

„The intrusion therefore of cattle is by itself sufficient to produce the extirpation of the native race”: Socio-Ecological Systems and Ecocide in Conflicts between Hunter-Gatherers and Commercial Stock Farmers in Australia

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This contribution attempts to discuss neglectful or willful manipulations of Social Ecological Systems by commercial stock farmers as part of an attempt to drive Aboriginal people from their lands into the hinterland thereby accepting or condoning their annihilation or demographic reduction. By displaying the different ways in which commercial stock farmers have engineered changes in the ecological system I will show that traditional definitions of the term genocide fall short of applied techniques of decimation which consist of a combination of micro-practices and quotidian low-level violence. It is doubtful that given the complexity and the resilience of Social Ecological Systems (SES), however, a group of commercial stock farmers is able to operate the system (of which, after all, they are an element) in a controlled way. Thus it is doubtful, whether the term ecocide should be applied to the way, stock farmers changed the habitat of the indigenous population, because the term supposes agency. SES as coupled complex systems is dependent on the existence of bio-diversity, the intensity of grazing<sup>1</sup>, defoliation, habitat fragmentation and changes of the soil as a consequence of densification.<sup>2</sup>

### Settler Imperialism and Agency

Instead of using the terms *genocide* or *ecocide* at this point of the deliberation I would propose to locate the whole process of domination over indigenous populations within the context of another concept, called Settler Imperialism, which is not the same thing as settler colonialism.<sup>3</sup>

The term settler imperialism goes back to Karl Marx, who developed it in nuce. Marx analyzed the results of an increasing separation of labor and the relocation of agrarian production into the colonies.<sup>4</sup> In historiography the first usage of the term occurred in a book by historian Carl Degler who speaks of „agrarian imperialism“ in connection with American land hunger in the course of the 18th and 19th century.<sup>5</sup> The expression occurs infrequently in relationship with African and Australian historiography without being introduced systematically.<sup>6</sup>

Economic historians P. J. Cain and A. G. Hopkins have proposed a theory of imperialism on the basis of Marx's earlier reflections that defines the political economy of British expansion overseas as a result of rentier capitalism. Central to Cain's and Hopkins' view of British imperialism is their concept of a „gentlemanly class“. In the early part of the nineteenth century, with aristocratic power in decline, power and prestige devolved on a new „gentlemanly class“ arising from the non-industrial service sector of British capitalism.

Paramount in the whole discussion is the question of historical agency. Settler imperialism was not only kept alive by the investments of London gentlemen in overseas colonial possessions, in order to be sustained it needed agents on the ground – in the colonies. As much as an identification of the „gentlemanly class“ is central for an understanding of the machinery of settler imperialism, it gives us only half the picture because it fails to look at the borders of colonial possessions. Settler imperialism presupposes the existence of a large group of farmers, small speculators and land surveyors on the fringes of white settlement that push into the interior, driving away the indigenous population. Cain's and Hopkins's gentlemanly class as agents of imperial expansion therefore has to be supplanted by a symbiotic rhizome of economic and political elites in the hinterland and the settler at the frontier that were mutually dependent from one another. The participating groups have an interest to expand the area of their control and to either drive away the original owners of the land or to accept their destruction as a necessary consequence of settler imperialist expansion. There are different modi of operandi in place vis-à-vis the indigenous populations, ranging from economic and social cooperation, employment of indigenous labor as pastoralists, toleration of the indigenous peoples on the land that once belonged to them (dual occupation), and banishment from the land.<sup>7</sup> In terms of the ecological manipulation of resources on the ground, these could be affected out of ignorance or negligence, for the purpose of profit maximization, and intentionally in order to undermine the resources indispensable for indigenous survival. If the conflicts with the indigenous population deteriorated they could be cast as low-impact violence, or, if indigenous resistance could not be broken, this could entail military action by militias, colonial military and mounted police. „Extermination when it deems indispensable, dislocation or integration when it is possible“, sums up the common program of the settler imperialist agents.

A second venture into the history of concepts seems unavoidable at this point. Genocide is a notion that has been linked to singular events like the Shoa in the past. I would like to differentiate my position à propos usual definitions of genocide by referring to a passage from the German writer Ingeborg Bachmann's „Todesarten-Projekt“ („ways of death project“) which sums up certain genocidal processes of dislocation in a stunning manner. Bachmann wrote „The aborigines [...] were never annihilated, and still they are becoming extinct“.<sup>8</sup> In her paradoxical expression which describes the barely detectable vanishing of colonized populations Bachmann has anticipated one of the hypotheses of my contribution.<sup>9</sup> Genocides should not be seen exclusively as instances of organized almost industrial mass murder that develop within a relative short time span. Genocides may also occur beneath the threshold of the visible and sayable, resulting in an almost unnoticeable disappearance of the indigenous owners of the land.<sup>10</sup> In contrast to this reformulation of the genocide, the Shoa between 1941 and 1945 has served as the role model for the description of most genocides, and with good reasons. Genocides of the Shoa-type are very perceptible, they have a precise beginning and an exact end, they provide rich documentation and thus they are a prime object of historical interest. For historians, genocides culminate in historical events like the holocaust between 1941 and 1945, the mass murders of Armenians by Turks between 1915 and 1918 or the Rwanda killings of 1994 which lasted only 100 days, but caused hundreds of thousands of dead. These events, through their limited time frame and the density of available source material, are suited for a narrative with a plot.<sup>11</sup> Let me make one thing crystal clear: I do not deny that it may be useful and politically necessary to define genocides as events with indictable suspects and legally responsible perpetrators. I do also not deny the singularity of the holocaust in any way. This is, however, not what I write about. The question at hand is whether historians, by concentrating on genocides as events of the Shoa-type, have neglected genocides of a *longue durée*, as long-lasting micro-practices and continuing quotidian politics. These practices may operate beneath the ceiling of public observations and political debates.<sup>12</sup> Events like genocides are sometimes sentences without a subject. In the case of settler imperialism the sentence enunciated could have the form „one dies“ or „it vanishes“.<sup>13</sup>

A lively debate emerged among the relatively small group of international historians that do research on genocides on the question whether one should stick to the definition of genocides as formulated in the UN some fifty years ago or whether it would not be advisable to defect from the ranks of those who think that the UN document is too rigid and too political in its intentions in order to be a useful category for historical research. On the one hand one finds the liberal defenders of the mens-rea-principle who insist that intentionality is the defining rule for

genocide. In other words, if one lacks positive evidence for the intentionality of genocide, then there is no genocide. On the other side one finds the post-liberal theoreticians of the actus-reus-principle, who insist that killing, maiming, affliction of physical or mental damage or the destruction of a socio-ecological system (SES), that bring about a physical or cultural threat for a population constitute the crime of genocide.<sup>14</sup>

Protagonists of the liberal school, historians like Ben Kiernan<sup>15</sup>, Adams Jones<sup>16</sup> and Günter Lewy argue that „[...] there is every reason not to ignore the role of intent in what is often called ‘the crime of crimes’ – the destruction of an entire group of people or genocide. Proof of specific intent is necessary to find an individual guilty of genocide, and the role of intent is similarly crucial when the historian assesses an episode of mass death that occurred in the past. [...]The disregard of intentionality will create an incomplete or distorted picture and lead to false conclusions.“<sup>17</sup> With a grain of salt one could even argue that the liberals tend to ponder the historical specificity of the holocaust and to consider it a paradigmatic singularity on the one side, but syntagmatic normality in regards of genocide in modernity.<sup>18</sup>

In contrast to the liberals and often in close alliance with the post-liberals, historians of colonialism, who have dealt with the allegedly „vanishing races” in the Americas and in Australia, tend to deemphasize the role of intentionality. Both positions, that of the liberals as well that of the post-liberals have underlying political motives. Attempts to thematize the expulsion and destruction of Native Americans and Aborigines fail, if one endeavors to file a law suit against the perpetrators 150 or 200 years after the deeds were committed. Actors of dislocations and of the taking of the land did – as a rule – not intend to physically annihilate a whole group as a group. The majority of the land-hungry farmers and squatters wished to solve a concrete problem that they had with their immediate indigenous neighbors in a pragmatic way.

My own point of departure from the post-liberal dogma refers to the concept of the event. Following Jacques Le Goff and Paul Veyne, I strongly believe that the dichotomy of structure and event represents a fallacy. French historiography since the 1970s went through a „return of the event” according to Pierre Nora.<sup>19</sup> The disappearance of up to 18 million Native Americans in North America between 1492 and 2000 constitutes neither an event, nor a structure, but it is a serial reiteration that resembles a wave-particle-duality. Settler imperialism oscillates in the same way, sometimes as evident massacres among the indigenous, sometimes as slow encroachments in a Social Ecological System that have delayed but long-lasting effects. Therefore I propose the oxymoron „intent without intent”<sup>20</sup> in order to describe the apparent shifts in settler imperialist practices, alterations that are the result of both changing registers of observation and apparently

contingent, in reality non-linear modulations of the same micro-practices. The departure therefore out of the explanatory dilemma between legalist intentionalism and structuralist longitudinal cuts in the research on indigenous expulsion has to focus in the concept of the event.

### What is Ecocide?

Contrary to a popular myth, the term ecocide was not coined in connection with the use of defoliants in the Vietnam War but goes back to a debate about the usefulness of pesticides in a commercial agricultural setting.<sup>21</sup> The discussion had been instigated by Rachel Carson's seminal study on DDT entitled „Silent Spring“, which had appeared in 1962 already.<sup>22</sup> A substance with the scientific name *sodium fluoracetate* that was used as rodent killer in the US and as „dingo bait“ in Australia was called „ecocide 1080“. The term was reappropriated, however, and became widely known after the publication of Frank Weisberg's important study on the effects of the Vietnam War on the ecology in 1970, even if it may have been coined in the same year by Arthur W. Galston, a biologist at Yale.<sup>23</sup> Galston was also the first scientist to attempt a definition of the concept of ecocide, making use of the definition of genocide, despite the fact that the US would only sign the UN Convention against genocide as late as 1988:

„After the end of World War II, and as a result of the Nuremberg trials, we justly condemned the willful destruction of an entire people and its culture, calling this crime against humanity *genocide*. It seems to me that the willful and permanent destruction of environment in which people can live in a manner of their own choosing ought similarly to be considered as a crime against humanity, to be designed by the term *ecocide*.”<sup>24</sup>

Let me, for the purpose of clarity, underline that even within the restricted applicability of the UN genocide convention the term genocide does not denote the actual and completed wiping out of a population. The convention expressively refers to acts that are committed *with the intent to destroy*, among other things *by inflicting on the group conditions of life calculated to bring about its physical destruction*.<sup>25</sup> Whereas this first attempt at a definition of the term is clearly limited by the initial uses of the term genocide (in reference to the holocaust) and the political setting (a conference against American war crimes in Vietnam) in which this definition took place, later definitions are more systematic and do not implicitly refer to previous war crimes or genocides. Needless to say that the expression „inflicting on the group conditions of life calculated to bring about its physical destruction“ is defined broadly enough to cover most attempts at ecocide as well.

„Ecocide is the heedless or deliberate destruction of the natural environment through various human activities that endanger human life. It is the extreme environmental degradation of the vital areas needed for the survival of indigenous communities. Ecocide might result from ‘externalities’ such as pollution, which destroy the ecosystem or from less-than-adequate safety procedures utilised by corporations, governments etc., operating on the indigenous lands themselves. This leads to a situation where the lands, the reproductive ability and the long-term health of the indigenous population are irreparably damaged.”<sup>26</sup>

This definition is remarkable for three reasons: Firstly, it stays away from all attempts to reduce it to the „willful destruction” of the environment by including its „heedless” obliteration by humans. Secondly, it makes use of the notion of the ecosystem, where the older definition talks about an „environment in which people can live in a manner of their own choosing.” Thirdly, the modern definition also emphasizes the impact of ecocides on the indigenous communities as societies that are most disposed to suffer from manipulations of the ecosystem.<sup>27</sup> This definition breathes the scent of older historiographical battles, especially the notion of the „ecological Indian”, a controversy about the question if indigenous populations had some kind of ecological awareness or whether they, like European settlers and colonialists, were also guilty of practicing ecocide.<sup>28</sup> In reference to Australia this controversy has basically settled down on the question of aboriginal fire-stick ecology and the overhunting hypotheses.<sup>29</sup>

## What is a SES?

Social ecological systems (SES) are systems that combine biotopes and humans in a complex system that tends to be stable and resilient, even when under duress.<sup>30</sup> Due to the complex nature of SESs, their development is hard to predict: SESs undergo change, but we also recognize that there are periods of perceived constancy. Social-ecological systems display high complexity with non-linear dynamics and feed-back cycles which makes it almost impossible to predict their changes.

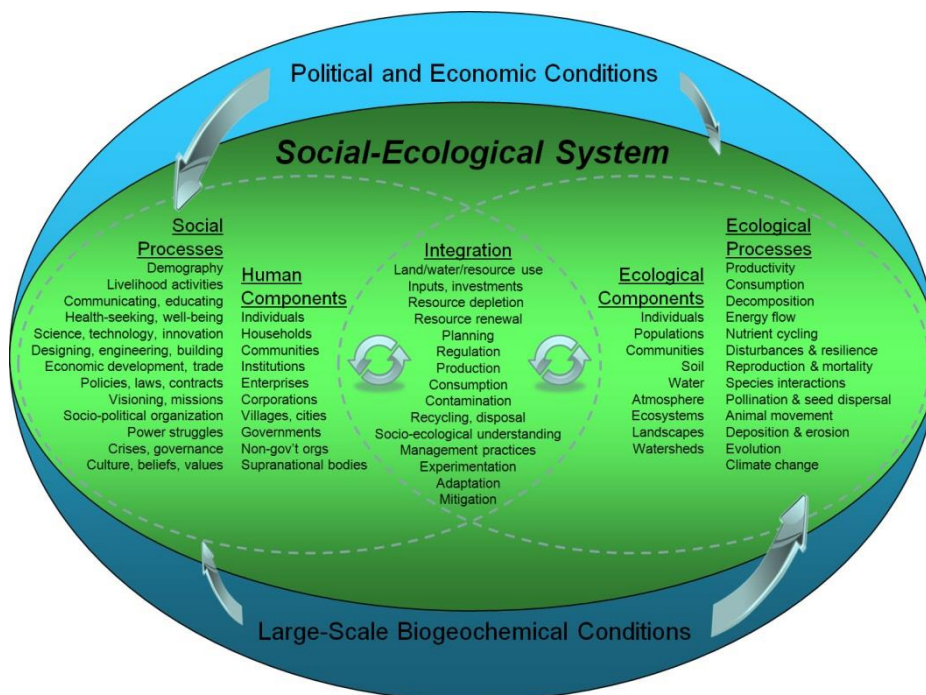
It is known that both social and ecological systems have self-reinforcing mechanisms that prevent shifts into other configurations. Complexity theory tries to describe these phases and the underlying mechanisms that give rise to them, and variables that affect these mechanisms. The most notable contribution to this body of theory from an ecological perspective is Crawford Stanley Holling’s metaphor of the adaptive cycle: If the system is stressed, it reacts by adaptation

until a state is reached in which resilience cannot compensate for the changes.<sup>31</sup> A systematic breakdown will take place which leads to eventual reorganization of a new SES.<sup>32</sup> The reason why an adaptive cycle was possible, even normal, is explained by Holling with the human capacity for learning. Holling is not unaware of the possibility of ecological collapse, to the contrary. He gives a number of examples which indicate that despite human interference with the intent to stabilize a SES these systems deteriorated or failed. Such systems include the collapse of fisheries or pest control which has allowed the emergence of chronic pest outbreaks.<sup>33</sup> I am convinced that learning processes of humans in Social Ecological Systems may contribute to adapting a system in a context of rapidly changing variables. Learning that contributes to an adaptive cycle, however, may go in both directions. It is way too optimistic to assume that learning will lead to an adaptive cycle that stabilizes the SES. It could, just as well, induce the systematic undermining of the very basics of life of another human group within the same SES. I do not assume that Australian indigenous groups were innocent of such destructive learning processes: Flannery gives examples of how Aborigines used the traditional fire-stick ecology as a weapon in the conflicts with white settlers.<sup>34</sup> If the Aborigines knew, so knew the settlers as early as 1848:

„Fire, grass, kangaroos, and human inhabitants, seem all dependent on each other for existence in Australia; for any one of these being wanting, the others could no longer continue. Fire is necessary to burn the grass, and form those open forests, in which we find the large forest-kangaroo; the native applies that fire to the grass at certain seasons, in order that a young green crop may subsequently spring up, and so attract and enable him to kill or take the kangaroo with nets. In summer, the burning of long grass also discloses vermin, birds' nests, etc., on which the females and children, who chiefly burn the grass, feed. But for this simple process, the Australian woods had probably contained as thick a jungle as those of New Zealand or America, instead of the open forests in which the white men now find grass for their cattle, to the exclusion of the kangaroo, which is well-known to forsake all those parts of the colony where cattle run. The intrusion therefore of cattle is by itself sufficient to produce the extirpation of the native race, by limiting their means of existence; and this must work such extensive changes in Australia as never entered into the contemplation of the local authorities. The squatters, it is true, have also been obliged to burn the old grass occasionally on their runs; but so little has this been understood by the Imperial Government that an order against the burning of the grass was once sent out, on the representations of a traveller in the south. The omission of the annual periodical burning by natives, of the grass and young saplings, has already produced in the open forest lands nearest to Sydney, thick forests of young trees, where, formerly, a man might gallop without impediment, and see whole miles before him. Kangaroos are no longer to be seen there; the grass is choked by underwood; neither are there natives to burn the grass, nor is fire longer desirable there amongst the fences of the settler. The occupation of the territory by the white race seems thus to involve, as an inevitable result, the extirpation of the aborigines; and it may well be pleaded, in extenuation of any adverse feelings these may show towards the white men, that these consequences, although so little considered by the intruders, must be obvious to the natives, with their usual acuteness, as soon as cattle enter on their territory. The foregoing journal affords instances of the habits of the natives in these respects. Silently, but surely, that extirpation of aborigines is going forward in grazing districts, even where protectors of aborigines have been most active; and in Van Diemen's Land,

the race has been extirpated, even before that of the kangaroos, under an agency still more destructive.”<sup>35</sup>

This source is remarkable for different reasons which may justify my extensive quotation. Mitchell is sympathetic to the Aborigines. He saw clearly that the culture of the indigenous population was at the verge of being extinct, but he did not exonerate himself by reference to some anonymous force of nature or the myth of the western superiority, but identified reasons for the decline of aboriginal cultures: The introduction of cattle. Mitchell is also aware of the long-term changes brought about by the interruption of the fire-stick ecology and the impact of these changes for the ecology not only for the indigenous populations but also for the settlers. Therefore the formula „adaptive cycles triggered by human learning” turns out to be too optimistic, if one considers the demise of indigenous societies. A „new SES”, emerging from an adaptive cycle very often meant a SES in which indigenous peoples are missing. Niklas Luhmann, however, among others, stressed the point that a social system may cease to exist, if the surrounding ecology stops to provide certain operations.<sup>36</sup>



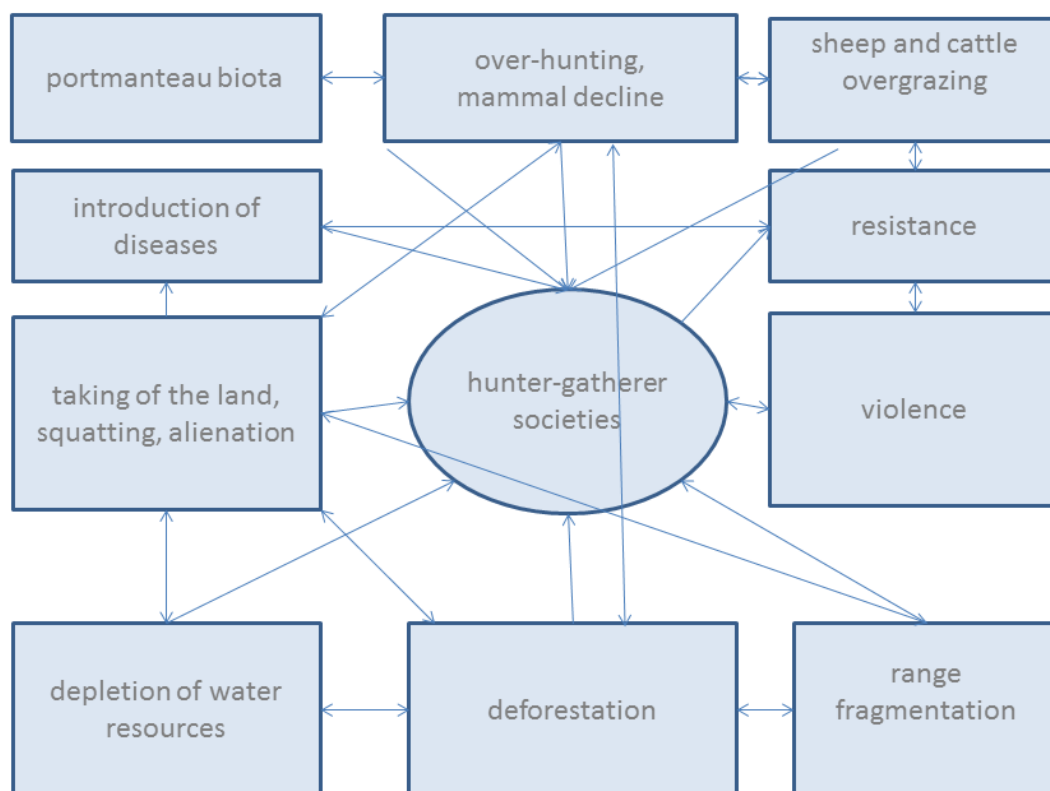
John Barkley Rosser distinguishes between a chaotic non-linear behavior of a system (which is sustainable although incomprehensible) and a catastrophic system behavior, which is not sustainable. „At the large scale where many processes and structures appear continuous and stable much of the time, important changes may occur discontinuously, perhaps as the result of



complex emergent processes or phase transitions bubbling up from below, perhaps as high level catastrophic bifurcations. In turn, chaotic oscillations can arise out of the fractal process of a cascade of period-doubling bifurcations<sup>37</sup> [the „flip”, N.F.], with discontinuities appearing at the bifurcation points and most dramatically at the accumulation point where chaos emerges.”<sup>38</sup>

Expressed in historical terms this means that an ecosystem like that of the indigenous population may collapse (or start an adaptive cycle) not only because of some major scheming by white settler („learning”) but because of a „minor” interference that happens beneath the threshold of visibility, as in the case of the prohibition of fires by the Imperial government.

In the following paragraphs I will mention some of the extrinsic factors that influenced the collapse of the Social Ecological System of hunter-gatherer societies in New South Wales under the combined impacts of commercial pastoralism between 1800 and 1870. It is my contention that there is not one single explanation for this collapse but that different factors have to be seen in connection and mutual reinforcement, as symbolized in the following graph:



## Hunter-Gatherers

Australia is subject to severe climatic variations which demand adaptive social organization. The Aboriginal hunter-gatherer system was characterized by high levels of social capital.<sup>39</sup> Religion, ecological understanding, and social organization were linked through myths that made the land sacred and humans, plants, animals, and the physical environment „of one essence.” Spiritual and economic connections linked a person to a specific part of the country, and groups of related individuals to particular stretches of country.

Pre-colonial Aboriginal social structures were decentralized and non-hierarchical, yet complex and differentiated in this mobile system. Resource use rights were conferred through stories and myths. Gathering was carried out by foraging units from more than one descent group, which allowed access to more than one territory, thereby increasing resilience to high spatial and temporal variability in resource abundance. Extensive networks and reciprocity made the society more itinerant and thus more resistant to famine. Peoples were recognized by differences in language and custom. However, this system, highly resilient as it was to spatio-temporal variation, was vulnerable to portmanteau biota and human invaders.

Australian Aborigines had developed a system of fire-stick farming making use of the vegetative cycles that occur after a bushfire.<sup>40</sup> It is not unlikely that the Australian indigenous population has altered the natural environment after they arrived on the continent, but in any case this change has been so slow that it allowed plants, animals and humans to survive and thrive in an arid and hot climate. This changed with the arrival of European settlers who not only took the land forcefully from its original owners, thus contributing to a rapid decline of the indigenous population, but also intervened vigorously in the ecology of the land they took over. For European settlers, the culture of Australian hunter-gatherers was characterized by the lack of structure. Settlers and early ethnologists alike reduced Aboriginal cultures to the life within the horde that roamed a smooth social and topographical space.<sup>41</sup>

Although tribal and clan structures were broken up by colonization, displacement, and deaths, Aboriginal culture on a large scale, and tribal affinities at local scales in those areas in which tribes survived, remained to provide a platform of bonding capital for the reorganization of the Aboriginal system.

In the pre-European era, levels of physical capital were low, and there was no monetary economy, but human and natural capitals were high. Simple technologies were enhanced by complex ecological knowledge. Frequent and patchy burns from fire-stick farming facilitated travel, assisted hunting, and changed the vegetation structure in favor of food plants for humans and

prey. The sources of resilience that enabled the persistence of the regime were: Social networks and knowledge adapted to exploit spatial and temporal heterogeneity across and from outside the region; knowledge of how to organize for the collective management of Aboriginal fire-stick farming; and a cultural memory that encompassed the knowledge, beliefs, and values passed on through religion.

It was the persistence of this memory that enabled the Aboriginal SES to survive colonization as a recognizable system. Yet, the system was unable to resist or adapt to British colonization. New diseases brought by the colonists, including smallpox, influenza, and measles, preceded the explorers and settlers and overwhelmed Aboriginal immune systems that had been isolated for millennia. Disease depleted the national Aboriginal population to a fraction of its precolonization level, which in turn depleted the social networks and knowledge, and reduced the labor for hunting and gathering. The collapse occurred when the Aboriginal peoples were displaced by the settlers who occupied New South Wales after the 1840s and cut them off from their natural capital. In addition, the natural capital on the pastoral stations was depleted because grazing reduced the diversity of the plants within grazing radius of water. The introduction of dams and groundwater bores gave livestock access to ecological communities whose biota had evolved under a regime of occasional grazing after rain. Extinction rates of native biota were very high. Grazing also reduced the frequency of fires by reducing fuel loads; as a result, the Aboriginal fire mosaic was lost, and with it the diversity of species and suitability of the vegetation structure for hunting and gathering.

There has been a recent scholarly debate about the meaning of the word genocide, which put into question the notion of intentionality. The older literature tended to emphasize the notion of intentionality as a conceptual necessity for genocide. If historians could not prove that atrocities had been committed to partially or completely kill or damage populations for racial, cultural, religious reasons, then whatever happened did not fit the definition of genocide – no matter how deplorable the event under consideration had been. Another defining feature of genocide was its fixity in terms of space and time: It had to be an event in the sense of a fixed period in time with a clear-cut beginning and a definable end, such as the holocaust or the Armenian genocide. More recent research has hinted at the fact that the Geneva genocide convention itself was the result of a political bargain between the Allies after WWII and that the original intention of the theoretician of genocide, Raphael Lemkin, had been to define genocide very broadly. Scholars argued for a definition that would include cultural genocide, the taking of the land of indigenous populations and a dismissal of the notion of intentionality which had to be proven before a court of law. It has also been argued that genocide could occur as a process rather than an event.<sup>42</sup> If genocides are not linked to the intent to kill a population and if they can acquire a processual

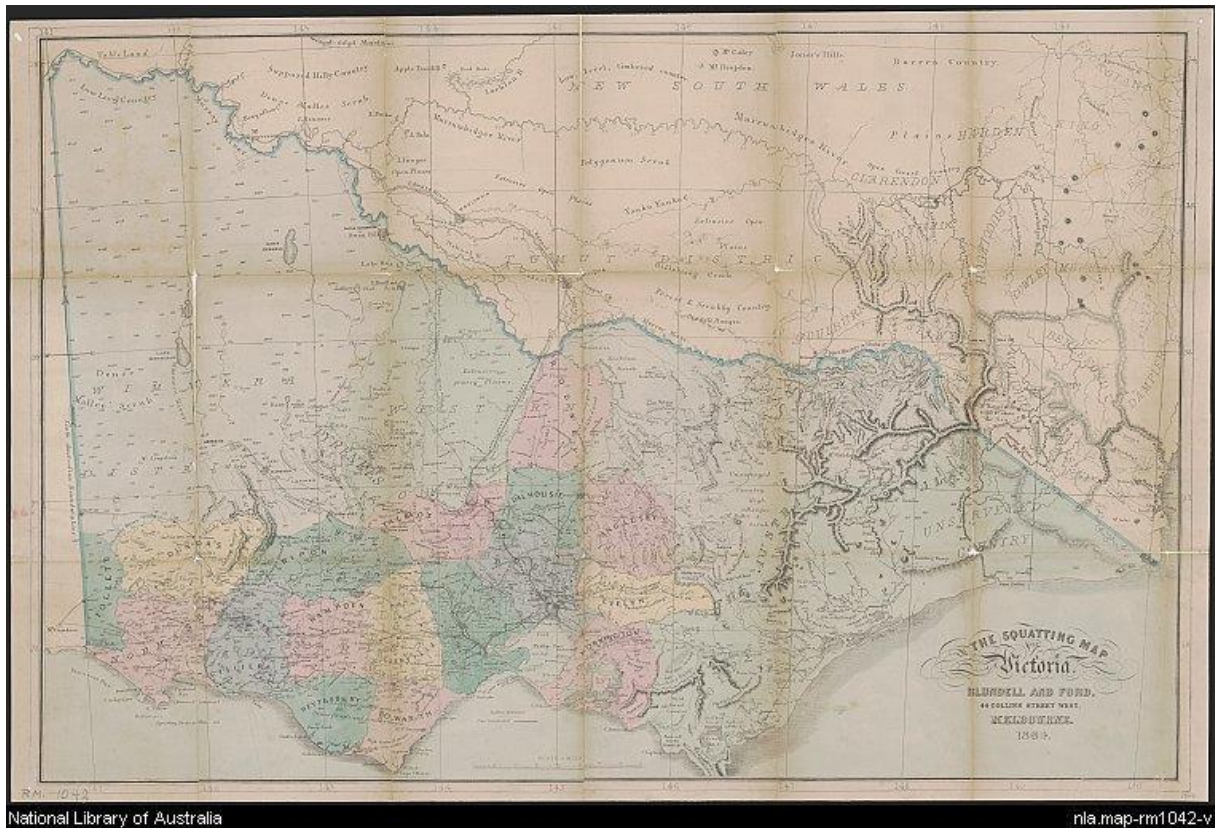
form, then the manipulation of the ecological resilience in settler colonies can have a genocidal effect on indigenous populations.

### Commercial Stock Farmers

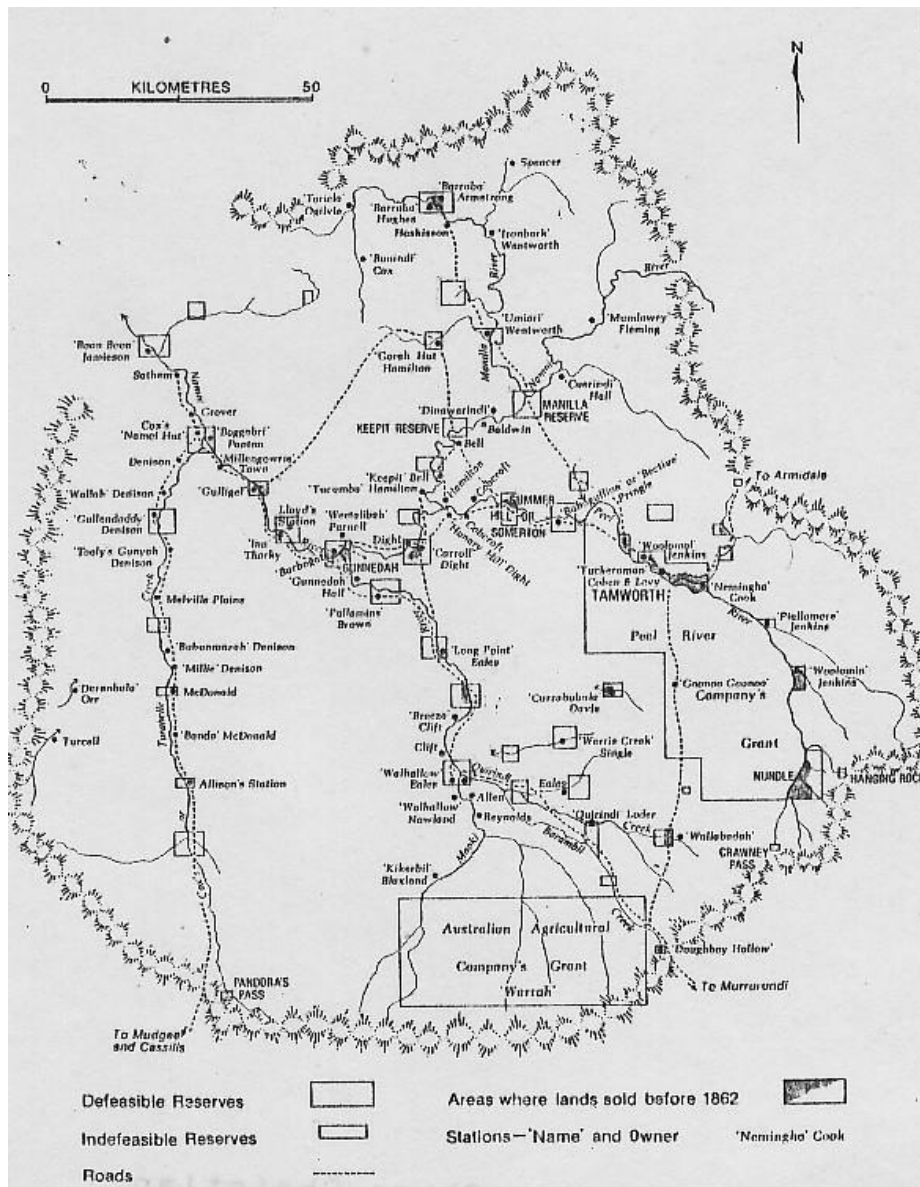
Socio-ecological systems combine biotopes and humans in a complex system that tends to be stable and resilient, even when under stress. Australia is subject to severe climatic variations which demanded adaptive social organization from indigenous societies. As a result pre-colonial Aboriginal social structures were complex, decentralized, non-hierarchical and highly mobile. Central to the Australian socio-ecological systems was the Aborigines' system of fire-stick farming that exploited the vegetative cycles that occur after a bushfire. Such systems, though highly resilient to spatio-temporal variation, were vulnerable to invaders.

The taking of the land was a multi-faceted process as well. There were the official auctions by the colonial land office, but very often land was alienated by squatting, the extra-legal possession of crown land.<sup>43</sup> The end of New South Wales as a penal colony produced a significant rise of squatting.<sup>44</sup> Starting in 1842 all land sales were organized by auction which met heavy opposition by the settler who wanted to have the right of preemption. As a consequence, squatting was made legal by the Australian Land Act (6 Vic 36) and Orders in Council in 1846.<sup>45</sup> In Victoria, which was cut out of the original territory of NSW in 1851, squatting became common as early as 1835. In New South Wales, squatting began near the southern coast on an area which had been set aside by the government for yeoman farmers. This zone was called „the Limits of Location” and only in this expanse settlers could acquire land from the government in a legal way.<sup>46</sup> The heroic age of squatting began in the 1830s after pastoralists disregarded the rules and took land outside the “limits of location”. In 1836 the government issued grazing licenses that were valid for one year and distributed land beyond the limits of location, thus terminating the protection of Aborigines by limiting the access to indigenous lands. This phase also constituted the highest impact on Aboriginal mortality. After 1847 grazing licenses were transformed into *leaseholds* which meant de facto a permanent ownership, which was again altered to *freeholds* in 1852, finally giving de jure full possession and ownership to previous squatters.<sup>47</sup>

In the Murray region land was taken up by settlers as early as 1835, culminating in a stampede for land in 1843. Some of the pastoral runs contained 80.000 acres, the equivalent of more than 320 square kilometers. This space contained more than two million sheep in 1863.<sup>48</sup>



Although Victoria was only founded in 1851, its lands had been distributed by 1861. Containing an overall surface of 55 million acres (or 225,000 square kilometers), 472,800 acres (or 1,913 square kilometers) of which had been legally sold before 1862, the bulk of the land (33,829,760 acres or 134,894 square kilometers) had been occupied by squatters.<sup>49</sup> As can be seen on the map, the taking of the land in the Liverpool Plains did not progress evenly but evolved along the main water arteries and included sites that could be defended militarily.



This meant that Australian stock farmers had established almost unconstrained opportunistic pastoralism during the initial colonization period of the rangelands and thereby destroyed the elaborate and elastic indigenous resource use system.<sup>50</sup> Early settlers in Australia tended to treat the environment as inimical to their plans to live and settle on the land. Since commercial stock farmers were interested in acquiring land with a dense layer of grass, anything that impeded the growth of grass or plants on which cattle could feed, was destroyed. Because of the aridity of the hinterland, vast surfaces had to be brought under control and commercial stock farms tended to be aligned with the major water supplies such as rivers and creeks. The ecological consequences of overstocking, drought, soil erosion and the invasion of exotic flora and fauna led to major ecological catastrophes that left their impact not only on the indigenous population but on the

European settlers as well. NSW boasted 55 million sheep in 1892. If one calculated between one and 5.9 hectares (in the Central Tablelands) of ground for one sheep, it is evident how much of the surface of 800.000 square kilometers had been converted into pasture.<sup>51</sup>

Some of the Australian plants stood in the way of cattle and sheep breeding, because they allegedly hindered the growth of weeds. Since Eucalyptus trees contain high levels of phenolics and terpenoids, they are toxic to most animals and humans and had to go. This had devastating effects on the Australian landscape, among other things salination.<sup>52</sup>

„Sheep eat men“, this sentence attributed to Thomas More, describes the situation in Australia at the beginning of the 19th century quite adequately.<sup>53</sup> Whereas the number of Aboriginal Peoples was dropping rapidly after the arrival of the First Fleet in 1788, the number of sheep rose just as dramatically. From estimated 500.000 to 750.000 Aborigines alive in 1788, less than 100.000 had survived in 1901.<sup>54</sup> Aboard the ships of the First Fleet had been 28 cape sheep. In 1830 there were more than a million sheep and more than 400.000 cattle in New South Wales. These animals were owned by roughly 70.000 white settlers, that is an average of 20 animals per white settler, women and children included.<sup>55</sup> If we estimate a maximum yield of four pounds/sheep and year, which is excessive and thus constitutes a conservative bias, the number of living sheep, then in 1836 there was close to a million sheep living in NSW and that number rose quickly to more than two million in 1840. By 1843, according to this estimation, more than three million sheep lived in the colony and the four million-threshold must have been reached in 1845.<sup>56</sup>

Table 1: Growth of wool production in NSW, 1827 to 1846<sup>57</sup>

Year	lbs.
1827	407116
1828	834343
1829	1005333
1830	899750
1831	1401284
1832	1515156
1833	1734203
1834	2246933
1835	3893927
1836	3693241
1837	4448796
1838	5749376
1839	7213584
1840	8610775
1841	8390540
1842	9428036
1843	12704899
1844	13542173
1845	17364734
1846	16479520

Historian Ben Kiernan assumes that the decimation of the Australian indigenous population was largely the effect of diseases that were brought inadvertently to Australia by European settlers.<sup>58</sup> He does not, however, call this genocide, even if he mandates that „multiple deliberate killings and a series of genocidal massacres” occurred during the early period of European settlement.<sup>59</sup> The British administration of Australia typically took an attitude that could be characterized as *laissez-faire*, leaving decisions regarding the Aborigines to colonial authorities and the settlers.<sup>60</sup> With the settlers pushing into the hinterland beyond the Blue Mountains after 1813, Sydney and the colony’s governor were out of reach.<sup>61</sup> In this region commercial stock farmers abounded. On the Bathurst frontier, the number of sheep and cattle rose exponentially once the limit on inland settlement was lifted by Governor Thomas Brisbane in 1821. „Between 1821 and 1825, the number of cattle and sheep in the Bathurst district increased from 33,733 to 113,973, while the amount of alienated land increased from 2520 acres to 91,636 acres (1010 ha to 36,650 ha).”<sup>62</sup> Kiernan summarizes: „The result was genocidal for many Aboriginal groups, in part or whole. The initial colonial experience that made such outcomes predictable, the policies that rarely emphasized their prevention, and the measures that denied Aborigines self-defense all indicate legal responsibility even on the part of passive officials.”<sup>63</sup>



The question whether one can call something non-genocidal if the result is genocidal is not only a question of logic. It is definitely a question of definition. Can a subject, an individual commit a murder who does not premeditate his/her action or intent to gravely harm another individual? The answer is a definite yes.<sup>64</sup> If an individual can become a murderer without the obvious and stated intent to kill a specific person, then a group of people can do the same.

The invasion of white settlers on the land of the indigenous population and the intended or unintended impact of their micro-practices made an outright genocide of the holocaust-type superfluous. The indigenous peoples „vanished” despite the lack of concentration camps, gassing devices, death marches and industrially organized mass killings.<sup>65</sup> „Frontier” did not mean a demarcation line between the white settlements and „wilderness“, it did not even mean a “contact zone”.<sup>66</sup> The use of “contact zone” conceals the spatial and chronological dimensions, which are the product of the contact zone – according to Evans. Evans therefore introduces the term “pre-frontier”, a period in time, which lays the foundation for what is operationalized as contact zone or frontier.<sup>67</sup>

### **Pre-Frontier and Portmanteau Biota**

Pre-Frontier is a contact zone which is temporally heteromorphic and topologically undelimited. Contact at the pre-frontier did not mean direct person-to-person contact between indigenous peoples and settlers, but also indirect contact via pathogens or portmanteau biota.<sup>68</sup> Portmanteau biota are species that have been carried or smuggled into the Australian flora and fauna and which tend to derail the established biota equilibrium.<sup>69</sup> 26 species of exotic mammals and 27 species of exotic birds have been introduced to Australia since 1788.<sup>70</sup> Some of the mammals developed into pests due to the absence of natural competitors, such as rabbits, foxes, asses, buffalos, camels, which all affected the foliage on the ground tremendously and changed the composition of the fauna to the detriment of the domestic species.<sup>71</sup> The importance of portmanteau biota in the history of imperialist expansion is underlined in the historiography of Hawai’i for instance.<sup>72</sup> Some of these biota were introduced inadvertently, some were brought into the island intentionally even before European intrusion.<sup>73</sup> In NSW, some exotic weeds had supplanted the indigenous plants within ten years after initial settlement by white stockmen. Mitchell notes the common occurrence of the for livestock highly unpalatable horehound (*Marrubium vulgare*) on the Bogan River as early as 1848. At the Riverina, originally an open woodland and shrub land of boree, saltbush and numerous annual chenopods, the introduction

of exotic plants took out the succulent chenopods and domestic grasses, then the saltbush. What remained were poisonous or prickly domestic increasers. Consequently, the proportion of bare ground increased and weeds moved in.<sup>74</sup>

The next step of contact could be the direct personal contact, very often untainted by mutual expectations of profit or yield. The next situation would involve the „taking-of-the-land“ by European settlers, mostly stock farmers producing for a local or global market. This could be achieved by purchase or squatting, both possible only after the expulsion of the indigenous population. Even though the colonial government tried to restrict access to land in the interior, there is ample evidence for the incursion of illegal settlers beyond the “limits of location”.<sup>75</sup>

Settlement or use for the breeding of sheep or cattle demanded a more direct and more permanent contact with Aborigines than mere expulsion. It also triggered the expulsion and ultimately the extinction of local species of marsupials. Geographical range overlap with sheep turned out to be the only persistent predictor of decline for domestic marsupials, meaning that the extrinsic factor of commercial pastoralism almost exclusively explains the decline and ultimate extinction of marsupials in Australia.<sup>76</sup>

Sometimes, manipulation of the local biota and direct intervention against Aborigines went hand in hand. Settlement or breeding brought about ecological changes which were the result of everyday practices, so-called micro-practices. Occasionally this taking-of-the-land had to be accompanied by military actions enacted by ordinary military forces or indigenous police. This kind of low-level warfare was expensive, especially since police forces in NSW had to be financed by the colony rather than the core in Great Britain.

According to Evans and if we consider the above-quoted source one can assume a synchronicity of various contact zones and an asynchronicity of different forms of contact within the same area. Contact zones in the vicinity of the bridgehead colonies such as Sydney could be multiple and synchronous: Diseases spread from here, personal contacts were initiated from here, settlers started from here on their scouting trips for good land into the interior, police and military units were stationed here.<sup>77</sup> Whereas everything seemed to start from the bridgehead, there were areas in which the Aborigines were ravaged by the smallpox even before they had set their sight on the first European. The smallpox epidemic of 1789 started in Sydney, spread from here to the North and the South and petered out only around 1791.<sup>78</sup> The pastoral „frontier“ of Queensland for example was less a contact zone but a fluctuating seam which crossed the country several times

like a reoccurring bushfire.<sup>79</sup> Some historians even define the pastoral frontier as the ultimate Australian type of frontier, because here aboriginal peoples developed a lasting contact with white settlers for the first time.<sup>80</sup> The introduction of large herds of portmanteau herbivore animals by white settlers influenced the ecology of the backcountry permanently. One of the main reasons for this change was the exhaustion of the water reserves in an area that had an instable system of long-term water storage at best.<sup>81</sup> The settlers decided where and for how long these animals remained on one run and they took an interest in the shaping and changing of the animals' ecosystem.<sup>82</sup>

### Overhunting

Part of the most invasive micro-practices was over-hunting.<sup>83</sup> Despite scientists having documented the disappearance and decline of once-common species, in the mid to late 19th century New South Wales passed laws protecting from over-hunting, but just for a few native bird and mammal species.<sup>84</sup> Contrary to a part of the research that assumes that there has been no systematic over-hunting, the available numbers for the period of 1883 to 1920 tell another story.<sup>85</sup>

Species Group	<i>N of Animals</i>	<i>Avg. Bounty in p.</i>	<i>Money Paid</i>
<b>Kangaroo Rats</b>	2.603.614	2,40	£26.036,14
<b>Pademelons</b>	799.390	1,70	£5.662,35
<b>Wallabies</b>	13.123.452	3,60	£196.851,78
<b>Walloos</b>	11.388	5,60	£265,72
<b>Kangaroos</b>	3.598.728	6,40	£95.966,08
<b>Bandicoots</b>	58.138	2,20	£532,93
<b>Bilbies</b>	1.271	38,60	£204,42
<b>Wombats</b>	18.186	22,40	£1.697,36
<b>Possums</b>	90.849	1,70	£643,51
<b>Marsupials</b>	2.889	6,00	£72,23
<b>Dingoes</b>	336.823	160,00	£224.548,67
<b>Total</b>	20.644.728		£552.481,18

The Australian mammal population has been in steady decline since 1788. In the Adelaide urban agglomeration about 50 percent of the mammal species have been lost since 1836.<sup>86</sup> This decline has been induced by the spatial limitations of the available ecosystems, through deforestation and

commercial agriculture, through the overgrazing by sheep and cattle, by the decline of the fire-stick ecology and through arson by pastoralists and foresters, but also by over-hunting.<sup>87</sup> Given the importance of the kangaroo for instance for the food intake of Aborigines, the over-hunting of this species constitutes an alteration of the *conditions of life [of Aborigines, N.F.] calculated to bring about [their] physical destruction*.<sup>88</sup> Over-hunting, resulting in the extinction of top predators such as the dingo, may also lead to extinction of other mammal fauna since the numbers of mid-level predators such as the cat or the fox may surge uncontrolled, leading to further loss of mammal species such as marsupials.<sup>89</sup>

### **Bark Ringing and Deforestation**

In English and North American horticulture bark-ringing (also called ring-barking or girdling) was promulgated as an enhancement of the fertility of trees and bushes. The New England Farmer wrote in 1831 (and this was repeated in Webster's Dictionary of 1848): „RINGING [...] In horticulture, the cutting out of a ring of bark for the purpose of making a branch fruitful, &c.”<sup>90</sup> As soon as 1845, however, there were voices that hinted at the detriment effect of ring barking for the affected trees.<sup>91</sup>

Early settlers in settler colonies such as the British colonies in North America, South Africa or Australia tended to treat the environment as inimical to their plans to live and settle on the land of former indigenous populations. Immigrant Guides and immigrant societies informed settlers how to control the land, the animals and plants existing on it and how to deal with first peoples that had lived on it. Since commercial stock farmers were interested in acquiring lands with a dense layer of grass on it, everything that stopped or impeded the growth of grass or plants appropriate for the feeding of cattle had to go. First among the plants that stood in the stock farmers way was the Australian eucalyptus tree.

The main technique for getting rid of the tree was bark-ringing that consisted of cutting away the bark near the bottom of the stem. As a result the fluids necessary for the tree would stop to flow and the tree would die off. After a while the dead trunks of these trees could be burned to the ground. The technique was widely used in Australia. See „The Ringing of Timber” in: The Sydney Mail, January 27<sup>th</sup>, 1883. The concept was so widely known and practiced that a poem, published in the Melbourne Argus in 1851, could refer to „bark-ringed trees, all standing bleak and leafless” without further explanation. The Illustrated Sydney News reported on an inland trip in 1871 with the words: „This seems only a belt of verdant foliage, as another hundred yards or so brings us to a more open part, many dead trees, numbers having been bark ringed, and very

many bleached with age and exposure to the weather.”<sup>92</sup> The ecological effects of bark-ringing were widespread and so severe that they brought affected areas close to ecological collapse. Even if the eucalyptus tree could never be beaten back completely, the ability of the soil’s upper crust to hold water was tremendously diminished. Strategic use of bark-ringing was also employed to drive away the indigenous population. For example, the Bogong Moth (*Agrotis infusa*) which was one of the most important sources of protein for aborigines in New South Wales depended for its existence on the eucalyptus tree. With the deforestation of large parts of New South Wales it became more difficult for the insect to find the giant eucalyptus tree (*eucalyptus regnans*) on which it fed, greatly reducing the amount of protein available to Aborigines. The ecological effects of bark-ringing were widespread and they were bordering on ecological collapse.

Historian Tim Bonyhady even speaks of a „mania for ringbarking”.<sup>93</sup>

In 1803 the colonial governor in Sydney, Philip Gidley King, issued a proclamation that made clear that debarking trees was perceived as a severe infringement on the property rights of the legal owners of land.<sup>94</sup> In the same year, the governor also distributed „general orders” which underline the disastrous effects of deforestation by girdling in NSW:

„General Orders. FROM the improvident method taken by the First Settlers on the Sides of the Hawkesbury and Creeks, in Cutting Down Timber and Cultivating the Banks, many Acres of Ground have been removed, Lands inundated, Houses, Stacks of Wheat, and Stock, washed away by former floods which might have been prevented in some measure if the Trees and other Native Plants had been suffered to remain ; and instead of cutting any down to have planted others to Bind the Soil of the Banks closer ; and rendered them less liable to be carried away by every inconsiderable Flood ; nor is this the only evil: The Public convenience having suffered by the numerous large Trees lying in the Stream, and fallen across, rendering water carriage on the Creek, almost impracticable, and in some Part of the Hawkesbury very dangerous. As several Settlers have been, and are now fixing the Lower Part of the Hawkesbury, along the Nepean, South Creek, and Georges River, in Situations where the above Evils may be presented. It is hereby directed that no Settler or other Person, to whom Ground is Granted or Leased on the Sides of any River or Creek where Timber is now growing, Do on any account Cut Down, or Destroy by barking or otherwise, any Tree or Shrub growing within Two Rods of the Edge of the Bank, except for an Opening, One Rod wide, to have Access to the Water.”<sup>95</sup>

Since the early 1820s, owners of runs warned against „trespassing by stock, setting fire to the grass, or burning the fence, which was put up at a considerable expence [sic], by barking the trees, and cutting down timber that is intended for building and other purpose”.<sup>96</sup> Girdling was also used in the early days to define the demarcation lines between various runs owned by different farmers.<sup>97</sup> As early as 1828, the new technique of getting rid of trees that stood in the way of large herds, was described in the Australian as being practiced in Canada as follows:

„During the first season, when the settler is struggling for necessaries, and when the object of primary importance is to raise by as speedy means as possible, a sufficient supply of food, few think of cutting down, much less of rooting out, the trees of their allotment. They content themselves with the process termed "girdling" that is, cutting, round the bark sufficiently deep to destroy the vitality of the tree. This, which is the work of a few minutes, prevents the pushing of the leaves and admits freely the sun and the air to the crop below.”<sup>98</sup> There can be no doubt that girdling or ring-barking was a widely known and applied technique of rapid deforestation in the early days of Australian settlement by farmers and stockmen.

The Clarence and Richmond Examiner and New England Advertiser, an Australian newspaper out of Grafton, NSW, wrote on November 17<sup>th</sup>, 1874 under the heading „Ring-Barking Timber”:

„The evident complaint the hon. member had to make was that the property of the State, the landed estate of the people, was deteriorated in consequence of the pastoral tenants, and, probably, others possessing grazing rights having adopted a system of ringbarking and thus destroying the timber growing on lands which they rented from the Government simply for grazing purposes. For the purpose of marking definitely the right of the pastoral tenant, 'the regulations' state 'Lessees of Crown Land are at liberty to cut and remove any timber, stone or other material required by them as tenants of their several lands, but shall have no right to sell the same.' The system of ringbarking as improvement of the natural herbage has been proved to be in such districts as this a fallacy, and that, on the contrary, it is most injurious, as depriving the winter feed of its natural protection from frost [...].”

Ring-barking also supposedly increased the tendency of the soil to turn to a swampy underground after rainfalls, because it deprived the earth of the leaves that protect the ground. The article concludes that the tenants had no right whatsoever to ring-bark trees because this constituted a destruction of government property.<sup>99</sup> Even if during the initial stages of white settlement in some areas the old-fashioned method of clearing the woods by ax and fire was employed, this method turned out to be very costly. The clearing of the land by cutting down the trees amounted to five pounds/acre, which could account for very high investments into the land. Consider a rather „small” run like that of Mundoona in NSW (today Victoria) which consisted in 1848 of 12.000 acres. Clearing that amount of surface could easily push up the cost of this land to 60.000 Pounds Sterling. If you think of a larger tract of land like Tallygaroopna, not far away, the clearing of the land by traditional means would have easily consumed 800.000 Pounds, very likely one of the reasons why this run was broken up and sold in smaller lots in the 1870s.<sup>100</sup> So ring-barking was foremost a question of financial investments. On large properties gangs of up to 70 underpaid Chinese workers would roam through the woodlands, cutting the bark of trees very close to the roots.<sup>101</sup> „Tree-murder by ring-barking devastated the country on a gigantic scale.”<sup>102</sup> In the Hunter Valley, a district north of Sydney, three quarters of the ground

were deforested in this way.<sup>105</sup> A source from West Australia gives the following information to the prospective farmers from Great Britain: „The cost per acre to clear ready for the plough?“  
„The clearing of trees, large and small, costs about £5 per acre, but many of the paddocks are cultivated while the trunks of the big gums are ringed and left standing.”<sup>104</sup>  
„The reckless ringing of trees (merely to obtain a little more grass) and stripping of bark would be brought within stringent laws, and many other losses be obviated.”<sup>105</sup>

Even if the tenacious eucalyptus tree could never be beaten back completely<sup>106</sup>, the ability to hold water in the upper crust of the soil was tremendously diminished. As a result, soil erosion took away a lot of the fertile crust.<sup>107</sup> The Hunter river valley was among the areas that were affected most. A Forestry Commission Report described the devastation of the valley as follows: “To-day [sic], eighty-three years after the first ringbarking for grazing improvement [...] and sixty years since this work has destroyed most of the forest cover on threequarters of the purchased land, [...] a scene of rural desolation remains.”<sup>108</sup>

Strategic use of bark-ringing was also applied to drive away the indigenous population by diminishing their ability to collect food. The Bogong Moth (*Agrotis infusa*) which was one of the most important sources of protein for aborigines in New South Wales depended for its existence on the eucalyptus tree. With the deforestation of large parts of New South Wales it became more difficult for the animal to find the giant eucalyptus tree (*eucalyptus regnans*) on which it fed which resulted in a reduced number of eatable animals.<sup>109</sup>

Crosby has labeled these techniques under the rubric of „ecological imperialism“. This is especially fitting when we consider deforestation.<sup>110</sup> As early as 1864 the effects of deforestation as a corollary of imperial advancement could clearly be described by George Perkins Marsh.<sup>111</sup> The micro-practice of bark-ringing, however, was already identified as disastrous for the water supply by colonial authorities in 1803.<sup>112</sup>

## **Pastoral Economy and Water Resources**

In order to measure the impact of the taking of the land by pastoralists, one should look at some numbers. Land grants were given rather cautiously in the beginning. The earliest grants had been given under the condition of residence, cultivation, reservation of timber as naval stores (which limited the possibility of ring-barking) and a quit-rent of sixpence per 30 acres for the emancipists (i.e. former convicts) and two shillings per 100 acres from settler after ten years.<sup>113</sup> Governor Brisbane withdrew the cultivation clause and in 1823 diminished the quit rent to 15

shillings per 100 acres. In 1824 the acquisition of land was further facilitated. Every immigrant could receive 2560 acres or four square miles and could buy additional lands. Landowners who would employ convicts on their land could be compensated for the purchase money of their land. Attempts to protect the interests of the Aborigines by limiting access to their lands taken by Governor Gipps led to fierce protest by stockmen and investors and the foundation of the Pastoral Association of New South Wales.<sup>114</sup>

Around 1830 most of New South Wales had been parceled up and given over to pastoralism, at least the areas with sufficient water supply. Parts of Victoria and Queensland were also being opened for livestock economy. As a rule commercial stock farmers followed the rivers into the interior and into regions where aboriginal resistance was expected to be minimal. In 1839 there were already 1.4 million sheep in the areas beyond the limits 1.4 million sheep. Governor George Gipps referred to pastoralism as inevitable and unstoppable.<sup>115</sup> The areas under control of small farmers and large squatters in NSW were indeed remarkable. The governor's report of 1846 observed: „Taking the four largest and the four smallest occupiers of land in each of the [...] 14 districts, we shall have 56 large and 56 small squatters, and it will be found that the 56 large occupiers hold collectively [...] 7,750,640 acres of land, and that the 56 small occupiers [...] hold 433,460 acres, so that the largest squatters have each [...] 138,404 acres; the small squatters only 7,740 acres [...]”<sup>116</sup> In the Liverpool Plains various land owners had appropriated amazing amounts of land under their control. William Charles Wentworth “[...] held 1,747,840 acres under eight licences. Nine persons in the same district held under nine licences 311,040 acres. Mr. Benjamin Boyd, Chairman of the Pastoral Association, appeared in ten returns for nearly every district [...] The four largest proprietors (in each district) throughout the colony held 7,750,640 acres. The four smallest (in each district) held 433,460.”<sup>117</sup> The Australian Agricultural Company, founded in 1824, held one million acres between Port Stephens and the Manning River, 549.000 of which were exchanged for lands in the Liverpool Plains.<sup>118</sup>

“Some parts of the colony are mere deserts, no number of acres of which will feed a sheep; in others, this may be done with little more than a single acre; in others, the stations cannot be occupied more than a few months at a time from want of water.”<sup>119</sup>

The large-scale presence of European cattle and sheep in the arid or semi-arid areas of Australia did not only constitute a major tweaking of the bio-diversity of this continent, but created a situation in which Aborigines themselves became an endangered group.<sup>120</sup> Because Aborigines had acquired a reputation of threatening the herds, stock farmers attacked them brutally, by denying them access to the land, to the water and to food. Farmers opened fire on Aborigines as



soon as they appeared on lands that had been bought or acquired by the settlers or had their employees beat them up. Heather Goodall has dubbed the taking of the land and the expulsion of the original owners a „system of terrorism”. She emphasized the implemental character of violence in this process and remarks: „In many regions this [the taking of the land] was accomplished by violence, which ranged from small clashes to calculated and systematic genocide [...] violence left such deep scars on the memories and imaginations of Aboriginal victims and of European perpetrators [...] that it must be regarded as the major weapon of dispossession by terror.”<sup>121</sup> Aborigines fought back, sometimes very efficiently, by driving away the cattle, killing it, using it for their own purpose or by attacking isolated farms and outposts directly.

Although Aboriginal people were involved in the pastoral industry from the start, conflicts occurred on a daily basis. In the Bathurst Plains, about 200 km northeast of Sydney, expanding pastoralists pushed back the local Wiradjuri. Until 1822 the Bathurst frontier was relatively peaceful, but then the Governor Thomas Brisbane made new land grants to European settlers. Between 1821 and 1825, cattle increased fourfold in the Bathurst district, and the amount of alienated land rose from a mere 2520 acres to 91.636 acres. The traditional land use pattern of the Wiradjuri was thus threatened. They began to fight back by raiding the cattle and supplanting their traditional foods by beef.<sup>122</sup> These raiding campaigns ended British expansion in the district for the time being.<sup>123</sup> Mitchell, one of the more reliable, even if unsympathetic sources on aboriginal life, reported in 1848:

„The line of demarcation between the squatter and the savage had been once much lower down, at Mudà, and even at Nyingan [...], but the incursions of the blacks had rendered these lower stations untenable, without more support than the Colonial government was able to afford. There, at least, the squatter is not only not the real discoverer of the country, but not even the occupier of what had been discovered. The map will illustrate how it happens that the colonists cannot keep their ground here from the marauding disposition of the savage tribes. The Darling is peopled more permanently by these natives, than perhaps any other part of Australia: affording as it does a more certain supply of food. It is only in seasons of very high flood that this food, the fish, cannot be got at, and that they are obliged to resort to the higher country at such seasons, between the Darling, the Lachlan, and the Bogan [three rivers in NSW, N.F.]. It also happens that the cattle of the squatter are most accessible from the soft state of the ground; the stockmen cannot even ride to protect them. The tribes from the Lachlan and Macquarie meet on these higher lands, and when tribes assemble they are generally ready for any mischief. The Bogan is particularly within their reach, and when wet seasons do occur the cattle of squatters must be very much at the mercy of the savages. The tribes from the Darling are extremely hostile, even to the more peaceably disposed hilltribes near the colony, and several stations have already been abandoned in consequence of the outrages of the aborigines from the Darling and Lachlan. Nothing is so likely to increase these evils as the precarious or temporary occupation of such a country. The supply of water must continue uncertain so long as there is no inducement from actual possession to form dams and by means of art to secure the full benefit of the natural supply. Hence it

is that half a million of acres, covered with the finest grass, have been abandoned, and even savages smile at the want of generalship by which they have been allowed to burn the white man's dairy station and stockyards on the banks of the Bogan."<sup>124</sup>

Almost as dramatic as the violence were the changes brought about by the depletion of the scarce water resources by huge herds of cattle and sheep. Even if there was water in abundance during some months of the year, the water reserves were precarious, since rivers and rivulets with a steady all-year supply were rare. Even the Murray, Australia's longest river, stopped running several times, beginning in 1850. This situation was aggravated by the stockowners practice of storing water in huge privately owned reservoirs during the driest months of the year. This was necessary because cattle consumes in the average 30 liters/day, sheep 10 liters/day plus the huge amount of water that is necessary for washing the sheep before shearing them – as it was the standard procedure before 1870.<sup>125</sup> Or put in terms of water-use, 55 million sheep (1892) would consume 550 million liters of drinking water/day, the equivalent of 5.500.000 cubic meters. Even if one concedes that there were occasional floods in NSW, the amount of drinking water used for livestock and spoiled by washing sheep in the river on a daily basis is astounding.

After a herd of cattle or sheep had been driven into an area, very often water resources in this region were depleted. Some sources refer to ponds that were as dry as a market place after a flock had visited them. On their bottom fish were jumping up and down, gasping for air. Needless to mention that the banks of ponds and rivers which had been used to water the animals were completely devastated by their hoofs. Areas in which domestic weeds could grow also diminished as a consequence.<sup>126</sup>

## Summary

Non-linear systems defy easy explanations. There is no single controlling factor, since the system is kept alive by feed-back loops and couplings. It was my intent to show the interrelationship of different factors within the SES of the Aborigines in NSW that might help to explain the sudden and dramatic loss of 75 percent of the aboriginal population in the period between 1788 and 1901. I suggest that white settlement, the introduction of European diseases combined with the insertion of sheep, cattle and portmanteau biota, the (often violent) alienation of aboriginal lands, the deforestation, decimation of domestic flora and fauna taken together have caused a catastrophic demise of the domestic SES. Instead of a self-sustaining and largely elastic and resilient system that easily supported a hunter-gatherer system white commercial pastoralists installed a settler-imperialist economy that was connected with a global market. The result was an ecocide, if not a genocide, even according to a traditional definition.

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<sup>1</sup> Andrew J. Ash and John G. McIvor, 'How Season of Grazing and Herbivore Selectivity Influence Monsoon Tall-Grass Communities of Northern Australia', *Journal of Vegetation Science* 9, no. 1 (February 1, 1998): 123-32.

<sup>2</sup> Kimberly A. With and Thomas O. Crist, 'Critical Thresholds in Species' Responses to Landscape Structure', *Ecology* 76, no. 8 (December 1, 1995): 2446-59. Richard J. Hobbs, 'Synergisms among Habitat Fragmentation, Livestock Grazing, and Biotic Invasions in Southwestern Australia', *Conservation Biology* 15, no. 6 (December 1, 2001): 1522-8.

<sup>3</sup> Kenneth Good, 'Settler Colonialism in Rhodesia', *African Affairs* 73, no. 290 (January 1, 1974): 10-36; Kenneth Good, 'Settler Colonialism: Economic Development and Class Formation', *The Journal of Modern African Studies* 14, no. 4 (December 1, 1976): 597-620.

<sup>4</sup> Karl Marx, *Das Kapital*, 3 vols., vol. I, in *MEW*, vol. 23: 475.

<sup>5</sup> Majid Tehranian, 'Pancapitalism and Migration in Historical Perspective', *International Political Science Review* 19, no.3, (1998): 289-304.

<sup>6</sup> Joshua Nkomo, 'Southern Rhodesia: Apartheid Country', in *Africa Speaks*, ed. James Duffy and Robert A. Manners (Princeton, NJ: Van Nostrand, 1961), 130-43, 143; Emmanuel N. Obiechina, *Language and Theme: Essays on African Literature* (Washington, DC: Howard University Press, 1990), 172. See also Mitchell Silver, *A Philosophy of Secular Jewish Identity and Education* (Amherst, MA: University of Massachusetts Press, 1998), 127; John R. McNeill, 'Islands in the Rim: Ecology and History in and around the Pacific, 1521-1996', in *Pacific Centuries: Pacific and Pacific Rim History since the Sixteenth Century*, ed. Dennis O. Flynn, Lionel Frost, and A. J. H. Lanham (London: Routledge, 1999), 70-84, 78.

<sup>7</sup> Regarding dual occupation see Heather Goodall, *Invasion to Embassy: Land in Aboriginal Politics in New South Wales, 1770-1972* (St. Edwards, NSW, Australia: Allen & Unwin in association with Black Books, 1996), 66-78.

<sup>8</sup> Ingeborg Bachmann, „Todesarten“-Projekt, 4 vols. in 5, vol. 2 (München: Piper, 1995), 230. „The Australian native can withstand all the reverses of nature, fiendish droughts and sweeping floods, horrors of thirst and enforced starvation-but he cannot withstand civilization.“ Daisy Bates, *The Passing of the Aborigines: A Lifetime Spent among the Natives of Australia, 1939*, Gutenberg Project, 0400661.txt.

<sup>9</sup> Georg Gerland, *Ueber das Aussterben der Naturvoelker* (Leipzig: Friedrich Fleischer, 1868).

<sup>10</sup> Dirk A. Moses, 'An Antipodean Genocide? The Origins of the Genocidal Moment in the Colonization of Australia', *Journal of Genocide Research* 2, no 1. (2000): 89-106.

<sup>11</sup> Frank Robert Chalk and Kurt Jonassohn, *The History and Sociology of Genocide: Analyses and Case Studies* (New Haven, CT, 1990), 8-9. Ward Churchill, *A Little Matter of Genocide: Holocaust and Denial in the Americas 1492 to the Present* (San Francisco, CA, 1997), 71. See also Ann Curthoys and John Docker, 'Introduction - Genocide: Definitions, Questions, Settler-Colonies', *Aboriginal History* 25, no.1 (2001): 1-15.

<sup>12</sup> Curthoys and Docker, 'Introduction', 10.

<sup>13</sup> Gilles Deleuze, 'Les cours de Gilles Deleuze' (lecture, April 7, 1987), « Logique de l'événement »,

<http://www.webdeleuze.com/php/texte.php?cle=147&groupe=Leibniz&langue=1> (accessed March 14, 2008). See also Mirjam Schaub, *Gilles Deleuze im Wunderland: Zeit- als Ereignisphilosophie* (München: Wilhelm Fink, 2003), 116-23. On the „narrow“ definition of genocide by the UN see Dan Stone, 'Raphael Lemkin on the Holocaust', *Journal of Genocide Research* 7, no. 4 (2005), 539-50.

<sup>14</sup> Cécile Tournaye, 'Genocidal Intent before the ICTY', *International and Comparative Law Quarterly* 52, no. 2 (2003): 447-62, XXX; A. Dirk Moses, 'Conceptual Blockages and Definitional

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Dilemmas in the 'Racial Century': Genocides of Indigenous Peoples and the Holocaust', in *Colonialism and Genocide*, ed. A. Dirk Moses and Dan Stone (Abingdon: Routledge, 2007), 148-80, 159-64.

<sup>15</sup> Ben Kiernan, *Blood and Soil: A World History of Genocide and Extermination from Sparta to Darfur*, (New Haven, CT, London: Yale University Press, 2007), 10-12. Regarding „genocidal intent”: Ibid., 17-20.

<sup>16</sup> Adam Jones, 'Why Gendercide? Why Root-and Branch? A Comparison of the Vendée Uprising of 1793–94 and the Bosnian War of the 1990s', *Journal of Genocide Studies* 8, no. 1 (2006), 9-25, 10.

<sup>17</sup> Günter Lewy, 'Can There Be Genocide Without the Intent to Commit Genocide?', *Journal of Genocide Research* 9, no. 4 (December 2007): 661–74, Conclusion.

<sup>18</sup> „History's most extreme case of genocide is clearly unique in several ways. A state-sponsored attempt at total extermination by industrialized murder of unarmed millions has no parallel before or since.” Kiernan, *Blood and Soil*, 454; Zygmunt Bauman, *Dialektik der Ordnung: Die Moderne und der Holocaust* (Hamburg, 1992), 103 f.

<sup>19</sup> Pierre Nora, 'Le Retour de l'événement', in *Faire de l'histoire*, ed. Jacques Le Goff and Pierre Nora, 3 vols., vol. 1 (Paris: Gallimard, 1974), 210-27.

<sup>20</sup> John B. Quigley, *The Genocide Convention: An International Law Analysis* (Aldershot, England, Burlington, VT: Ashgate Pub, 2006), 111-9. See also Jean Baudrillard and Enrique Valiente Noailles, *Exiles from Dialogue* (Cambridge: Polity, 2007), 127. Michel Foucault, *The History of Sexuality*, 3 vols., vol. 1 (New York: Pantheon Books, 1978), 94.

<sup>21</sup> Frank E. Egler, book review, *Ecology* 47, no. 6 (November 1, 1966): 1077-84, 1078; Frank E. Egler, book review, *American Scientist* 56, no.4 (December 1, 1968): 484A-6A; David Zierler, *The Invention of Ecocide: Agent Orange, Vietnam, and the Scientists Who Changed the Way We Think about the Environment* (Athens, GA: University of Georgia Press, 2011), 14.

<sup>22</sup> Clarence L. Barnhart, 'Of Matters Lexicographical: Keeping a Record of New English, 1963-1972', *American Speech* 45, no.1/2 (April 1, 1970): 98-107, 102; Rachel Carson, *Silent Spring* (Boston, Cambridge, MA: Houghton Mifflin. Riverside Press, 1962).

<sup>23</sup> Barry Weisberg, *Ecocide in Indochina: The Ecology of War* (San Francisco: Canfield Press, 1970). Zierler, *The Invention of Ecocide*, 15, 94 f; Fred Wilcox, *Scorched Earth: Legacies of Chemical Warfare in Vietnam* (New York: Seven Stories Press, 2011); Petronella J. Ytsma, *Legacy of an Ecocide: Agent Orange Aftermath* (Minneapolis, MN: Aliform Pub, 2009).

<sup>24</sup> John Robert McNeill and Corinna R. Unger, *Environmental Histories of the Cold War* (Washington, DC, New York: Cambridge University Press, 2010), 237.

<sup>25</sup> „The Convention defines genocide as any of a number of acts committed with the intent to destroy, in whole or in part, a national, ethnic, racial or religious group: killing members of the group; causing serious bodily or mental harm to members of the group; deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part; imposing measures intended to prevent births within the group, and forcibly transferring children of the group to another group.” See United Nations, Article 2, Convention on the Prevention and Punishment of the Crime of Genocide, <http://www2.ohchr.org/english/law/genocide.htm>, accessed March 9, 2012.

<sup>26</sup> Oscar Mwangi, 'Hydropolitics, Ecocide and Human Security in Lesotho: A Case Study of the Lesotho Highlands Water Project', *Journal of Southern African Studies* 33, no. 1 (March 1, 2007): 3-17, 4.

<sup>27</sup> There is a school in the study of ecosystems that emphasizes resilience rather than collapse. See for instance Patricia Ann McAnany and Norman Yoffee, *Questioning Collapse: Human Resilience, Ecological Vulnerability, and the Aftermath of Empire* (Cambridge, New York: Cambridge University Press, 2010).

<sup>28</sup> Donald A. Grinde and Bruce E. Johansen, *Ecocide of Native America: Environmental Destruction of Indian Lands and Peoples* (Sante Fe, NM: Clear Light, 1995); Shepard Krech, *The Ecological Indian: Myth and History* (New York: W.W. Norton & Company, 1999); Michael Eugene Harkin and Da-

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vid Rich Lewis, *Native Americans and the Environment: Perspectives on the Ecological Indian* (Lincoln: University of Nebraska Press, 2007); Paul Nadasdy, 'Transcending the Debate over the Ecologically Noble Indian: Indigenous Peoples and Environmentalism', *Ethnohistory* 52, no. 2 (April 1, 2005): 291-331.

<sup>29</sup> Tim F. Flannery, *The Future Eaters: An Ecological History of the Australasian Lands and People* (New York: Grove Press, 2002), 217-36; Ian Abbott, 'Aboriginal Man as an Exterminator of Wallaby and Kangaroo Populations on Islands Round Australia', *Oecologia* 44, no. 3 (January 1, 1980): 347-54; Douglas W. Bird, Rebecca Bliege Bird, and Christopher H. Parker, 'Aboriginal Burning Regimes and Hunting Strategies in Australia's Western Desert', *Human Ecology* 33, no. 4 (August 1, 2005): 443-64; Karl W. Butzer and David M. Helgren, 'Livestock, Land Cover, and Environmental History: The Tablelands of New South Wales, Australia, 1820-1920', *Annals of the Association of American Geographers* 95, no. 1 (March 1, 2005): 80-111; David Choquenot and D. M. J. S. Bowman, 'Marsupial Megafauna, Aborigines and the Overkill Hypothesis: Application of Predator-Prey Models to the Question of Pleistocene Extinction in Australia', *Global Ecology and Biogeography Letters* 7, no. 3 (May 1, 1998): 167-80; Beth Gott, 'Aboriginal Fire Management in South-Eastern Australia: Aims and Frequency', *Journal of Biogeography* 32, no. 7 (July 1, 2005): 1203-8; Lesley Head and Richard Fullagar, 'Hunter-Gatherer Archaeology and Pastoral Contact: Perspectives from the Northwest Northern Territory', *Australia. World Archaeology* 28, no. 3 (February 1, 1997): 418-28; Henry T. Lewis, 'Ecological and Technological Knowledge of Fire: Aborigines versus Park Rangers in Northern Australia', *American Anthropologist* 91, no. 4 (December 1, 1989): 940-61; Helen Verran, 'A Postcolonial Moment in Science Studies: Alternative Firing Regimes of Environmental Scientists and Aboriginal Landowners', *Social Studies of Science* 32, no. 5/6 (October 1, 2002): 729-62.

<sup>30</sup> D. Scott Slocombe, 'History and Environmental Messes: A Nonequilibrium Systems View', *Environmental Review* 13, no. 3/4 (1989): 1-13. See also Niklas Luhmann's contributions to the relationship between society and ecology. Roland Lippuner, 'Kopplung, Steuerung, Differenzierung: Zur Geographie Sozialer Systeme (Coupling, Steering, Differentiation. The Geography of Social Systems)', *Erdkunde* 61, no. 2 (April 1, 2007): 174-85.

<sup>31</sup> Crawford Stanley Holling, Lance Gunderson, and D. Ludwig, 'In Quest of a Theory of Adaptive Change', in *Panarchy: Understanding Transformations in Human and Natural Systems*, ed. Lance H. Gunderson and C. S. Holling (Washington, DC: Island Press, 2002), 3-24.

<sup>32</sup> Nick Abel, David H. M. Cumming, and John M. Anderies, 'Collapse and Reorganization in Social-Ecological Systems: Questions, Some Ideas, and Policy Implications', *Ecology and Society* 11, no. 1, art. 17, <http://www.ecologyandsociety.org/vol11/iss1/art17/> (accessed December 13, 2013); Gunderson and Holling, *Panarchy*.

<sup>33</sup> Gunderson and Holling, *Panarchy*, 5 f.

<sup>34</sup> Flannery, *The Future Eaters*, 222 f.

<sup>35</sup> Thomas Livingstone Mitchell, *Journal of an Expedition into the Interior of Tropical Australia* (London: Longman, Brown, Green and Longmans, 1848), 412-4.

<sup>36</sup> Lippuner, *Kopplung, Steuerung, Differenzierung*, 177.

<sup>37</sup> Ilya Prigogine, 'Time, Structure, and Fluctuations', *Science*, New Series 201, no. 4358 (September 1, 1978), 777-85.

<sup>38</sup> John Barkley Rosser, Jr., *From Catastrophe to Chaos: A General Theory of Economic Discontinuities*, vol. 1, *Mathematics, Microeconomics, Macroeconomics, and Finance* (Boston, Dordrecht: Kluwer Academic Publishers, 2000), 60.

<sup>39</sup> Robert I. Rotberg and Gene A. Brucker, *Patterns of Social Capital Stability and Change in Historical Perspective* (Cambridge, UK, New York: Cambridge University Press, 2001); Anthony Bebbington, *The Search for Empowerment. Social Capital as Idea and Practice at the World Bank* (Bloomfield, CT: Kumarian Press, 2006).

<sup>40</sup> Elizabeth A. Wilman, 'An Economic Model of Aboriginal Fire-Stick Farming' (working papers, Department of Economics, University of Calgary, December 10, 2001).

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- <sup>41</sup> Norbert Finzsch, 'Der glatte Raum der Nomaden; Indigene Outopia, indigene Heterotopia am Beispiel Australiens', in *"Rasse" und Raum: Dynamiken, Formationen und Transformationen anthropologischen Wissens im Raum*, ed. Claudia Bruns (Wiesbaden: Dr. Ludwig Reichert 2014). (forthcoming)
- <sup>42</sup> Norbert Finzsch, 'The Aborigines ... Were Never Annihilated, and Still They Are Becoming Extinct': Settler Imperialism and Genocide in Nineteenth-Century America and Australia', in *Empire, Colony, Genocide: Conquest, Occupation, and Subaltern Resistance in World History*, ed. A. Dirk Moses (New York: Berghahn Books, 2008), 253-70; Norbert Finzsch, 'If It Looks Like a Duck, If It Walks Like a Duck, If It Quacks Like a Duck: Comment on 'Can There Be Genocide Without the Intent to Commit Genocide?' by Gunter Lewy', *Journal of Genocide Research* 10, no. 1 (2008): 119-26; Norbert Finzsch, '[...] Extirpate or Remove 'That Vermin': Genocide, Biological Warfare, and Settler Imperialism in the Eighteenth and Early Nineteenth Century', *Journal of Genocide Research* 10, no. 2 (2008): 215-32.
- <sup>43</sup> Samuel Butler, *The Hand-Book for Australian Emigrants: Being a Descriptive History of Australia and Containing an Account of the Climate, Soil, and Natural Productions of New South Wales, South Australia, and Swan River Settlement* (Glasgow: W.R. M'Phun, 1839), 139. Butler's allegations seem very doubtful. See H. J. Scott, *South Australia in 1887: A Handbook for the Adelaide Jubilee International Exhibition* (Adelaide: E. Spiller, Govt. Printer, 1887), 25.
- <sup>44</sup> Stephen H. Roberts, *The Squatting Age in Australia, 1835-1847* (Melbourne: Melbourne University Press in association with Oxford University Press, 1935).
- <sup>45</sup> David Clune and Ken Turner, *The Governors of New South Wales 1788-2010* (Annandale, NSW: The Federation Press, 2009), 193 f; Alastair Davidson, *The Invisible State: The Formation of the Australian State 1788-1901* (Studies in Australian History, Cambridge, Melbourne: Cambridge University Press, 1991), 73; Great Britain. Parliament. *Further Papers Relative to the Alterations in the Constitutions of the Australian Colonies* (London: HMSO; 1853), 98.
- <sup>46</sup> Gretchen Poiner and Sybil Jack, *Limits of Location: Creating a Colony* (Roseville, NSW: NSW Chapter, Independent Scholars Association of Australia Inc; 2007).
- <sup>47</sup> John C. Weaver, 'Beyond the Fatal Shore: Pastoral Squatting and the Occupation of Australia, 1826 to 1852', *The American Historical Review* 101, no. 4 (1996): 981-1007, 984 f.
- <sup>48</sup> William Westgarth, *The Colony of Victoria: Its History, Commerce and Gold Mining; Its Social and Political Institutions Down to the End of 1863; with Remarks, Incidental and Comparative, Upon the Other Australian Colonies* (London: Sampson Low, Son, and Marston, 1864), 272.
- <sup>49</sup> Westgarth, *The Colony of Victoria*, XIX.
- <sup>50</sup> Ryan R. J. McAllister et al., 'Pastoralists' Responses to Variation of Rangeland Resources in Time and Space', *Ecological Applications* 16, no. 2 (April 1, 2006): 572-83, 573.
- <sup>51</sup> Butzer and Helgren, 'Livestock, Land Cover, and Environmental History', 80-111, 103 f.
- <sup>52</sup> R. Naidu, M. E. Sumner, and P. Rengasamy, *Australian Sodic Soils: Distribution, Properties, and Management* (East Melbourne, Vic., Australia: CSIRO Publications, 1995).
- <sup>53</sup> Vandana Shiva, *Earth Democracy: Justice, Sustainability, and Peace* (Cambridge, MA: South End Press, 2005), 19.
- <sup>54</sup> Kiernan, *Blood and Soil*, 250.
- <sup>55</sup> Michael Pearson et al., *Pastoral Australia: Fortunes, Failures and Hard Yakka: A Historical Overview 1788-1967* (Collingwood, Vic.: CSIRO Publishing in association with the Dept. of the Environment, Water, Heritage and the Arts and the Australian Heritage Council, 2010), 3.
- <sup>56</sup> In 1852 there were 10.053.641 sheep and 1.752.852 „horned cattle” in New South Wales. John Capper, *Philip's Emigrant Guide to Australia* (Liverpool: George Philip and Son, 1852), 23.
- <sup>57</sup> Source: J. T. Danson, 'Some Particulars of the Commercial Progress of the Colonial Dependencies of the United Kingdom, during the Twenty Years, 1827-46', *Journal of the Statistical Society of London* 12, no. 4 (November 1, 1849): 349-439, 404.
- <sup>58</sup> See also Jeffrey Grey, *A Military History of Australia* (Port Melbourne, VIC: Cambridge University Press, 2008), 31 f.
- <sup>59</sup> Kiernan, *Blood and Soil*, 250.

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<sup>61</sup> Allan Cunningham, 'Brief View of the Progress of Interior Discovery in New South Wales', *Journal of the Royal Geographical Society of London* (January 1, 1832): 99-132.

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<sup>63</sup> Kiernan, *Blood and Soil*, 252.

<sup>64</sup> Norbert Finzsch, 'If it looks like a duck', 119-126.

<sup>65</sup> Norbert Finzsch, '„[...] der kupferfarbige Mensch [verträgt] die Verbreitung europäischer Civilisation nicht in seiner Nähe“: Der Topos der Dying Race in den USA, Australien und Deutschland' (forthcoming).

<sup>66</sup> Mary Louise Pratt, 'Arts of the Contact Zone', in *Mass Culture and Everyday Life*, ed. Peter Gibian (New York: Routledge, 1997), 61-72, 63. Bruce Pennay, *From Colonial to State Border: A Federation History of the Social Construction of the Border between New South Wales and Victoria as a Frontier, Barrier and Contact Zone* (Albury, NSW: Johnstone Centre, Charles Sturt University, 2001); Mark Hall and Mary Rosner, 'Pratt and Prattfalls: Revisioning Contact Zones', in *Crossing Borderlands: Composition and Postcolonial Studies*, ed. Andrea A. Lunsford and Lahoucine Ouzgane (Pittsburgh Series in Composition, Literacy, and Culture. Pittsburgh, PA: University of Pittsburgh Press, 2004), 95-109.

<sup>67</sup> Julie Evans, 'Beyond the Frontier: Possibilities and Precariousness along Australia's Southern Coast', in *Colonial Frontiers: Indigenous-European Encounters in Settler Societies. Studies in Imperialism*, ed. Lynette Russell (Manchester: Manchester University Press, 2001), 151-72.

<sup>68</sup> Norbert Finzsch, 'Die Frühgeschichte der biologischen Kriegsführung im 18. Jahrhundert: Nordamerika und Australien im Vergleich', *Medizin, Gesellschaft und Geschichte* 22 (2003): 9-29.

<sup>69</sup> Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (Cambridge; New York: Cambridge University Press, 2004), 89, 91, 162 f., 270 f., 278, 287.

<sup>70</sup> Graham P. Hall and Kate P. Gill, 'Management of Wild Deer in Australia', *The Journal of Wildlife Management* 69, no. 3 (2005): 837-44, 837.

<sup>71</sup> Australian State of the Environment Committee. *Australia State of the Environment 2001: Independent Report to the Commonwealth Minister for the Environment and Heritage*, vol. 4 (Collingwood, Vic.: CSIRO Publishing, 2001), 106.

<sup>72</sup> Patrick Vinton Kirch and Marshall David Sahlins, *Anahulu: The Anthropology of History in the Kingdom of Hawaii*, 2 vols., vol. 2: *The Archeology of History* (Chicago: University of Chicago Press, 1992), 168. On portmanteau biota, see Crosby, who first introduced this concept: Crosby, *Ecological Imperialism*, 89-91, pertaining to Australia 161-4.

<sup>73</sup> Patrick Vinton Kirch, 'Human Impacts, Pre-European', in *Encyclopedia of Islands*, ed. Rosemary G. Gillespie and D. A. Clague (Berkeley, CA: University of California Press, 2009), 414-8, 415.

<sup>74</sup> P. B. Mitchell, 'Historical Perspectives on Some Vegetation and Soil Changes in Semi-Arid New South Wales', *Vegetatio* 91, no. 1/2 (January 31, 1991):167-82, 172 f.

<sup>75</sup> S. J. Gale and R. J. Haworth, 'Beyond the Limits of Location: Human Environmental Disturbance Prior to Official European Contact in Early Colonial Australia', *Archaeology in Oceania* 37, no. 3 (October 1, 2002): 123-36.

<sup>76</sup> Diana O. Fisher, Simon P. Blomberg, and Ian P. F. Owens, 'Extrinsic versus Intrinsic Factors in the Decline and Extinction of Australian Marsupials', *Proceedings: Biological Sciences* 270, no. 1526 (September 7, 2003): 1801-08.

<sup>77</sup> Regarding the term *beachhead frontier* see Connor, *Australian Frontier Wars*, 26.

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- <sup>78</sup> J. H. L. Cumpston, Milton James Lewis, and Australia. Dept. of Community Services and Health, *Health and Disease in Australia: A History* (Canberra: Australian Government Publishing Service, 1989), 49; Judy Campbell, *Invisible Invaders: Smallpox and Other Diseases in Aboriginal Australia, 1780-1880* (Carlton South, Vic.: Melbourne University Press, 2002); David Arnold, *Imperial Medicine and Indigenous Societies* (Manchester ; New York: Manchester University Press, 1988), 9; Donald Denoon, Philippa Mein Smith, and Marivic Wyndham, *A History of Australia, New Zealand, and the Pacific. The Blackwell History of the World* (Oxford, UK ; Malden, Mass.: Blackwell Pub., 2000), 72-94.
- <sup>79</sup> Pearson, *Pastoral Australia*, 103.
- <sup>80</sup> Rodney Harrison and Christine Williamson, *After Captain Cook: The Archaeology of the Recent Indigenous Past in Australia* (Walnut Creek, CA: AltaMira Press, 2004), 40; Henry Reynolds, *The Other Side of the Frontier: Aboriginal Resistance to the European Invasion of Australia* (Sydney: University of New South Wales Press, 2006), 159.
- <sup>81</sup> Reynolds, *The Other Side*, 159-62.
- <sup>82</sup> Elinor G. K. Melville, *A Plague of Sheep: Environmental Consequences of the Conquest of Mexico* (Cambridge, New York: Cambridge University Press, 1994), 1-16; Charles Sturt, 'A Condensed Account of an Exploration in the Interior of Australia', *Journal of the Royal Geographical Society of London* 17 (January 1, 1847): 85-129.
- <sup>83</sup> „As to [the kangaroo's] decrease, it is estimated that in 1881 there were more than six millions of kangaroos proper in the Colony, and, as at the end of 1889, their estimated number was not much over one million, five-sixths have been destroyed in eight years.” George Lacon James, *Shall I Try Australia? Or, Health, Business, and Pleasure in New South Wales: Forming a Guide to the Australian Colonies for the Emigrant Settler and Business Man* (London: L. Upcott Gill, 1892), 194 f. „The whole face of the district quickly changes. The woodman's axe was heard in forests which till then only echoed back the howl of the wild dog, or the shout of the savage. The county became gradually peopled. The cockatoo settler [i.e. the small farmers] built his log-hut on his small clearing, the wild solitude of the bush vanished before the presence of civilized man, and the game was of course driven back into wilder and more secluded regions by the foot of the stranger.” H. W. Wheelwright, *Bush Wanderings of a Naturalist, or, Notes on the Field Sports and Fauna of Australia Felix* (New ed. London: Frederick Warne & Co., 1865), VIII f.
- <sup>84</sup> P. J. Jarman and M. A. Brock, 'The evolving intent and coverage of legislation to protect biodiversity in New South Wales', in *Threatened Species Legislation: Is It Just an Act?*, ed. Pat Hutchings, Daniel Lunney and Chris Dickman (Mosman, NSW.: Royal Zoological Society of New South Wales, 2004): 1-19.
- <sup>85</sup> Jeff Short and Andrew Smith. 'Mammal Decline and Recovery in Australia', *Journal of Mammalogy* 75, no. 2 (1994): 288-97, 288 f.
- <sup>86</sup> Catherine J. Tait, Christopher B. Daniels, and Robert S. Hill, 'Changes in Species Assemblages within the Adelaide Metropolitan Area, Australia, 1836-2002', *Ecological Applications* 15, no. 1 (February 1, 2005): 346-59, 346.
- <sup>87</sup> Short and Smith, 'Mammal Decline', 288-97, 288 f.
- <sup>88</sup> On the importance of kangaroo for aboriginal diet see: Wendy R. Telfer and Murray J. Garde, 'Indigenous Knowledge of Rock Kangaroo Ecology in Western Arnhem Land, Australia', *Human Ecology* 34, no. 3 (June 1, 2006): 379-406, 381 f.
- <sup>89</sup> Christopher N. Johnson, Joanne L. Isaac, and Diana O. Fisher, 'Rarity of a Top Predator Triggers Continent-Wide Collapse of Mammal Prey: Dingoes and Marsupials in Australia', *Proceedings: Biological Sciences* 274, no. 1608 (February 7, 2007): 341-6.
- <sup>90</sup> Thomas Green Fessenden, *The New England Farmer, and Horticultural Register*, vol. 9 (Boston: J. Breck, , 1831), 382. Noah Webster, Chauncey A. Goodrich, and Noah Porter, *An American Dictionary of the English Language; Containing the Whole Vocabulary of the First Edition* (Springfield, MA: G. and C. Merriam, 1848), 859.



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<sup>91</sup> A. J. Downing, *The Fruits and Fruit Trees of America; or, the Culture, Propagation, and Management, in the Garden and Orchard, of Fruit Trees Generally; with Descriptions of All the Finest Varieties of Fruit, Native and Foreign, Cultivated in This Country* (New York & London: Wiley and Putnam, 1845), 34.

<sup>92</sup> Charles Harpur, 'The Bush Fire', *The Argus*, March 31, 1851; 'Overland to Wollongong', *The Illustrated Sydney News*, May 15, 1871. See also *Empire*, Friday 12, 1872; in reference to the sale of farms, previous ring-barking became an item that would enhance the value of the property: *The Sydney Morning Herald*, March 14, 1874, 11. „A squatter remarked a short time ago, when all our run is selected on the land we have secured to ourselves, by selecting 10,000 acres, we hope to be able to fatten 500 head of bullocks. The land is well grassed, and people to whom this has been repeated think that if the trees on the land, wherever it is too heavily wooded, were killed by bark-ringing, more than a thousand bullocks could be fattened upon it.” *The Queenslander*, July 31, 1875, 9.

<sup>93</sup> Bonyhady, however, is wrong when it comes to the chronology of ring-barking, since the practice started long before the middle of the 19<sup>th</sup> century. Tim Bonyhady, *The Colonial Earth* (Carlton, VIC: Miegunyah Press, 2000), 178. See 'Practical Agriculture', *The Sydney Morning Herald*, July 5, 1850, 2, which gives an elaborate description of the practice. An advertisement for the sale of a dairy farm in the *Maitland Mercury* in 1854 reads: „The farms consist of choice pasture lands; are well watered with a chain of ponds and creeks. That on which the improvements are erected is in every way adapted for a Dairy Farm, having every requisite for this purpose. A great portion of the land is cleared, and the most of the timber on the other portion is ring-barked ready for burning off.” *The Maitland Mercury & Hunter River General Advertiser*, August 19, 1854, 3.

<sup>94</sup> *The Sydney Gazette and New South Wales Advertiser*, June 26, 1803.

<sup>95</sup> *The Sydney Gazette and New South Wales Advertiser*, October 3, 1803, 1.

<sup>96</sup> *The Sydney Gazette and New South Wales Advertiser*, June 10, 1820, 4.

<sup>97</sup> *The Australian*, February 17, 1827, 3.

<sup>98</sup> *The Australian*, June 25, 1828, 2; *The Monitor*, July 12, 1828.

<sup>99</sup> *The Clarence and Richmond Examiner and New England Advertiser*, November 17, 1874, 2. See also William Edward Abbott, *Ringbarking and Its Effects* (Sydney, NSW: Thomas Richards, Govt. Printer, 1880).

<sup>100</sup> Samuel Butler, *The Hand-Book for Australian Emigrants*, 64 f; Katandra and District History Group, Inc: Squatters, URL: <http://home.vicnet.net.au/~katandra/squatters.htm>, accessed December 13, 2013.

<sup>101</sup> „In the Riverina and western NSW several thousand Chinese men were employed in land clearing (referred to colloquially as scrub-cutting and ring-barking), market gardening and ancillary activities. The cleared land was used for wheat growing and pastoral activities, in particular, sheep grazing, and the men resided in camps on the fringe of towns and on the pastoral properties.” Jack Bridle, 'Memories and Information of the Chinese', *Memories of Tumut Plains, residents and ex residents* (Tumut: Wilkie Watson, 1993), 12-4; Kerry Kell, 'Agriculture at Tumut Plains', *Memories of Tumut Plains*, 24-5; Malcolm Moy, 'The Moy family', *Memories of Tumut Plains*, 64; *Discussions with Bill Moy, 2000-2001*, quoted in Barry McGowan, 'Chinese Market Gardens in Southern and Western New South Wales', *Australian Humanities Review* 36 (July 2005), [http://www.australianhumanitiesreview.org/archive/Issue-July-2005/10McGowan.html#\\_edn15](http://www.australianhumanitiesreview.org/archive/Issue-July-2005/10McGowan.html#_edn15) (accessed December 13, 2013); Bonyhady, *The Colonial Earth*, 178 f.

<sup>102</sup> Bonyhady, *The Colonial Earth*, 161.

<sup>103</sup> Bonyhady, *The Colonial Earth*, 179.

<sup>104</sup> L. Lindley-Cowen. *The West Australian Settler's Guide and Farmer's Handbook. Part 1.* ([Perth]: E.S. Wigg; 1897), 135.

<sup>105</sup> Ellwood Cooper and Ferdinand von Mueller. *Forest Culture and Eucalyptus Trees* (San Francisco: Cubery & Company, 1876), 55 f.

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- <sup>106</sup> Ian D. Lunt et al., 'Effects of European Colonization on Indigenous Ecosystems: Post-Settlement Changes in Tree Stand Structures in Eucalyptus-Callitris Woodlands in Central New South Wales, Australia', *Journal of Biogeography* 33, no. 6 (June 1, 2006): 1102-15.
- <sup>107</sup> Gale and Haworth, 'Beyond the Limits of Location', 123-36, 129; S. J. Gale et al., 'Human Impact on the Natural Environment in Early Colonial Australia', *Archaeology in Oceania* 39, no. 3 (October 1, 2004): 148-56.
- <sup>108</sup> Quoted in Michael Terry, 'Soil Erosion in Australia', *The Geographical Journal* 105, no. 3/4 (March 1, 1945): 121-9, 122.
- <sup>109</sup> Jann E. Williams and John Woinarski, *Eucalypt Ecology: Individuals to Ecosystems* (Cambridge; New York: Cambridge University Press, 1997), 37; Kerin O'Dea et al., 'Traditional Diet and Food Preferences of Australian Aboriginal Hunter-Gatherers [and Discussion]', *Philosophical Transactions: Biological Sciences* 334, no. 1270 (November 29, 1991): 233-41, 236.
- <sup>110</sup> Michael Williams, 'Ecology, Imperialism and Deforestation', in *Ecology and Empire: Environmental History of Settler Societies*, ed. Tom Griffiths and Libby Robin (Victoria, Australia: Melbourne University Press, 1997), 169-84.
- <sup>111</sup> George Perkins Marsh, *Man and Nature; or, Physical Geography as Modified by Human Action* (New York: C. Scribner, 1864).
- <sup>112</sup> Bonyhady, *The Colonial Earth*, 179-81.
- <sup>113</sup> George William Rusden, *History of Australia*, 3 vols., vol. 2 (London: Chapman and Hall, 1883), 41.
- <sup>114</sup> Roderick Flanagan, *The History of New South Wales with an Account of Van Diemen's Land (Tasmania), New Zealand, Port Phillip (Victoria), Moreton Bay, and Other Australian Settlements: Comprising a Complete View of the Progress and Prospects of Gold Mining in Australia: The Whole Compiled from Official and Other Authentic and Original Sources*, 2 vols., vol. 2 (London: Sampson Low, Son, & Co, 1862), 78.
- <sup>115</sup> Pearson, *Pastoral Australia*, 24.
- <sup>116</sup> Great Britain. Parliament. The House of Lords, 'The Sessional Papers Printed by Order of the House of Lords or Presented by Royal Command in the Session 1846' (London, 1846), 254 f.
- <sup>117</sup> Rusden, *History of Australia*, 333.
- <sup>118</sup> Mark Hannah, 'Aboriginal Workers in the Australian Agricultural Company, 1824-1857', *Labour History* 82 (May 1, 2002): 17-33, 17; Edward Parry, *In the Service of the Company: Letters of Sir Edward Parry, Commissioner to the Australian Agricultural Company*, vol. 1, December 1829 - June 1832 (Canberra ACT: ANU Press, 2005), 413.
- <sup>119</sup> House of Lords, 'Sessional Papers', 301.
- <sup>120</sup> Butzer and Helgren deny the existence of an apocalyptic model in the ecological history of the NSW. Their method, however, is based primarily on archeological findings and therefore not reliable if used exclusively. Both agree that portmanteau biota have negatively impacted on the diversity of species. Butzer and Helgren, 'Livestock, Land Cover, and Environmental History', 80-111.
- <sup>121</sup> Goodall, *Invasion to Embassy*, 29.
- <sup>122</sup> Pearson, *Pastoral Australia*, 8; Connor, *Australian Frontier Wars*, 53-67.
- <sup>123</sup> Connor, *Australian Frontier Wars*, 55 f.
- <sup>124</sup> Mitchell, *Journal of an Expedition*, 20 f.
- <sup>125</sup> This is a very conservative estimate. Pickard estimates one cattle at 10 DSE (dry sheep equivalent). DSE does not only involve water use but also grazing pressure on the soil. John Pickard, 'Land Management in Semi-Arid Environments of New South Wales', *Vegetatio* 91, no. 1/2 (January 31, 1991): 191-208, 191. On the pollution of wool-washing see Great Britain. Parliament. House of Commons, 'Reports from Commissioners', vol. 33, 'Pollution of Rivers' (London: George Edward Eyre and William Spottiswoode, 1867), XXII. On mechanical wool-washing see 'South Australian Enterprise', *The Mechanics' Magazine* 24, October 28, 1870, 313; Ted Henzell, *Australian Agriculture: Its History and Challenges* (Collingwood, VIC: Csiro Publishing, 2007), 65.

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<sup>126</sup> Reynolds, *The Other Side*, 159-62. „[Aborigines] in pastoral areas were often worst affected because as hunter-gatherers they had to compete with pastoralists for water and grass. People in central and south-western Victoria suffered sudden and devastating losses during the great pastoral expansion of 1836-40, which by 1850 claimed most of the fertile land in the colony. Kangaroo, duck, emu and bush turkey fled, while sheep munched seasons' worth of yam and other plants. "The livestock won, hooves down."“ Denoon et al., *History of Australia*, 75.

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