan rivers on a number of occasions: flooding the town with enormous loss to both life and property on 22 October 1831, rising to over half a metre along the Calle Real in October 1840, and again inundating the town in 1882. In the town of Caibiran on Leyte, a big flood in 1876 washed away 'most of the houses, and even the church and bell tower'. The already described rising of the Abra River between 25 and 27 September 1867 caused the deaths of over 1,800 people, while the typhoon and flood that hit Bulacan in October 1882 left more than 15,000 people 'without shelter'. The entire town of Caoayan in Ilocos Sur was said to have disappeared beneath the waters.¹³ The most obvious flood-prone areas in the archipelago and those hardest hit were the ancient channels of river systems filled with Quaternary alluvial deposits. As these are also among the flattest, most fertile and easiest to irrigate landscapes,

they have also been the richest centres of agriculture and the sites of intensive human settlement. They were also the location where large numbers of domesticated animals were concentrated.

BODIES ON THE BEACH

Archival sources make frequent reference to the dead thrown up by the sea, of bodies on the beach as those caught by the swiftly-flowing current or trapped by suddenly rising water levels were washed off shore only to be deposited on land again by the incoming tide. Closer reading through the documentary record though reveals that most of these corpses were not human but animal. Despite the much greater amount of ink expended on the enumeration of human losses, by far the greater number of casualties were domestic animals, those either unable to flee or forgotten in the sudden flight and simply abandoned to their fates. 'With respect to the animals', writes José García, the commander of a schooner to the military governor of Mindanao in 1891, 'the greater part of them have been killed some drowned by the waters, and the others by the multitude of fallen trees'. Animals were literally dragged off their feet by the force of water and 'thrown into the sea'. So strong was the flow that a horse and rider found it impossible to negotiate a passage through even quite shallow waters. There was the too often repeated 'spectre' of the Cagayan river 'tumbling northward' bearing with it 'a grim cargo of dead carabaos'. Sometimes, these bodies were not swept away but were trapped in situ so that: 'Many animals were to be seen lying around dead in the fields and within the town proper'. The local chronicler of Nueva Caceres reported an extensive flood of the Bicol river in October 1872 that left the plain of Naga a 'tide-less sea' that stretched from Pili to Pamplona on whose surface floated: 'Corpses, carcasses, carabaos, sewage, filth ... rotting in the sun, spreading pestilence in every direction'.¹⁴

A great number of animals were lost in this way. There are repeated references to 'many animals', 'a multitude of animals', 'considerable numbers', 'hundreds of head' or 'a total past reckoning' being drowned or otherwise lost.¹⁵ Other accounts, however, try to be more exact and give some idea of the extent of the loss. There are mentions of the number of livestock lost by communities: 39 head of cattle in Pili drowned during a typhoon on 7–8 November 1865; or 72 head in San Isidro and more than 100 in Santa Cruz from the typhoon that hit Zambales between 19 and 20 October 1881. Collectively, these totals mounted up. The governor of Abra reported that besides the 600 souls and at least 950 houses carried away by the rushing waters of the river during the terrible flood of 1867 that as many as 6,500 animals had also drowned. The typhoon and subsequent flood that struck Isabela de Luzon on 7 October 1879 caused the death of a reported 8,160 domestic animals.¹⁶

BODIES ON THE BEACH

As people abandoned their homes and belongings and precipitately took sanctuary on higher ground, animals were often left to fend for themselves. The strength of the current posed their most immediate threat, compounded by the debris – objects that had come away from buildings or the whole structure itself and uprooted trees or sawn logs – that might inflict mortal blows on those they struck. Other animals were left stranded on any patches of higher ground that became small islands of dry land but without food or escape.¹⁷ One official, Jesús Mellados, graphically described what he had seen in the aftermath of the typhoon that hit Leyte on 12 October 1897:

‘... And there were the remains of all kinds of animals around that presented a fearful portrait of the titanic struggle they had sustained in their grim tussle for life in which they were finally overcome after suffering horrendous injuries to limb and body’.¹⁸

On another occasion, the provincial governor of Camarines Sur, touring the damages caused by the typhoon of 7–8 November, witnessed animals still swimming aimlessly among the houses though he noted that many had already drowned. Some animals, though, were able to find safety on their own account. The same official noted how in Milaor: ‘There was little water in the atrium of the Convento [priest’s house] and there many animals had taken refuge’.¹⁹

In the aftermath of typhoon and flood, the carcasses of many of these animals found their way onto the beaches of the 7,100 odd islands that comprise the Philippines archipelago where they lay under a tropical sun ‘in a state of corruption’. Disease was a major concern for officials. It was ‘a matter of the utmost urgency’, continued Jesús Mellados, to clear away this putrefying matter from both shore and dwellings and to rid the place of the ‘poisonous and disagreeable odours’. Strict laws were also passed on the sale and consumption of meat derived from dead or infirm animals or flesh ‘whose provenance could not be completely guaranteed without the slightest doubt’. However, it appears that such regulations were not always complied with and the injunctions had to be repeated on numerous occasions. Large numbers of bloated and decomposing animal bodies were gathered together into mounds and burnt ‘as a precautionary sanitation measure’, their stench adding to the already heavy reek exuded by the sodden landscape.²⁰ Even for many of the animals who survived the rushing waters, the total loss of provender and farmland rendered infertile by a thick layer of sand and stone often meant that a slower death through starvation awaited.²¹

Flood, of course, was not the only cause of death though more animals perished in this manner than from any other natural hazard. Volcanic eruptions, though perhaps more deadly within a given locality only affected a limited area. Historical data on Taal, one of the most active volcanoes (erupting at least 34 times since 1572) and situated only 50 kilometres south of Manila (and so the best documented site) gives some idea of the devastation that could be wrought.

Father Buencuchillo, an eyewitness of the terrible eruption of November 1754 – the most devastating in the recorded history of the archieplago – concluded that: ‘All the animals of whatever kind have perished’. An exceptional feature of Taal is its location in the middle of a lake so that eruptions are frequently accompanied by a tsunami-like wave that devastates the surrounding shoreline, drowning human and animal populations alike. Much the same kinds of observations were made about subsequent major eruptions on 19 July 1874 and 30 January 1911. Mr Martin, who witnessed the latter event, was absolutely certain that no animal life could have lived through it. Dean Worcester, an American colonial official noted in this respect that a particularly ‘distressing feature of this calamity was that crops and grasses were killed over immense areas within which no other very serious damage was done, with the result that a large number of domestic animals starved to death’.²² Domestic animals also undoubtedly died in many other natural hazards such as earthquakes and landslides but not evidently in sufficient numbers to make it a matter of historical note and so the extent of their demise is unknown. As a matter of perspective, however, all these death tolls pale in comparison to the animal fatalities caused by disease. The outbreak of rinderpest among carabaos and surra among horses in the 1880s and 1890s drastically reduced herds, killing up to 90 per cent of livestock in some regions. Nearly 60 per cent of equine deaths from all causes (including those in slaughter houses) were still caused by disease in 1918.²³

Data on how non-domesticates fared during natural hazards is even more difficult to reconstruct and there are only the occasional inadvertent or otherwise chance remark on their fate. An added peril during floods was poisonous snakes flushed out of their lairs by the rushing waters or taking refuge in abandoned homes especially above door-lintels and liable to bite anything they encountered under these circumstances. Of course, such incidents were only occasionally recorded when the victims were human but the same fate befell livestock. Somewhat more frequent are the references to unusual animal behaviour during such phenomena: how birds disappeared during a flood or how wild animals fled their forest homes at the first sign of an earthquake. Antonio Mendoza, an eyewitness to the 1911 eruption of Taal volcano, remembered certain signs that preceded the event in an interview he gave in 1977. He noted how *pugo* (quails) and *labuyo* (wild chickens) came down from the mountainside and sought shelter among the domesticated chickens and ducks under the stilt houses and how his sister had even been able to easily catch a wild ‘batu-batu’ bird because it had become so tame.²⁴ The idea that animal behaviour was somehow portentous of an impending disaster seems deep-rooted among Filipino folk culture. In D. Santiago Patero’s *Reglas Practicas para Librarse de los Huracanes en el Archipiélago Filipino*, he recounts how the sight of a large wild bird common to Mindoro that suddenly became tame and ‘almost seemed to want to come and hide itself among us’ was sufficient to persuade the commander of the boat he was travelling on to forgo

BODIES ON THE BEACH

the pleasures of a dance that evening and immediately board the craft 'so as to prepare ourselves properly to survive [the impending storm]'.²⁵

Nor were terrestrial animals the only victims of natural hazard as marine creatures were also sometimes affected though not always adversely. According to one Pedro Andres de Castro y Amadeo, the lake waters during the eruption of Taal in 1754 'threw up dead alligators and fish, including sharks'. Fishponds where milkfish or *bangus* (*Chanos chanos*) were raised from fingerlings were frequently damaged by floodwaters and their stock 'lost'. On the other hand, the destruction caused by typhoons and floods to marine gear and tackle severely restricted subsequent fishing activities and may have offered a temporary respite especially to demersal fisheries. The many fish corrals known as *baklad* that dotted the shoreline were especially vulnerable to storms, tidal surges and floods. A number of reports note their 'total ruin' and 'complete disappearance' from certain areas recently affected by flooding. The unwary fisherman who went down to the sea too soon to recover his corral risked drowning. Floodwaters may also have had an effect on marine fisheries by depriving fishermen of their boats either 'smashing them to pieces' or simply bearing them away without trace.²⁶

DOMESTICATION AND VULNERABILITY

The documentary evidence overwhelmingly shows that domesticated animals in the Philippines were at risk from natural hazards and died in large numbers during the nineteenth century especially as a result of floods. While all animals were threatened in one way or another by such events, were domesticates more exposed than other animals because of the intense nature of their relationship with human society and did this vulnerability increase over the period? The process of domestication has always been viewed more from an anthropocentric perspective as one conferring, on the one hand, great benefits through increased speed, strength, utility and productivity balanced, on the other hand, by increased morbidity through the mutation across species of a new set of contagious diseases such as smallpox, measles and influenza incubated among livestock, pets and poultry.²⁷ Viewed from the animal standpoint however, domestication entailed among many other factors, both positive and negative, concentration in large numbers often in hazardous locations such as on floodplains or in close proximity to active volcanoes. That is to say, domesticated animals were rendered more vulnerable to natural hazards through their association with humans than were their feral or wild counterparts.²⁸

The concept of vulnerability assesses exposure to hazards in terms of what renders people unsafe, a condition that depends primarily on a society's social order and the relative position of advantage or disadvantage that a particular group occupies within it. Vulnerable populations are those at risk not simply

because they are exposed to hazard but as a result of a particular form of marginality that is usually determined by a combination of variables such as class, gender, age, ethnicity and disability, among others.²⁹ The emphasis is on historical process, the combination of factors that come together at a particular time and place to expose some individuals, groups, communities or societies to the effect of hazard. Of course, this notion has only been applied to humans but its application to animals may add to a deeper understanding of the nature of the relationship between the two.

Going back to the documentary record with this concept in mind does reveal more about the impact of hazards and their influence on particular animal populations throughout the archipelago. It is clear that in some instances all domestic animals were reported either to have drowned or have been lost so that 'in some places there did not remain either a working carabao, or a cow or a horse [as] all had been washed away'. On Leyte, the flood that swept through Mauyog (Mayorga?) on 12 December 1879 totally destroyed the harvest and, again, was said to have killed all domestic animals. The same was true of domestic animals in Lupon in what is now the province of Davao Oriental where all of them apparently perished as well. Calibrating monetarily, the civil governor of Zambales estimated that the value of the animals drowned or disappeared amounted to 400 pesos, a considerable sum.³⁰

This devastation was seemingly only localised, however, when it comes to equating losses against total populations. Such comparisons can only be very rough estimates given the paucity of extant statistics, their reliability and the nature of the politico-administrative boundaries on which they are based but occasionally they are rather suggestive. Thus the 188 cows and horses specified as lost in Isabela de Luzon during the typhoon of 7 October 1879 only represented 2.4 per cent of the province's 7,973 recorded head of these species in 1891.³¹ Another comparison using data from a typhoon in October 1890 in the Batanes Islands and the animal populations there in 1911 yields similar results for cows and pigs but suggests that the loss of goats and sheep was very much more significant and could have been as high as 12.5 per cent of the total (Table 1).

TABLE 1. Batanes livestock lost October 1890 as per cent of population in 1911.³²

Animals	Cows	Pigs	Goats & Sheep
1890 deaths	60	123	152
1911 population	5358	2560	1220
Per cent	1.1%	4.8%	12.5%

All domestic animals were vulnerable to hazard but perhaps some were more vulnerable than others. It is difficult to calculate whether some domesticates were more at risk: larger animals such as carabaos, cattle and horses often figure more prominently in the documentary record but this may simply be a matter of their

BODIES ON THE BEACH

greater respective value and therefore the magnitude of their consequent loss. Thus 1,343 cattle, 842 horses and 761 carabaos are listed as having perished in the sudden rising of the Abra river in 1871 but only a 'numberless' amount of hogs. The town of Calabanga and its outlying *visitas* (dependent settlements) in Camarines Sur lost 170 carabaos, 30 horses and 15 cattle in November 1885. After the floodwaters that swept through the district of Principe on 12 November 1892 had retreated, the bodies of 22 carabaos and 19 horses were recovered but these figures did not include the more than 80 other head that had simply disappeared.³³ But when it comes to smaller and less value livestock and poultry, there are frequent references to the 'many pigs and chickens', 'the great number of pigs' or the 'great number of roosters and hens' that had been drowned or lost. In the case of the municipalities of Baganga and Quimablang in Surigao, the loss of pigs, ducks and chickens in this manner was apparently total.³⁴ Where the statistics are more comprehensive, less large domesticates constitute a higher percentage of all losses. A total of 715 animals perished as a result of the typhoon that hit the Batanes Islands, the most northerly point in the Philippines between 11 and 12 October 1890 of which 60 were cattle (9 per cent), 123 pigs (17 per cent), 152 goats and sheep (21 per cent) and 380 pets and poultry (53 per cent). Pigs represented fully 48 per cent of the 3,216 animals listed as lost in La Unión during the passage of three successive typhoons in 1859.³⁵

TABLE 2. Per cent of Domestic Animals Lost 22 October 1831 in Bacoor, Cavite.³⁶

Animals	Carabaos	Horses	Pigs	Chickens	Total
Loss	47	11	221	1722	2001
Per cent	2.4%	0.6%	11%	86%	100%

More detailed data on how a 'community' of domestic animals fared during such a hazard is extant for the pueblo of Bacoor in Cavite where information on loss is listed by household. Bacoor is a pueblo south of Manila but close to the capital that was hit by a strong typhoon and subsequent flood on 22 October 1831. There are 450 households mentioned as having suffered damage of one description or another during the storm of which 326 or 72 per cent reported the loss of domestic animals of some description.³⁷ Again the data corroborate that smaller domestic animals accounted for the majority of fatalities with pigs amounting to 11 per cent and poultry for fully 86 per cent of all losses. The number of deaths among larger livestock is much less though still significant particularly in the case of the 47 carabao that were drowned (Table 2). An interesting feature of the data on Bacoor, however, is the much fuller picture it presents of the extensive damage to fish farming and fisheries. Here both fish ponds and fish pens (corrals) are mentioned as well as the undefined 'fisheries' with 73 such operations identified as destroyed (Table 3). Information is also

provided on fishing boats with the loss of 27 craft reported, most described as small (22 or 81 per cent).

TABLE 3. Per cent of Fisheries Lost 22 October 1831 in Bacoor, Cavite.³⁸

Fish	Ponds	Small Ponds	Pens	Small Pens	Fisheries	Total
Loss	45	12	8	1	7	73
Per cent	62%	16%	11%	1%	10%	100%

While the data provides a snapshot of how a community of domestic animals fared during a flood, the evidence suggests that smaller animals might be more vulnerable under such circumstances than larger ones. Thus some 1,708 hens (and an additional 14 pullets) perished on 22 October but this number does not include the 11 other occasions when mention is made to the loss of ‘many hens’ nor the 22 references to the demise of chicks. Greater detail is provided for swine though this reinforces the idea that smaller, younger and perhaps feeding mothers were more particularly at risk. Suckling pigs and piglets accounted for 83 or 38 per cent of all losses not including the respective 11 further entries that mention the death of an undefined number of such animals. In addition, 21 suckling sows were also specifically listed as having perished. None of these conclusions, however, can be more than tentative given the nature of the evidence, especially the absence of data on the total population of each species in a community prior to the hazard striking.

Nor did the vulnerability of domesticates remain the same over the nineteenth century as human activity shaped and reshaped the landscape with an intensity and purpose hitherto unknown in the archipelago. Rural areas experienced profound changes during the nineteenth century partly due to the unprecedented increase in human population and partly as a result of the growth of commercial agriculture both of which had environmental consequences. The sheer number of people rose from just over two and a half million in 1818 to just under eight million by the end of the century, an annual rate of increase of slightly over 1.4 per cent.³⁹ Population density across the islands also rose accordingly on average from 8.8 to 26.8 per square kilometre. Migration, still predominantly between rural areas and not as yet primarily a rural-urban phenomenon, ensured that some regions grew faster than others and an ‘inland frontier’ emerged during the course of the century primarily in the central plain of Luzon but also on some islands, notably Negros and more latterly on Mindanao. Agriculture, too, for the first time was subjected to international market forces with the result that increasingly large swathes of land were devoted to the planting of export crops such as sugar, abaca and tobacco in place of the staple, rice. The demand for arable land quickened and its value rose as capitalist agriculture came to dominate certain sectors of the economy.⁴⁰

Much land was cleared and forest cover declined rapidly in some provinces to little more than six to seven per cent on Cebu and 11 per cent on Bohol. Overall, as much as 50 per cent of those areas under effective Spanish colonial rule may have been deforested by the end of the nineteenth century.⁴¹ As human settlement spread more intensively over the full extent of the Philippines, the environment, too, was subjected to new pressures that were reflected in the greater frequency and intensity of droughts and floods though the evidence is somewhat inconclusive given the islands' exposure to the full brunt of the El Niño-La Niña weather pattern, or ENSO. These changes affected domesticates as well. In particular, great stock farms were established by the religious orders as early as the seventeenth and eighteenth centuries with animals brought mainly from China and Japan. The Jesuit *estancia* at Zamboanga, for instance, reportedly had over 2,100 livestock (horses and cattle) by 1768.⁴² Such concentrations increased animals' vulnerability to disease and forced them to live under conditions more exposed to extreme climatic events.

Moreover, the relationship between humans and domestic animals is always a complex one that is never easily understood on just one level or basis of exchange. Just as the association is a multi-reciprocal one in terms of benefits, it is also one characterised by a compounded sense of vulnerability. Animals may have been more exposed to hazard because of their domestication but their loss in large numbers, in turn, made human communities that much more vulnerable. In a sense, the immediate hazard was only half the story – or only half the pain. The *principales* (leading citizens) of a small group of islands off Palawan complained how floodwaters 'carried away the fields already sown with rice leaving us without seed to sow anew', uprooted fruit trees, coconut palms and banana groves and deprived [us] of 'precisely the only resources ... from which the people depend upon for subsistence'. But not only did natural hazard deprive people of their crops and their seeds, it also left them without the animals they needed to work the fields. The great flood of September 1867 in Abra destroyed the harvest and 'left hardly a single work animal' so that there was a 'scarcity of the means of sustenance caused both by the loss of provisions and animals'. The result was that famine often followed hard upon the retreating waters, 'a great hunger' that caused 'incalculable hardship to the poor' as 'people were threatened with the misery caused by the lack of even the most basic necessities of life'. Memories of such events evidently stayed fresh in the minds of local communities. In the 1950s, the inhabitants of Barrio Bantog in Victoria, Tarlac still recalled a big flood that had occurred at the beginning of the nineteenth century when the Tarlac and Guimba rivers had overflowed their banks and washed away most of the fertile soil, the crops and many of the draft and domestic animals. 'Since the last disastrous flood to the present time', wrote down the elders in their local history, 'the place [has] remained generally low'.⁴³

'TOGETHER YET APART'

The human toll in disasters is always a matter of record but animal deaths rarely warrant a mention. Yet many more animals usually die in such events than do people. Not only are animals vulnerable to hazard but the fact of their domestication and the changes wrought by human activity on the environment may actually increase their exposure and place them more at risk. In tropical climates without extensive grazing lands, domesticated animals are concentrated in large numbers at sites that are more often situated to take advantage of good soil conditions and proximity to market rather than from any awareness of their vulnerability to seismic or meteorological conditions. These settlements are frequently located on floodplains, near active volcanoes or besides waterways, all areas that are more likely to create the conditions for a disaster to occur. Just as a disaster is not the product of natural hazard alone but is the result of an extreme event in association with a particular social, economic, political and cultural system, so it is also with animals. Animals are not just vulnerable but are made so by a range of factors, one of which is their domestication.

Domestication, however, is too broad a categorisation to be anything more useful than a means of differentiating broad groups of animals from one another and from humans. Vulnerability may have varied among domesticates as well. As the evidence from the nineteenth century Philippines shows large numbers of pigs, goats, sheep and especially poultry died as a result of hazards, especially floods. There is even a suggestion that these domesticates were more at risk than larger livestock such as carabaos, cattle and horses. Due to the inconclusive and fragmentary nature of the data, however, further research needs to be conducted to ascertain whether this was true and why it might be the case. Was it simply a matter of greater mass, better ability to swim or some other factor such as weight of sodden fleece? Also, there is next to no information on domestic pets and their fates during such occurrences; these animals are almost completely absent from the extant historical accounts when contemporary studies show their importance as a consideration in modern emergency management.⁴⁴ On the other hand, the more detailed data does suggest that even within species there were differences and that the young and suckling mothers were more at risk than their fellows. But vulnerability is rarely a matter of simply assessing one group in isolation from another but is more often a matter of compounded exposure. Just as animals were more at risk from their domestication so human societies that depended upon them for labour and nourishment were rendered more vulnerable by their sudden demise.

Animals, of course, have their own histories quite apart from that of humans though their narratives have run along parallel and converging lines particularly over the last five thousand years or so in the case of domesticates. There is no denying the centrality of this relationship but neither should it obscure the separateness of their histories. On the one hand, this history is about reciprocal partnership though one where the terms of exchange favour humans over ani-

mals much as they do in any patron-client relationship. On the other hand, it is also about mutual vulnerability, where the nature of the dependent relationship compounds the risks to which both are exposed. Animals may have increasingly begun to figure in historiography. As Harriet Ritvo argues, they are an integral part of 'our grand narrative' about the way in which humanity has come to terms with its environment both literally and symbolically. Yet, in a very real sense, they are still often ignored as in the case of natural hazards or represented in such a manner that they are 'absent yet present' in history.⁴⁵ Perhaps the challenge now is how to express the symbiotic nature of their histories in such a way that animals and humans are depicted as 'together yet apart'.

NOTES

¹ Greg Bankoff, *Cultures of Disaster: Society and Natural Hazard in the Philippines* (London: RoutledgeCurzon, 2003): 179–83.

² Humans are animals as well but the differentiation between humans and non-human animals seems somewhat contrived in the context of this discussion. The carabao or Asian water buffalo (*Bubalus bubalis*) is the principal draft animal employed in the archipelago due to its ability to work in thick mud or the flooded conditions characteristic of rice paddies.

³ For example, Gilbert White's seminal study of the impact of flooding in the USA published in 1945 only deals peripherally with livestock under the general heading of 'agricultural losses', an approach that largely holds true till the present. Gilbert White, *Human Adjustments to Floods: A Geographical Approach to the Flood Problem in the United States* (Chicago: Department of Geography, Research Paper No. 29, 1945): 78. A notable exception, however, is Sebastian Heath, *Animal Management in Disasters* (St. Louis: Mosby, 1999). On the effects of natural hazards on human populations, especially the concept of vulnerability, see among others: Kenneth Hewitt, 'The Idea of Calamity in a Technocratic Age', in *Interpretations of Calamity from the Viewpoint of Human Ecology*, ed. Kenneth Hewitt (Boston: Allen and Unwin, 1983): 3–32; Ben Wisner, 'Disaster Vulnerability: Scale, Power and Daily Life', *GeoJournal* 30, 2 (1993): 127–40; Terry Cannon, 'Vulnerability Analysis and the Explanation of "Natural" Disasters', in *Disasters, Development and Environment*, ed. Ann Varley (Chichester, New York, Brisbane, Toronto and Singapore: John Wiley & Sons, 1994): 13–29; Kenneth Hewitt, 'Sustainable Disasters? Perspectives and Power in the Discourse of Calamity', in *Power of Development* ed. Jonathan Crush (London and New York: Routledge, 1995): 115–28. See also Amartya Sen, *Poverty and Famines: An Essay on Entitlement and Deprivation* (Oxford: Oxford University Press, 1981).

⁴ James Serpell, *In the Company of Animals: A Study of Human-Animal Relationships* (Oxford, New York: Basil Blackwell, 1986); Harriet Ritvo, *The Animal Estate: The English and Other Creatures in the Victorian Age* (Cambridge: Harvard University Press, 1987); Elinor Melville, *A Plague of Sheep: Environmental Consequences of the Conquest of Mexico* (Cambridge: Cambridge University Press, 1994). See also in this respect the more recent study by Virginia Anderson, *Creatures of Empire: How Domestic Animals Transformed Early America* (Oxford: Oxford University Press, 2004).

⁵ Juliet Clutton-Brock, *A Natural History of Domesticated Mammals* (Cambridge: Cambridge University Press, 1987); Juliet Clutton-Brock ed., *The Walking Larder: Patterns of Domestication, Pastoralism, and Predation* (London, Boston, Sydney, Wellington: Unwin Hyman, 1989); Sebastian Heath, Simon Kenyon and Cristobal Zepeda Sein, 'Emergency Management of Disasters Involving Livestock in Developing Countries', *Revue Scientifique et Technique* 18, 1 (1999): 256–71. Land usage shrank from 21 to 6.4 per cent in the areas affected by the massive tidal bore that devastated parts of coastal Bangladesh in November 1970 killing on average between 60–80 per cent of all draft animals. Alfred Sommer and Wiley Mosley, 'East Bengal Cyclone of November 1970: Epidemiological Approach to Disaster Assessment', *The Lancet* 13 May (1972): 1029–36. See also Amartya Sen and M. Chander, 'Disaster Management in India: The Case of Livestock and Poultry', *Revue Scientifique et Technique* 22, 3 (2003): 915–30.

⁶ Centre for Research on the Epidemiology of Disasters, Université Catholique de Louvain, Brussels (hereafter CRED) EM-DAT: The OFDA/CRED International Disaster Database. Between 1900 and 2001, there were 612 disasters – earthquakes, volcanic eruptions, typhoons, floods, droughts, landslides, epidemics and wild fires – an average of six a year, causing 87,922 human deaths and affecting a staggering 214,518,635 persons. The totals do not include extreme temperatures, tidal waves/surges or insect infestations. CRED defines a disaster as an event requiring international assistance, or causing ten deaths or affecting more than 100 persons.

⁷ Emelina Almario ed., *Disasters: The Philippine Experience* (Quezon City: Citizens' Disaster Response Center, 1992): 63; Raymundo Punongbayan, 'Natural Hazards in the Philippines', in *Natural Disaster Mitigation in the Philippines: Proceedings of National Conference on Natural Disaster Mitigation 19–21 October 1994* (Quezon City: DOST-PHIVOLCS, 1994): 5. Bailey Willis documents 17 earthquakes as destroying entire towns and devastating whole districts between 1600 and 1900 and categorises another 36 as capable of causing buildings to topple and fall. Bailey Willis, 'Philippine Earthquakes and Structure', *Bulletin of the Seismological Society of America* 34, 2 (1944): 79–81. Major earthquakes occurred: on Mindanao in 1879, 1885, 1897 and 1924; in the Visayas in 1608, 1743, 1877 and 1948; in southern Luzon in 1877 and again in 1897; in northern and central Luzon in 1627 and 1892. Masó, 'Volcanoes and Seismic Centers', vol. 1, 208, 216, 219, 227, 245–46, 248; William Repetti, 'Catalogue of Philippine Earthquakes, 1589–1899', *Bulletin of the Seismological Society of America* 36, 3 (1946): 143–53, 155–7, 187–90, 236–7, 243–6, 249–54, 273, 314–7). The frequency of earthquakes in the capital reflects Manila's proximity to a seismic fault line that links it to one of the most active volcanoes in the archipelago, Taal, as well as the supposedly extinct cones of Maquiling, Banájao and Aráyat. 'Volcanoes', in *Report of the Philippine Commission to the President* (Washington: Government Printing Office, 1901): vol. 3, 147.

⁸ Giovanni Rantucci, *Geological Disasters in the Philippines: The July 1990 Earthquake and the June 1991 Eruption of Mount Pinatubo* (Rome: Dipartimento Per L'Informazione E L'Editoria, 1994): 25–6. As the historical record does not extend much beyond 400 years, there will undoubtedly be a future reclassification of some volcanoes from inactive to active. Mylene Martinez, 'Volcanoes, Volcanic Hazards and Hazards Mapping in Mindanao, Philippines', in *Natural Disaster Mitigation in the Philippines: Proceedings of National Conference on Natural Disaster Mitigation 19–21 October 1994* (Quezon City: DOST-PHIVOLCS, 1994): 107.

BODIES ON THE BEACH

⁹ Rantucci, *Geological Disasters in the Philippines*, 27; Archive of the Manila Observatory, Manila (hereafter AMO): List of Typhoons Box 9-35.

¹⁰ AMO, Manila: Miguel Duran to Governor and Captain General, Panitan, 20 November 1835 Box 4, 11; AMO, Manila: Miguel Selga, El Baguio del 4 de Octubre de 1854 en Pangasinan Box 10-36/10. A study undertaken by PAGASA (Philippine Atmospheric, Geophysical and Astronomical Services Administration) attributes 38 per cent of annual average rainfall from 1951–1997 to the passage of tropical cyclones. *Documentation on the Impacts of and Responses to Extreme Climate Events: Food and Agricultural Sector* (Quezon City: Bureau of Agricultural Statistics, 2001): 9.

¹¹ AMO, Manila: Floods in the Philippines 1691–1911 Box 10-37.

¹² AMO, Floods in the Philippines, 2, 5; Philippine National Archive, Manila (hereafter PNA): Francisco Plana to Coronel Gobernador Político Militar de Mindanao, Surigao 2 July 1862 Calamidades Publicas, Baguios y Huracanes, Bundle 3; PNA, Manila: Parte Producido por el Jefe de 3er Distrito de Esta Ysla, Dando Cuenta de los Estragos Causados por un Baguio en los Pueblos del Sur del Mismo en el Mes de Diciembre de 1868, Comandante Militar de Bislig, Surigao 1 February 1869 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Alcalde Mayor de Bulacan to Governor-general, Bulacan, 6 March 1872 Calamidades Publicas, Baguios y Huracanes, Bundle 2; PNA, Manila: Noticia Reasumida de las Perdidas y Daños Causados en Varios Pueblos de Esta Provincia por Consecuencia del Baguio Sufrido del 19 al 20 de Dicho Mes, Yba, 28 October 1881 Calamidades Publicas, Baguios y Huracanes, Bundle 2; PNA, Manila: Alcalde Mayor de Camarines Sur to Governor-general, Nueva Caceres, 30 October 1882 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Francisco Gómez to Governor-general, Bacalor, 25 September 1887 Calamidades Publicas, Baguios y Huracanes, Bundle 2.

¹³ AMO, List of Typhoons; AMO, Floods in the Philippines; PNA, Manila: Alcalde Mayor de Bulacan to Governor-general, Bulacan 21 October 1882 Calamidades Publicas, Baguios y Huracanes, Bundle 2.

¹⁴ AMO, Floods in the Philippines, 5, 16; PNA, Manila: Gerónimo Vida to Director General of Civil Administration, Masbate 29 November 1879 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Diego Zayas to Governor-general, Tayabas, 7 December 1882 Calamidades Publicas, Baguios y Huracanes, Bundle 2; PNA, Manila: Expediente sobre la Inversión de los \$1000 Concedidos para Socorrer a los Habitantes del Distrito del Príncipe que Sufrieron Perdidas a Consecuencia del Huracán de 7 de Noviembre, Misión de Mangaran, 16 November 1886 Calamidades Publicas, Baguios y Huracanes, Bundle 2; PNA, Manila: José García, Capitán de Goleta to Gobernador Militar de Mindanao, 14 May 1891 Calamidades Publicas, Baguios y Huracanes, Bundle 1. The Cagayan river was reported in flood in October 1845, November 1870, October 1871, September 1874, August 1881, October 1908, October 1909, October 1924 and December 1937.

¹⁵ AMO, Manila: Pedro Antonio Salazar to Secretario de Estado, Manila, 2 January 1836 Box 4-11; AMO, Manila: Marisco Clavería to Secretario de Estado, Manila, 5 December 1844 Box 4-11; AMO, List of Typhoons; AMO, Floods in the Philippines, 4; PNA, Manila: Noticia Reasumida de las Perdidas y Daños Causados en Varios Pueblos de Esta Provincia por Consecuencia del Baguio Sufrido del 19 al 20 de Dicho Mes, Yba, 28 October 1881 Calamidades Publicas, Baguios y Huracanes, Bundle 2.

¹⁶ AMO, Floods in the Philippines; PNA, Manila: Participando el Baguio Sufrido en Dicha Provincia el 8 de Noviembre y Disposiciones Adoptadas en su Consecuencia por el Jefe de la Misma y Junta de Socorros Nombradas al Efecto, Nueva Caceres, 10 November 1865 Calamidades Publicas, Baguios y Huracanes, Bundle 2; PNA, Manila: Provincia de la Ysabela de Luzon, Estado por Pueblos que Manifiesta las Perdidas Habidas en la Citada a Consecuencia del Vaguio que Tuvo Luga[r] la Noche del 7 del Actual [October 1879] Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Noticia Reasumida ... 28 October 1881.

¹⁷ On the perils of livestock experience during floods, see Heath, *Animal Management in Disasters*, 65–6.

¹⁸ PNA, Manila: Jesús Mellados to Inspector General de Beneficiaria y Sanidad, Tacloban, 29 October 1897 Calamidades Publicas, Baguios y Huracanes, Bundle 2.

¹⁹ PNA, Participando el Baguio Sufrido en Dicha Provincia...10 November 1865.

²⁰ PNA, José García, Capitán de Goleta ... 14 May 1891; PNA, Manila: Expediente sobre Petición de Recursos para Atender a los Necesidades Producidas por la Inundación Ocurrida en 12 Noviembre 1892 en el Distrito del Principe, Principe, 12 November 1892 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Jesús Mellados to Inspector General ... 29 October 1897.

²¹ PNA, Manila: Report of Colector de Abra 30 September, Administración de Colecciones y Labores de Tabaco de Filipinas to Governor-general, Manila 15 October 1867 Langostas, Inundación, Terremotos; PNA, Expediente sobre la Inversión de los \$1000 ... 16 November 1886. Prolonged inundation not only kills vegetation and reduces the nutritional value of the pasturage that remains but also removes organic matter from the soil, diminishing its water-retaining capacity and rendering the soil much more susceptible to drought. Previously flooded pasture cannot support the same density of livestock, often leading to a vicious cycle of overgrazing and soil erosion. Heath, *Animal Management in Disasters*, 65–6.

²² Dean Worcester, 'Taal Volcano and Its Recent Destructive Eruption', *The National Geographic Magazine* 23, 4 (1912): 327–8, 353, 355. Apart from the actual eruption, the blanket of ash that covers the ground to a greater or lesser extent depending on the prevailing winds, preventing grazing and inducing toxæmia, posed the principal danger to animals. On Taal volcano, see Thomas Hargrove, *The Mysteries of Taal: A Philippine Volcano and the Lake, Her Sea Life and Lost Towns* (Manila: Bookmark Publishing, 1991).

²³ Marshall McLennan, *The Central Luzon Plain: Land and Society on the Inland Frontier* (Quezon City: Alemar-Phoenix Publishing House, 1980): 169; Reynaldo Iletto, 'Hunger in Southern Tagalog, 1897–1898', in *Filipinos and their Revolution: Event, Discourse, and Historiography*, ed. Reynaldo Iletto (Quezon City: Ateneo de Manila Press, 1998): 113–15; Greg Bankoff, 'Bestia Incognita: The Horse and Its History in the Philippines 1880–1930', *Anthrozoös* 17, 1 (2004): 5–9; Greg Bankoff, 'Horsing Around: The Life and Times of the Horse in the Philippines at the Turn of the Twentieth Century', in *Smallholders and Stockbreeders: Histories of Foodcrop and Livestock Farming in Southeast Asia*, ed. Peter Boomgaard and David Henley (Leiden: KITLV Press, 2004): 233–55.

²⁴ PNA, Manila: Alcalde Major de Ilocos Sur to Governor-general, Vigan, 9 October 1881 Calamidades Publicas, Baguios y Huracanes, Bundle 2; PNA, Manila: José Marina to Governor-general, Cottabato, 12 November 1894 Calamidades Publicas, Baguios y

Huracanes, Bundle 1; Paul Incamina, 'No Sign of Eruption Yet, Taal Folk Say', *Philippine Daily Express* October 17 (1977); Heath, *Animal Management in Disasters*, 64–5.

²⁵ D. Santiago Patero, *Reglas Practicas para Librarse de los Huracanes en el Archipiélago Filipino* (Madrid: Imprenta de Miguel Ginesta, 1873): 38–9. The bird is not named by the author but is described as large with striking markings on the wings and having an open-scissor-like tail. It might have been the Mindoro Imperial Pigeon (*Ducula mindorensis*), a shy bird now almost extinct but still common in the nineteenth century.

²⁶ AMO, Floods in the Philippines, 21; PNA, Manila: Relación de los Perjuicios Ocaionados en los Pueblos de este Distrito por Consecuencia del Temporal Habidos en la Noche del 19 al 20 del Actual y Mañana de Este [1879] Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Alcalde Major to Governor-general, Bulacan 26 October 1882 Calamidades Publicas, Baguios y Huracanes, Bundle 2; PNA, Manila: Enrile Moul to Governor-general, Moroni 10 November 1882 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Gobernar Político Militar de Negros to Director General de Administración, Bacolod, 18 October 1886 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Bernardo Echalues, Governor PM of Carolinas Occidentales to Director-general of Civil Administration, Manila 26 March 1895 Calamidades Publicas, Baguios y Huracanes, Bundle 2; Thomas Hargrove, 'Submerged Spanish Era Towns in Lake Taal, Philippines: An Underwater and Archival Investigation of a Legend', *The International Journal of Nautical Archaeology and Underwater Exploration* 15, 4 (1986): 334. These corrals consisted of split bamboo barriers that blocked the movement of fish and then guided them through a series of successively smaller chambers until they could be easily netted. John Butcher, *The Closing of the Frontier: A History of the Marine Fisheries of Southeast Asia c.1850–2000* (Leiden: KITLV Press, 2004): 41–2. Demersal fisheries refer to those fish found living near or at the sea floor.

²⁷ On the transmission of diseases between humans and animals, see Lise Wilkinson, *Animals and Disease: An Introduction to the History of Comparative Medicine* (Cambridge: Cambridge University Press, 1992) and Joanna Swabe, *Animals, Disease and Human Society: Human-Animal Relations and the Rise of Veterinary Medicine* (London: Routledge, 1999).

²⁸ On domesticates in the Philippines in general, see Dan Doeppers, *Feeding Manila 1850–1945: Provisionment and National Integration* (forthcoming). On the origins of the horse, see Greg Bankoff, 'A Question of Breeding: Zootechny and Colonial Attitudes towards the Tropical Environment in Late Nineteenth Century Philippines', *Journal of Asian Studies* 60, 2 (2001): 413–37. The history of animal domestication and introduction in the Philippines has still largely to be researched and is often quite apocryphal or conjectural. Take the native duck (*Anas domestic Linnaeus*) as an example. It is popularly believed to have been introduced by Chinese traders who settled in a place outside Manila prior to the Spanish conquest in 1565 that was subsequently called Pateros, a name derived from the Spanish word for duck 'pato' and so literally means 'duckers'. Pedro Manalao, *Duck-raising in the Philippines* (Manila: Department of Agriculture and Natural Resources, Popular Bulletin 38, Bureau of Printing, 1953): 4.

²⁹ Michael Watts, 'Hunger, Famine and the Space of Vulnerability', *GeoJournal* 30, 2 (1993): 118–20; Wisner, 'Disaster Vulnerability', 131–3; Kenneth Hewitt, *Regions of Revolt: A Geographical Introduction to Disasters* (Edinburgh: Longman, 1997): 141.

³⁰ PNA, Parte Producido por el Jefe de 3er Distrito ... 1 February 1869; PNA, Manila: Estado Demostrativo de los Destrozos Causados en los Pueblos de Esta Provincia a Con-

secuencia del Baguio del día 11 al 12 de Diciembre del Presente Año [1879] Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Alcalde Major de La Laguna to Governor-general, Santa Cruz, 6 November 1882 Calamidades Publicas, Baguios y Huracanes, Bundle 2; PNA, Manila: Gobernador Civil de Zambales to Governor-general, Iba 15 October 1894 Calamidades Publicas, Baguios y Huracanes, Bundle 2.

³¹ PNA, Provincia de la Ysabela de Luzon ... [October 1879]; *Census of the Philippine Islands, 1903* (Washington: United States Bureau of the Census, 1905): vol. 4, 235.

³² Sources: PNA, Manila: Francisco Paulino, Gobernador Político Militar de Batanes to Governor-general, Santo Domingo de Basco, 20 December 1890 Calamidades Publicas, Baguios y Huracanes, Bundle 2; 'Number of Horses, Cattle, Carabaos, Hogs, Goats and Sheep in the Philippine Islands, by Province, at the Beginning of the Fiscal Year 1911', *Philippine Agricultural Review* 4, 7 (1911): 373.

³³ AMO, Floods in the Philippines, 15; PNA, Manila: Expediente sobre Concesión de \$1500 del Fondo de Calamidades Publicas y Franquicia para la Corta de Maderas hasta el 30 de Abril de 1886 a los Habitantes de la Provincia de Camarines Sur que Hayan Sufrido en el Huracán de los 6 y 7 de Noviembre, Nueva Caceres, 16 November 1885 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, José García, Capitán de Goleta ... 14 May 1891; PNA, Manila: Expediente sobre Petición de Recursos...12 November 1892.

³⁴ PNA, Parte Producido por el Jefe de 3er Distrito ... 1 February 1869; PNA, Manila: Estado Demostrativo de los Perjuicios Ocasionados por los Baguios Acaecidos en las Días 25 y 31 de Diciembre del Año Próximo Pasado [1874] en los Pueblos que a Continuación se Expresen Según se Desprende de los Partes Recibidos de los Mismos Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Estado Detallado de los Perdidas Ocurridas por el Baguio del 25 del Actual en los Pueblos que a Continuación se Expresen, Surigao 2 January 1877 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Expediente sobre Petición de Recursos ... 12 November 1892.

³⁵ AMO, Manila: Miguel Selga, Tres Baguios en La Unión en 1859 Box 10-36/15; PNA, Manila: Francisco Paulino ... 20 December 1890. Some animals are simply denominated as 'wool-bearing', presumably sheep and goats but the number of the former in the Philippines was limited and the Batanes is atypical in this respect to most other areas of the archipelago.

³⁶ Source: Archdiocesan Archives of Manila, Manila (hereafter AAM): Baguios, Incendios y Terremotos 1831 40.D.10 Folders 1–3.

³⁷ The population census of 1885 lists Bacoor as having a population of 12,300 inhabitants or, using the accepted factor of five people per family, a total of 2,460 households. *Estado General de los Pueblos del Arzobispado de Manila y de los Obispos Sufráganos de Nueva Cáceres, Nueva Segovia, Cebú y Jaro* (Manila: Establecimiento Tipográfico de Ramirez y Giraudier, 1886). As there is no definition of what constitutes an extended group of domestic animals of different species living together in an area greater than a farm, it seems reasonable to use the term 'community' based on the human politico-administrative divisions that are responsible for their congregation in the first place.

³⁸ Source: AAM, Baguios, Incendios y Terremotos.

³⁹ The actual figures are 2,593,000 in 1818 and 7,928,384 in 1898. Ildefonso de Aragon, *Población de las Islas Filipinas con Algunas Noticias Curiosas de su Producciones*

BODIES ON THE BEACH

(Manila, 1817); Onofre Corpuz, *Education and Socio-Economic Change in The Philippines, 1870–1960's* (Quezon City, University of the Philippines, 1967).

⁴⁰ McLennan, *The Central Luzon Plain*; Camille Lataillade, Alexandre Dumontier and Nicolas Grondard *L'Agriculture des Philippines: La Plaine Centrale Histoire et Perspectives* (Paris: Les Indies Savantes, 2002); Benito Legarda, *After the Galleons: Foreign Trade, Economic Change and Entrepreneurship in the Nineteenth-Century Philippines* (Madison: Center for Southeast Asian Studies, University of Wisconsin-Madison, Monograph No. 18, 1999). Land was either acquired by outright purchase (*venta real*), by royal grant, by legal or illegal methods of seizure or by settlement. Land tenure patterns are discussed in detail in a number of works. See: Leslie Bauzon, 'Rural History, Land Tenure and the Negros Hacienda Complex: Some Preliminary Notes', *PSSC Social Science Information* January (1974): 5–7, 21, 23; Nicholas Cushner, *Landed Estates in the Colonial Philippines* (New Haven: Yale University Southeast Asian Studies Monograph Series No.20, 1976); Dennis Roth, *The Friar Estates of the Philippines* (Albuquerque: University of New Mexico Press, 1977); as well as McLennan, *The Central Luzon Plain*.

⁴¹ Sebastián Vidal y Soler, *Memoria de la Colección de Productos Forestales Presentada por la Inspección General de Montes de Filipinas en la Exposición Universal de Filadelfia* (Manila: Imprenta de la Revista Mercantil de J. Loyzaga y Ca., 1875); Greg Bankoff, 'One Island Too Many: Reappraising the Extent of Deforestation in the Philippines Prior to 1946', *Journal of Historical Geography* 33, 2 (2007): 314–34. Spanish dominion was only nominal over large areas of Mindanao and Palawan.

⁴² Pedro Chirino, Pedro, 'Relación de las Islas Filipinas, 1604', in *The Philippine Islands, 1493–1898*, eds. Emma Blair and Alexander Robertson (Mandaluyong: Cacho Hermanos, 1973): vol. 12, 191; 'Expulsion of the Jesuits, 1768–69', in *The Philippine Islands, 1493–1898*, eds. Emma Blair and Alexander Robertson (Mandaluyong: Cacho Hermanos, 1973): vol. 50, 304. ENSO (El Niño Southern Oscillation) is a weather phenomenon that gives rise to particular anomalies in rainfall, wind and temperature on a cyclical basis throughout the Pacific Basin as well as having more global implications. Alternating droughts and floods are connected to corresponding 'warm' and 'cold' episodes of ENSO and are the regular climatic sequence to be expected in the Philippines.

⁴³ PNA, Report of Colector de Abra... Manila 15 October 1867; PNA, Manila: Asimismo se han Perdido Muchísimos Sembrados Hallándose los Naturales Amenazados de Miseria por Falta de los Primeros Artículos de Necesidad, Adolfo Avilo[?] to Governor-general, Cebu 16 January 1883 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Gobernar Político Militar de las Islas Visayas to Governor-general, 25 May 1883 Calamidades Publicas, Baguios y Huracanes, Bundle 1; PNA, Manila: Principales de Calamianes to Governor-general, Cabecera de Calamianes, 16 May 1896 Calamidades Publicas, Baguios y Huracanes, Bundle 2; Historical Data Papers, Manila: Historical Data of the Town of Victoria, Tarlac, Barrio of Bantog Reel 72: 7–8.

⁴⁴ Sebastian Heath, Susan Voeks and Larry Glickman, 'A Study of Pet Rescue in Two Disasters', *International Journal of Mass Emergencies and Disasters* 18, 3 (2000): 361–81; Sebastian Heath, Philip Kaas, Alan Beck and Larry Glickman, 'Human and Pet-related Risk Factors for Household Evacuation Failure During A Natural Disaster', *American Journal of Epidemiology* 153, 7 (2001): 659–65. On the history of pets during the nineteenth century, see Ritvo, *The Animal Estate*, 82–121 and Kathleen Kete, *The Beast in the Boudoir: Petkeeping in Nineteenth Century Paris* (Berkeley and Los Angeles: University of California Press, 1994).

⁴⁵ Harriet Ritvo, 'Animal Planet', *Environmental History* 9, 2 (2004): 204; Erica Fudge, *Perceiving Animals: Humans and Beasts in Early Modern English Culture* (Basingstoke: Macmillan Press, 2000): 3.