



Carceral Time at Port Arthur and the Tasman Peninsula: An Archaeological View of the Mechanisms of Convict Time Management in a Nineteenth Century Penal Landscape

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Accepted: 20 February 2024
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Abstract

Between 1833 and 1877 the Tasman Peninsula (Van Diemens Land/Tasmania) operated as a restricted penal zone for British convicts transported to Australia. The main penal settlement was situated at Port Arthur, with a series of substations spread across an area of 660 km² (250 mi²). At its mid-1840s peak over 3,000 male convicts, military, and free resided on the peninsula. The vast majority of the men were engaged in diverse industrial activities, ranging from manufacturing to resource extraction, as well as the associated tasks of transport and communications. Archaeological and historical evidence demonstrates that this multiscalar penological industrial landscape was coordinated by an interlinked system of audio and visual signaling. Activity within settlements and the immediate economic hinterland was synchronized by bells, while more distant or topographically difficult sites incorporated visual signaling with time balls and semaphores. A GIS analysis of soundscapes and viewsheds shows that the latter afforded coordination of labor across the hinterland, as well as rapid complex messaging between different stations and beyond, while also spreading a net of time compliance and surveillance across the penal peninsula.

Keywords Convicts · Carceral Time · Tasmania · Port Arthur · Tasman Peninsula

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Introduction

Between 1788 and 1868 Britain transported more than 160,000 of its male, female, and juvenile felons to various of its colonies in Australia (Maxwell-Stewart 2010:1224). This achieved several aims at once: removing a problematic portion of the population and relieving pressure on an overcrowded prison system, allowing Britain to stake a territorial claim in the Pacific, and providing an unfree colonizing population and workforce that would undertake foundational infrastructure development and provide cheap labor for “free” settlers (Anderson and Maxwell-Stewart 2013).

Once in the colony convicts were subject to a variety of regimes depending upon their stage of sentence, ranging from closed institutional settings with rigorous surveillance, through to very loosely supervised lives with high degrees of autonomy. In this paper we focus on the landscape of the Tasman Peninsula, in southeast Van Diemen’s Land (modern Tasmania, see Fig. 1). Between 1830 and 1877 the whole peninsula operated as a restricted penal environment, housing male convict transportees from the British Isles and dominions, as well as men convicted of crimes within the colony. Comprising the penal hub of the Port Arthur penal station (1830–77), a series of outstations and other standalone stations, the peninsula encompassed a tremendously complex penal and industrial enterprise. On a daily basis it saw several thousand convicts, military, and free administrators mobilized into internal and external spaces, carrying out diverse activities in a range of environments across a wide landscape. Daily regimes for both the convicts and to a degree those watching

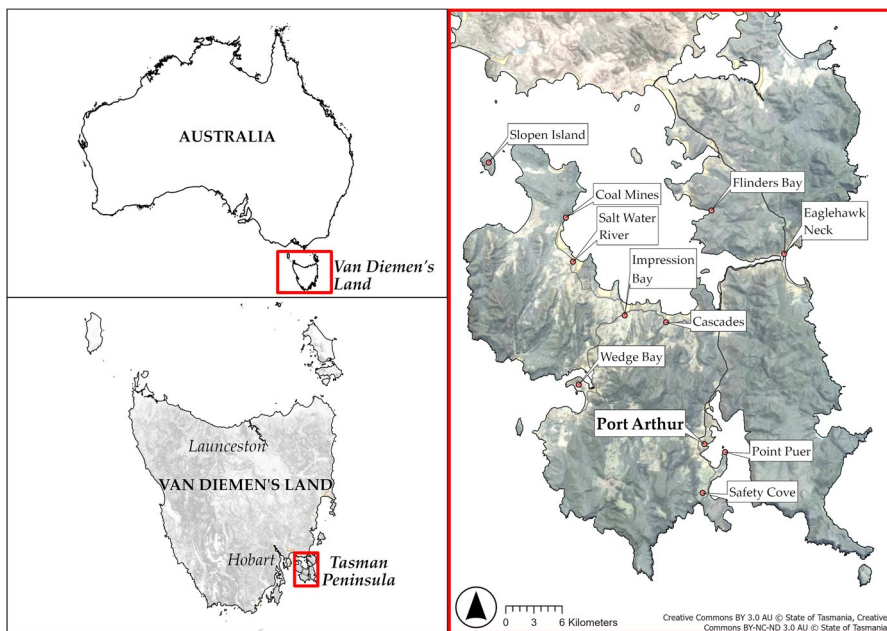


Fig. 1 Tasman Peninsula Location map and showing convict station locations

over them were rigidly regulated by mandated codes of classification, separation, discipline, and surveillance. By necessity these activities and routines had to interlock to ensure that the penal and industrial ventures were coordinated and efficient.

It is the imposition of routine – why and how it was done – that we examine in this paper. Regardless of setting, one of the factors which bound the diverse experiences of Australian convicts together was the regulation of time. Beginning with the journey on the transport ship, the rigid imposition of schedules was considered an important part of the reform process, with a convict's acceptance of routine and the allied development of a work ethic being integral to their reintegration to society as a moral and useful citizen (Maxwell-Stewart 2010; Shepherd and Maxwell-Stewart 2021). However, the pragmatics of these systems, including not just the management of time but the spatial coordination of convict and free populations, are sometimes overlooked in favor of more lyrical allusions to the temporal regimes of convict life and the environments they occupied, especially for those banished to the Australian colonies (e.g., Hughes 1987).

Port Arthur and the Tasman Peninsula

This paper is written from the perspective of the authors' *Landscapes of Production and Punishment* project, which examines the convict system within the framework of an industrial system (Gibbs 2020; Tuffin et al. 2018). While not denying the ideological power of schedules as part of the reformatory and punitive carceral regime, we raise as a parallel concern the logistic and administrative coordination of the complex industrial enterprise that was the convict system. We consider the historical and archaeological evidence of the roles, processes, and practical mechanisms of time management and the coordination of convict-related activities across the extended carceral landscape of the Tasman Peninsula. To do this we analyze documentary and archaeological sources to reconstruct and interrogate the different practical forms of audio and visual signaling, seeking to understand how a range of complex activities was controlled and directed across different spatial and coercive contexts.

Between 1833 and 1877 the Tasman Peninsula was designated a restricted area, the narrow Eaglehawk Neck connecting it to the mainland patrolled by a military piquet and a line of savage dogs (Tuffin and Gibbs 2019). For the entirety of this period, Port Arthur formed the heart of the peninsula's penal operation, working as an industrial complex with an associated extensive labor hinterland. At its peak, the main settlement contained as many as 1,200 prisoners as well as several hundred administrators and military. During the 1830s and 1840s the station was joined by additional outstations and stations, some very large in their own right and with their own resource extraction hinterlands (Brand 1990; Tuffin and Gibbs 2020). These stations were linked by a network of roads, tramways, and maritime services to facilitate the movement of people and materials. The extent of operations on the Tasman Peninsula ebbed and flowed with changes in convict management policies and systems, with Port Arthur eventually closing in 1877, 24 years after the final convict vessel arrived in Hobart – the last British convict station in Van Diemen's Land.

The complexities of Port Arthur and the Tasman Peninsula landscape can be understood at three different scales:

Core Settlement—The main settlement of Port Arthur provided accommodation for the prisoners, guards, administrators, and military (Fig. 2). A large rectangular compound of several barracks was initially built to house the majority of the prisoner population, replaced by the 1857 retrofit of an existing building into a penitentiary. Convicts undergoing strict forms of censure were housed in solitary and separate cells, the latter initially situated adjacent to the barracks and later in the ground floor of the penitentiary. In 1848 the Separate Prison, modeled upon the 1842 Pentonville prison in Britain, was constructed. This provided a dedicated venue for the incarceration and small-scale craft manufacturing labor of those undergoing separate treatment.

A variety of industries operated to supply the settlement, as well as to service an export trade to other parts of the convict system and the free market. Workshops were constructed, housing a diversity of craft and manufacturing activities: metal working and forging, shoemaking, tailoring, furniture making, and carpentry. The administrative and military buildings were largely kept separate from the barracks and workshops areas, delineated by high paling fences, masonry walls, and the site's topography. Slightly further away on the periphery were officers' quarters, usually with cottage gardens and a small number of stock animals. Although the settlement had no complete encircling boundary fence, mobility within and beyond the core

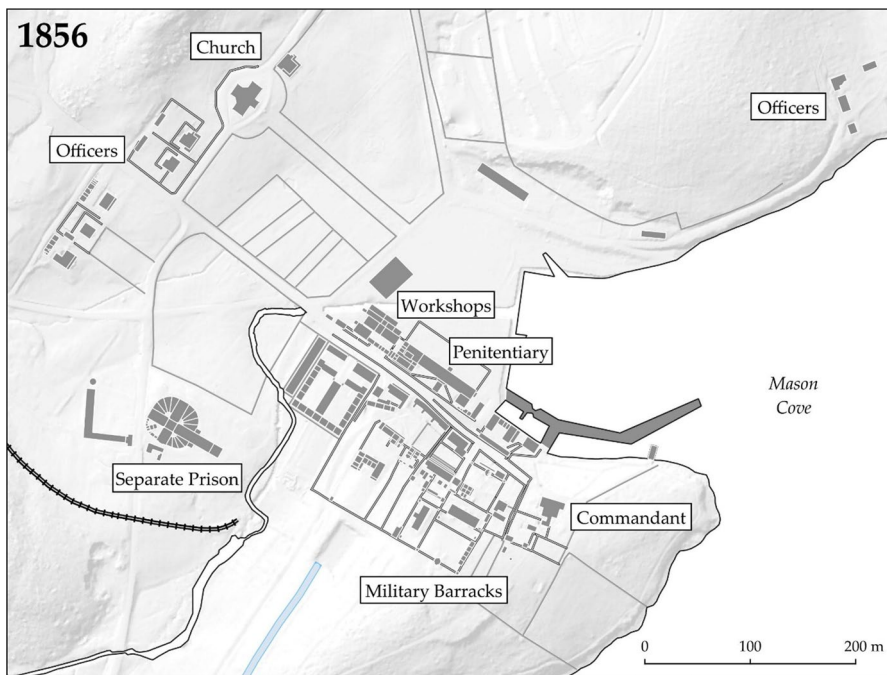


Fig. 2 Port Arthur penal station in 1856

area was constrained by tangible and intangible boundaries enforced by regulation and military piquet.

Hinterland—The immediate terrestrial and marine hinterlands adjacent to Port Arthur hosted an evolving complex of agricultural and animal husbandry operations, fishing, timber-getting, charcoal burning, mining, quarrying, brickmaking, and shipbuilding. Most of these were operated by day gangs, working up to several kilometers distance from the main settlement and returning in the evenings.

Inter-settlement—By 1834 two new substations had been added to the Tasman Peninsula: a juvenile industrial reformatory at nearby Point Puer (1834–49), and on the peninsula's northwest, a coal mining operation (Coal Mines, 1833–48) (see Fig. 1). By the 1840s the institution of the probation system resulted in convicts being retained in government service for longer periods. This necessitated the creation of a large number of additional stations across Van Diemens Land. A further seven stations were added to the Tasman Peninsula, more than tripling the peninsula's prisoner population to nearly 4,000 men (Tuffin and Gibbs 2020). Each station was its own core for administration and incarceration, to which were attached extensive labor hinterlands of timber-getting, mining, and agriculture. Though administratively linked to Port Arthur, the stations had their own populations of civil and military staff. There was also a constant flow of people, goods, and produce between stations, moving along a network of terrestrial and marine links, with information shared through a complex semaphore communication system (described below).

Carceral Time Management

Since the 1970s there has been exploration of the idea of time-geography, examining the intersections between spatial and temporal processes and the way individuals and groups navigate their way through social and environmental interactions (Ellegard 2019; Pred 1984). Proposed more as a framework of study rather than a singular approach, one of the core principles is that time has a material and spatial aspect. Individuals are subject to a series of practical constraints that limit and define their behaviors, both through their own corporeality and capacity as well as through the authoritative forces which exert control over them (Giddens 1984:265). Authoritative controls that proscriptionally regulate the passage of time and spatial or geographical states are especially true of the socially engineered environments of institutional and particularly prison settings. Aspects of this approach also has sympathies with some of the archaeological discourse surrounding the construction and nature of institutional cultural landscapes (Spencer-Wood and Baugher 2010).

There is now an extensive literature on carceral time–space within geographic and criminological literatures, with many works on the social construction and physical experience of time within the prison system in both contemporary and historical contexts (e.g., Guilband and Jacobs 2010; Herrity et al. 2021; Moran 2012; Wahidin 2006). The architecture and design of prisons, as well as the institutional logic that structures routines, and shape the organization of daily life (Marti 2023:98). The authoritative role in the assignment of sentences, remissions, or extensions of time, as well as the more mundane regulation of what individuals and groups are allowed

to do within each day's "time-spaces," is a critical part of the nexus between objective clock time (*chronos*) and subjective and qualitative experienced time (*kairos*) (Moran 2012:309; Smith 1969:1). This embraces the notion that, in prison, time becomes a commodity that can be measured, bought, and sold and is, in effect, a currency that has to be managed (Marti 2023; Wahidin 2006).

Although the geographies of carceral space embrace a wide range of settings, most studies of carceral signaling and time management have focused on the *closed* architectural spaces of prisons rather than the *open* landscapes of the economically productive hinterlands which some of these institutions embraced (e.g., Cope 2003; Foucault 1979; Herry 2024; Morin and Moran 2015). For this reason, sound within prison landscapes is perhaps most commonly explored as a means of carceral time management. Hemsworth (2016) has noted that although the visual qualities of Jeremy Bentham's Panopticon have often been considered, his designs were explicit in their use of auditory controls as well. Studies of carceral *soundscape*s (Saher and Cetin 2016) or *acoustemologies* (Hemsworth 2016; Howes and Walfish 2023) have examined the role of authorized sound and signaling in prison (bells, whistles, alarms, the voices of warders) and the suppression of unauthorized sound as manifestations of power and control, and as mechanisms for rehabilitation, surveillance, coercion, subjugation, and conditioning (see also Fennelly 2014 for comparable discussions of noise management in asylums). This paper poses the question of how these sorts of systems were extended across wider areas of landscape and to what effect.

The links between time management, sound, and carceral industrial production as part of both a rehabilitative regime and as a tool to ensure industrial productivity have been considered by several writers (e.g., Fennelly 2014; Petchesky 1993). However, much of the industrial activity associated with the Australian convict system happened beyond closed institutional settings. It is this *lucana* in our understanding of how control and power was asserted over a wide carceral landscapes that provides the focus for this paper.

Reconstructing Time-spaces, Viewscapes and Soundscapes

For the period under investigation, the critical use of documentary sources provides key insights into carceral time and routine. However, we would argue that documents expressing formal routines and schedules primarily convey *intent*. Snatches of carceral *actuality* trickle down to us through contemporary accounts, or the reminiscences of ex-prisoners and administrators – though all can be colored by inherent and entangled bias and motivations (Lenik 2012:52). While the reconstruction of actual lived experience is impossible, we are in some measure able to reconstruct the environment and influences that colored the daily experience of incarceration and management. In this paper we also demonstrate how a Geographic Information System (GIS) can be used to visualize how audio and visual mechanisms may have interacted with a recreated historical landscape.

GIS is a tool that is now familiar to historians, archaeologists, and geographers (Howes and Burg 2017; Lafreniere and Gilliland 2015; Trepal et al. 2020). It is best

deployed as “a platform from which to launch new work, rather than the endpoint reconstruction of the historic environment and people’s interaction with it” (Lock 2000:60). As such, it is an interface that permits spatial, temporal, and linked non-spatial data to be displayed and queried in innovative ways, but should not be read as a faultless rendition of past environments and actions divorced from a “coherent and stimulating theoretical framework” (Gillings 2017:122). A GIS facilitates visualization, data linkage, and complex analysis, which in turn manifests further avenues of inquiry for the researcher. It provides a useful, even essential, step in the analytical process, providing a foundation and trigger for further enquiry (Rennell 2012). Gillings (2017: 122) put it best, stating that “GIS-based visibility studies are always best thought of as the first stage of the analytical process.” Below, we demonstrate how simple GIS-generated viewshed and audioscape analyses have allowed us to both visualize the nominal skein of control draped across the Tasman Peninsula’s extended carceral landscape, as well as leading to further questions about the interaction of timekeeping systems and human actions. It demonstrates the historical concepts – rather than try to create a definitive model of very variable processes.

Convicts and Time in Australia

In his influential book on time in colonial Australia, historian Graeme Davison (1993) devoted the first part of his work to the centrality of timekeeping in the management of the convict population. Many of the early governors and administrators were sympathetic to the tenets of Evangelical Protestantism, seeing the strict regulation of time as essential to ensuring convicts were appropriately disciplined and put to labor. This control of labor was also seen as safeguarding the economic and practical survival of the colonies. Regulations were promulgated, with periodic revisions depending upon the perspectives of successive administrators and the circumstances of each colony or settlement. Added to this were the active negotiations between administrators and convicts regarding the allocation of time and the amount of labor effort required. Time-dictated production among the convict population promoted the idea of what was termed the *government stroke*, the minimum labor required to avoid punishment (Ramson 1988). Instead, convicts preferred taskwork or piecework quotas with a set labor output each day, after which they could devote their time to generating private income (Robbins 1999). Unsuccessful labor negotiations resulted in individuals and groups of convicts protesting in both passive and reactive ways, with absconding, being absent for labor at the designated time, being a common form of resistance (Atkinson 1979; Maxwell-Stewart and Quinlan 2022; Robbins 2003a, 2003b).

At a simplistic level of analysis, time regulation of convicts fell within one of three main categories depending upon the nature or stage of their sentence and their classification as a prisoner. First group was *assigned* convicts (and from the 1840s, passholders), working directly for settlers in a form of indentured servitude. While still under sentence, they could live with their employers or in some circumstances have their own lodging. Time management was to some degree under the control of their master or mistress, although in urban settings all

convicts were to have returned to their registered residence in time for the 10 pm curfew bell (Howe 1822; McLeay 1835). After this time, police were empowered to detain convicts found on the streets and even to enter dwellings to check if the prisoner(s) listed as being at that place were indeed in residence.

Convicts assigned to landowners in rural settings were still subject to time regulation, although the extent of this was dependent upon their master or mistress:

The overseer rises at day-break, and rings a bell, which is affixed to a tree, as a signal for the men to proceed to their labour. The greater number follow the overseer to the particular agricultural operation which the season requires; the rest separate to their several employments, one to the plough, another to the garden, and a third to the dairy, while a fourth conducts the cattle to their pasture. The bell is again rung at eight o'clock, when the men assemble for breakfast, for which they are allowed one hour; they again return to their labour till one o'clock, when they have an hour for dinner, and they afterwards labour from two till sunset (Lang 1837:11).

The second group was convicts under the direct management of the government, working as ganged or specialized labor in open or closed (but nonpenal) settings (Robbins 1999). Whether situated in urban areas or at the fringes of the settled districts, carceral places like prisoner barracks, probation stations, female factories, road stations, and hiring depots imposed their own form of time and routine upon the wider landscape. Rules and notices on the authorized routines for the different types of prisoner were periodically published and updated via the Government's General Orders (e.g., Campbell 1819; Chapman 1804; McLeay 1835). The bells that regulated convict activity during the day, from first muster through to the evening curfew, were generally situated in front of each establishment and would have been loud enough to be heard across the settlement for the information of convict and free alike:

The depot bell... was a public boon without alloy. It swung from a tall slender gallows in the middle of the white-railed yard, and being rung several times a day at stated hours, was as good as a church clock to those who heard it, few of whom had any other way of reckoning time (Millet 1980 1872:67).

Urban prisons would have labor within their closed architectural spaces, although convicts might also be released as gaol gangs to labor in the immediate environs, often while in chains. For recidivists and serious offenders there were also the secondary punishment settlements such as Sarah Island, Newcastle, Norfolk Island, Maria Island, Moreton Bay, and Port Arthur. These were all located in remote situations or ideally on islands or peninsulas, affording the most extreme forms of regulation and surveillance as part of the reformatory or punitive processes, while allowing expansion into a controlled carceral landscape. These settlements embodied a complex combination of activities within a *core settlement* which included the closed landscapes and microgeographies of individual rooms and buildings (whether accommodation, work, or incarcerative spaces) and the

nonarchitectural spaces within the immediate settlement boundary. They then had a *hinterland* of several kilometers' radius in which extractive and primary production industrial activities occurred. There were also the *intersettlement* spaces and connections between the main penal settlements and their substations, and connections to other penal and nonpenal settlements (Gibbs 2020). Precision in the management of time and labor across large areas was therefore critical.

As an extant and well-known example of a penal station, Port Arthur, as well as the other stations of the Tasman Peninsula, comprise an ideal subject for study of time management. This is due to a wealth of documentary and archaeological data, allowing us to examine how such stations attempted to impose regulation via different but interconnected signaling systems across diverse and extensive closed and open labor landscapes.

Time and Routine on the Tasman Peninsula

The 1840s provides an excellent window into the way time and routine was imposed upon the Port Arthur and Tasman Peninsula prisoner population. During the early half of this decade the outgrowth of stations caused by probation's introduction forced the Convict Department administrators to standardize and codify rules and regulations, varying for female and juvenile establishments. Convict routine was in some respects a continuation of the daily schedules which had been imposed on them while aboard the hulks and then the transport vessels which had brought the prisoners to Australia (Shepherd and Maxwell-Stewart 2021). Table 1 provides an example for Port Arthur in 1847. Such a timetable had to be applicable to internal and external domestic, industrial, reformatory, and punitive activities across a range of prisoner classifications and circumstances, additionally making allowance for seasonal shifts in light and weather. In theory there was little or no flexibility within these schedules, meaning that the operations of convicts, administrators, and military, despite working in a multitude of circumstances, were to be rigidly retained within set routines.

The routines of the prisoners were paralleled by those for the people in positions of power and authority over them. Overseers (often themselves prisoners) appointed by the Convict Department surveiled convict activities and ensured separation of the different classes, adherence to rules, and appropriate production in industrial tasks. Administrators were engaged in the bureaucracy of running the settlement: coordinating activities, budgeting, managing commissariat and ordnance supplies, as well as relentlessly updating the inmates' Conduct Records (from which their sentences and dispositions were decided). Into this group also fell the medical practitioners, clergy, and other service people.

The military at each station provided an armed security force for pursuit of absconders, supervising the transfer of prisoners between stations, and in extreme cases quelling unrest, riots, or uprisings among the prisoner population (e.g., Rigg 1991:46). Correlate with the prisoner population, the military detachment peaked in the 1840s: 260 men at the 14 stations and outposts on the peninsula, of which 115 men were stationed at Port Arthur (McLachlan and McFie 1995:12). The military

Table 1 Convict routine, 1847 regulations. After "Rules and Regulations for the first stage of Convict Probation in Van Diemen's Land, 1847", Enclosure No. 6, in: John Hampton, Comptroller General, to William Denison, Lieutenant Governor, 15 November 1847, *British Parliamentary Papers, Convict Discipline and Transportation*, 1849 [1022] [1121], pp. 139–51

	Nov,	Mar, Apr,	May, Aug	Jun, Jul	Activity	Routine (summer)	Duration (summer)	Routine (winter)	Duration (winter)
Dec, Jan,									
Feb									
4:30	4:30	6:00	6:00	6:00	First bell	Convicts rise, fold bedding	15 min	Convicts rise, fold bedding	15 min
4:45	4:45	6:15	6:15	6:15	Second bell	Dormitories and separate apartments unlocked, convicts marched to wash troughs, mustered by class, subdivided by mess, muster called, gangs inspected, prayers read. After Morning Service, convicts divided into working parties and marched to labor	45 min—1:45 h	Dormitories and separate apartments unlocked, convicts marched to wash troughs, mustered by class, subdivided by mess, muster called, gangs inspected, prayers read. After Morning Service, convicts divided into working parties and marched to labor	1:15—1:45 h
5:30	6:30	7:30	8:00	8:00	Work begins		1:25 h—2:25 h		3:55 h—4:25 h
7:55	7:55				Station bell rung	Working parties return to breakfast	1 h		
8:00	8:00				Breakfast period starts				
8:30	8:30				Breakfast ends	Returned to respective yards			
8:40	8:40				Turned out for work	Working parties turned out			
8:55	8:55				Bell rung	Marched to work			
11:55	11:55	11:55	11:55	11:55	Bell rung	Convicts return for dinner period	1 h 5 min	Convicts return for dinner period	1 h 5 min
12:00	12:00	12:00	12:00	12:00	Dinner starts				
12:50	12:50	12:50	12:50	12:50	Bell rung	Parties turned out		Parties turned out	
13:00	13:00	13:00	13:00	13:00	Bell rung, Dinner ends	Parties marched out		Parties marched out	

Table 1 (continued)

Nov, Dec, Jan, Feb	Mar, Apr, Sept, Oct	May, Aug	Jun, Jul	Activity	Routine (summer)	Duration (summer)	Routine (winter)	Duration (winter)
17:30	17:00	17:00	16:30	Bell rung, work ends	Parties recalled in time to allow gang to be assembled in classes, ready for bell to be rung, convicts wash, then have supper	30 min	Parties recalled in time to allow gang to be assembled in classes, ready for bell to be rung, convicts then wash, muster called, supper, then prayers	30 min (Winter est. only)
18:00	18:00	17:30	17:00	Bell rung	Gang mustered for prayers, attend school, or leisure, all stores secured and bakehouse/cookhouse locked	2 h	Attend school, or spending leisure time in wards. All stores secured and bakehouse/cookhouse locked	2:30 h—3 h (Winter est. only)
20:00	20:00	20:00	20:00	Free time ends	School and leisure ends, each mustered in wards, each man giving berth number when name called, entered in muster book, dormitories locked	15 min	School and leisure ends, mustered in wards, each man giving berth number when name called, entered in muster book, dormitories locked	15 min

maintained closely regulated routines of parading, exercising, training, and other duties, although it can be presumed these were by necessity well integrated with the schedule for the convicts. Army regulations for the time stipulate a garrison's day was regimented by trumpet and drum: *Reveille* at daybreak, *Assembly* at parade, *Retreat* at sunset, *Tattoo* for curfew (Adjutant General's Office 1844). Signaling was also vital to their tactical deployment and coordination across the peninsula.

It was critical that the various daily routines across the different free and unfree groups and classes at Port Arthur and the other Tasman Peninsula stations were synchronized. Regular mustering and audits were essential to ensure that convicts, and sometimes the military personnel, had not absconded or become lost – both literally in the surrounding bush and figuratively within the unforgiving workings of the system. Movements into, within, out of, and between settlements required similar levels of coordination. In addition, the Tasman Peninsula needed to remain connected to the wider colony and especially the capital of Hobart, located 50 km from Port Arthur across the often-tumultuous waters of Storm Bay. Despite a high level of self-sufficiency, the Tasman Peninsula settlements still required external supply. Though an overland route did exist, the majority of extra-peninsula contact occurred via the maritime networks. Primarily managed by the colonial marine, a regular traffic of barques, schooners, whaleboats, and later steamships, shuttled prisoners, personnel, and supplies to and from the stations.

The Mechanisms of Time Regulation

Given the sheer size of the Port Arthur establishment as well as the nature of the physical environment and the diversity of activities across the Tasman Peninsula, various mechanisms had to be employed to ensure that standard time was maintained across the system. The following discussion considers the evidence for the systems of coordination of time and activity at the different spatial scales, from internal spaces and closed landscapes through to the wider hinterlands.

Settlement Clock and Settlement Bell

An official clock (or timekeeper) regulated time at Port Arthur and later across the peninsula. The first reference to this was in 1833, when the station transitioned from its operation as a timber-getting camp into a penal settlement (Vicary 1833). It is likely that in this early penal period a person was delegated to keeping time and sounding the settlement bell (sometimes called the muster bell) to announce the major changes in the day as set out in Table 1 (Brown 1866). A 76 lb (34.5 kg) bell had been sent to Port Arthur in 1831 (Vicary 1833) and was mounted near the gateway of the palisaded prisoner barracks (Lempriere 1954:109). Port Arthur regulations are quite specific with regard to the times the station bell was to be rung; to alert the convicts to prepare to commence or complete labor, pack up tools and work areas, proceed to meals or to accommodation, and for the final evening silence bell (see Table 1; Brown 1866). The smaller stations across the peninsula also had their

own settlement bells coordinated by the semaphore signals sent from Port Arthur (described below).

In the 1850s the settlement bell outside the barracks was superseded by a publicly visible clock and connected bell on the tower of the Penitentiary building, some meters higher than its predecessor (Boyd 1855, see Fig. 3). There is no historical information as to the size of this bell. In 1848 a peal of eight bells was cast in the workshops and installed in the settlement's church tower. Whether these bells were only rung for the purposes of calling the residents to worship, or if they had a supplementary role in the settlement's timekeeping, is not clear. If rung only to signal daily or weekly religious observance, this then created a separate and parallel set of acoustic signals for the population, in effect a sacred counterpoint to the secular routines.

Various studies have explored the acoustic intensity of historic bells, modeling their range using GIS and other approaches (e.g., Lipscombe and Robinson 2021; Mlekuz 2004; Primeau and Witt 2018). These studies consider factors which might enhance or attenuate sound propagation and the distance a bell can be heard, including size of the bell and its frequency, height of the belltower, surrounding topography, climate, wind, moisture, etc. Unfortunately, these factors also limit to a large degree the modeling we might achieve for Port Arthur, as little is known about the size or decibel output of the bells used.

However, with such limitations acknowledged, Fig. 4 shows a simple GIS-based model of the estimated auditory reach of Port Arthur's barracks settlement bell, using the open source QGIS program. The landscape was a LiDAR (Light Detection and Ranging) model (1 m cell size) derived from remote sensing data, while historical elements, such as buildings, boundaries, and communication ways were drawn



Fig. 3 Anonymous (1860) *Contemporary sketch of Port Arthur by a prisoner at the latter period of its occupation*. Libraries of Tasmania item 144586765. Detail showing: A. Main semaphore, B. 'Local' semaphore, C. Penitentiary Clock and Bell, D. Original barracks "settlement bell"

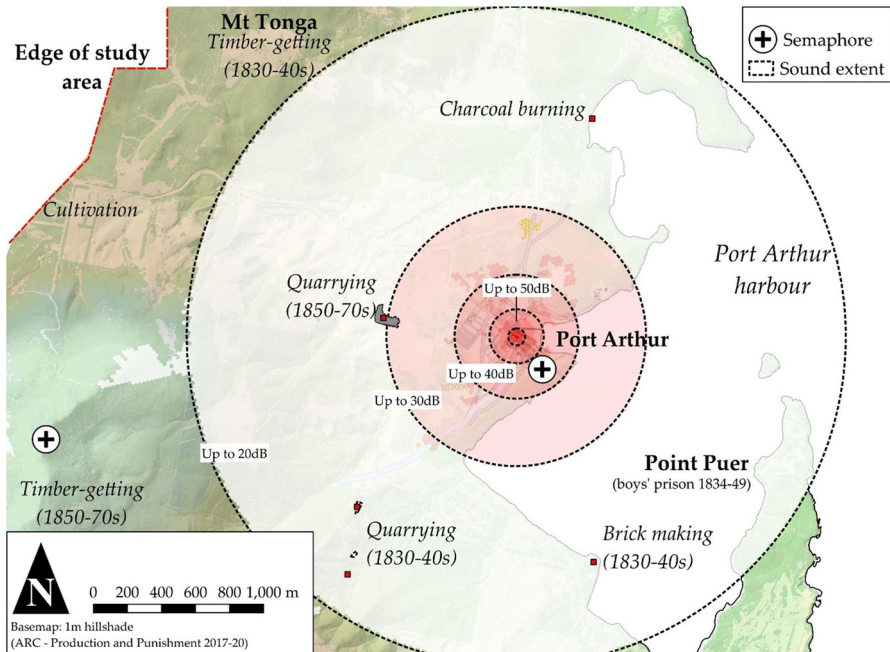


Fig. 4 The estimated auditory extent of Port Arthur's settlement bell (estimated 85 dB), modeled using a DSM. Soundscape generated using QGIS plugin Noise Prediction

from historical and archaeological research during this project. The decibel level of the bell was estimated at 85 dB, using readings taken from a contemporary bell still extant at Brickendon Estate World Heritage Site.

Though only an indicative model, it does illustrate that the sound of the settlement bell likely carried with some clarity across the immediate landscape of the station and its near hinterland. Its impact would have been less in the labor hinterland, though it still would have been audible for an extended distance. The sole subjective measure of the range of this bell is in the memoirs of Martin Cash who was a prisoner at Port Arthur in 1842. He recounts a story of fellow prisoners who had escaped the settlement and camped overnight near the summit of Mount Tongataboo (modern Mt Tonga), awakening when they heard the bell at Port Arthur in the early morning (Cash 2015:61). This does match very closely the GIS projection of a maximal extent of about 4 km in at least some directions.

Closed Areas: Hand Bells

While the main settlement bell regulated action around Port Arthur as a whole, smaller hand bells were used for localized time management: regulating movement within the penitentiary, for men working the treadmill, or as an alerting mechanism for bedridden hospital patients. Many of these bells would also have been cast in the

Port Arthur workshops. The most extreme example of sound regulation and signaling by small or hand bells was within the Separate Prison.

All newly arrived prisoners at Port Arthur were to spend time locked within the walls of the Separate Prison, their humanity stripped away by harsh psychological conditioning. There was rigid physical separation, with each man spending 23 hr per day alone in their cells, including a working day performing labor tasks such as shoemaking, tailoring, picking oakum, or broom making (Hampton 1852). The prison operated on a silent system, with prisoners not allowed to speak in the attempt to “produce docile bodies through ‘subtle coercion’” (Hemsworth 2015:22; also see Howes and Walfish 2023). After being taught the system of bells and signals the only voice they heard was that of the religious minister who officiated in the attached chapel. The prison’s internal routine was regulated by a central clock (Fig. 5), while each cell had a signaling device that caused a numbered plate to stand out at the cell door, the activation of which rang a bell that summoned a guard. Prisoners wore a head-to-toe drab gray uniform and when removed from their cell for their daily hour of exercise (walking) in silence within a high-walled yard, they also wore a full head-covering mask. A Quaker visitor described the use of auditory signals as they returned from this daily exercise.

The strictest silence is maintained. Both prisoners and officers walk in slippers, and the officers do not speak to a prisoner. The only sound that is heard is a striking of a clock and occasionally the sound of a bell. Whilst we were



Fig. 5 Port Arthur Separate Prison “tell-tale” clock. (photo: M. Gibbs)

standing in the centre, the time arrived for those prisoners that were exercising to go back to their cells. Upon the sound of a bell they all stood with their faces to the wall that they may not see the prisoner who is passing to his cell. An officer unlocks the door of a yard, claps his hand, when the prisoner turns round, walks or runs out, going direct to his cell, where another officer receives him and locks him up. A second prisoner then leaves his yard and so on until all are back in their cells. One man who had been in but a short time, when leaving his yard, by mistake went up the wrong passage to his cell, the officer instantly clapped his hands, he stopped, turned round, and the officer pointing, shewed him his mistake (Mackie 1973:163).

The rigor of the Separate Prison's temporal regime also extended to the guards. The central watch clock was a Joseph Fairer tell-tale clock that required the officer to push a peg into the dial at the correct time every quarter hour to ensure they had adhered to the rigid schedule (Franklin 1838; Fig. 5). A surviving journal from a warden of the prison illustrates the tedious nature of the task, with daily repetitions of the phrase "I examined the watch clock and found that it had been regularly attended to" (Aylett 1860:3). Warders who failed to attend correctly to their duties were fined (Evenden 1884).

Other Auditory Signaling

There is mixed information on the use of other auditory signals. It has already been noted that the military used trumpets, fifes and drums for their own routines. Gunshots could also be used as a salute at a time of celebration such as the sovereign's birthday or a visit by a dignitary like the colony's lieutenant governor (Adjutant General's Office 1844:46, 259). The Settlement Orders of 1836 dictate that "[t]he Military and Constables for the future will understand that on no occasion is a shot or shots to be considered as a signal for a prisoner apprehended, nor on any account is it to be used as such" (Settlement Order 1836). However, in *Instructions for the Non-Commissioned Officer of the Guard at Eagle Hawk Neck* there is a directive that "In the event of the signal being received by two shots quickly succeeding one another he [the guard] will not loose [sic] a morning tment in repohe same" (Anonymous 1838).

Visual Signaling

From 1836 a semaphore system was installed on the Tasman Peninsula, providing a means of communicating with and between the various stations and then to the colony's capital, Hobart. Forty kilometers at its widest extent, the Tasman Peninsula is defined by undulating terrain that extends from sea level to over 460 m. Direct visual access between all but the stations of Port Arthur and Point Puer (intervisible across a stretch of water) was impossible. As such, a series of repeater stations constructed on the highest peaks across the peninsula carried information from semaphores situated at or near all the stations. Many of these stations utilized existing trees where possible, although towers were constructed as necessary. The main Port

Fig. 6 Telegraph Tree at Port Arthur, V. D. Land. Ludwig Becker, 1851 (State library of Victoria: H30897)



Arthur semaphore constructed from a giant tree, reported as being 106 ft (32 m) from the tree base to the top of the staff affixed to it (Franklin 1837; Fig. 6).

Each semaphore comprised a mast mounting three sets of paired paddles and a series of flags. The elevation of the individual paddles, accompanied by the type of flag flown, meant that upward of 3,000 code numbers could be transmitted. These could then be decoded in a book held at each of the semaphore stations (Tasmania Convict Department 1844). This allowed for very complex messaging to be passed quickly and efficiently, reaching the 50 km to Hobart in as little as 15 min on a clear day (Evenden 1884). Messages were often administrative in nature, notifying on supply or movements, but could also carry advisories including specific information on absconders. When he escaped from Port Arthur in 1842, prisoner William Derricourt described the immediate response:

All round were the signal stations. In the event of a convict having broken loose, the arms of the semaphores notified his number for miles and miles around. As I lay in sight of a semaphore, I could see my own number go up, and I had to act with caution (Derricourt 1899:47).

Messages could also be passed between the various stations and outstations of the Tasman Peninsula – including two stations positioned on the peninsula's western and southern capes tasked solely with relaying the identity of incoming shipping. Port Arthur also had a smaller internal semaphore system, allowing messages to be related quickly between otherwise separated parts of the station and local shipping (visible below the larger mast in Fig. 6).

The semaphores were primarily staffed by good-conduct prisoners nominated as constables. Quartered in small huts at each semaphore and equipped with a telescope, a clock, and a code book, the signalers were expected to remain vigilant. In the event of a night time alert, signal fires were used (Commandant 1869). The chief constable of the peninsula reportedly carried a telescope with him on his journeys from station to station, checking on the promptness and accuracy of messages (Evenden 1884). Despite its acknowledged successes, the main semaphore system from Port Arthur to Hobart was closed in late 1849 as an economy measure (Lieut. Governor 1849), although it appears that the local peninsula system was maintained (Commandant 1854). Contemporary correspondence suggests that the loss of rapid communication with Hobart was much regretted, with the system reestablished in 1861 (Anonymous 1861).

One of the most consistent uses of the semaphores was to ensure standard time across the Tasman Peninsula through use of a time ball. Initially employed by the Royal Navy in the early 1830s, a large and readily visible black sphere object would be dropped (still attached by a rope) from the semaphore's yard at a specific time each day, offering a readily understood visual time regulation device (Aubin 2010:164). The clocks at each of the Tasman Peninsula semaphore stations was corrected and regulated by a 12 noon drop from the main semaphore station at Port Arthur and thence communicated along the system, although there is no record of an accompanying cannon shot (Anonymous 1872; Evenden 1884).

Time balls were also used for coordinating the hinterland activities of work gangs. The memoirs of Martin Cash include a number of references to its use as a midday signal and also at other times of the day:

[a]t a quarter to twelve a ball was hoisted at the flagstaff the usual signal for the gangs working in the bush to repair to dinner... [w]e continued to work [in the afternoon] until the ball appeared at the flagstaff, when we were conducted back to the station (Cash 2015:22).

A visitor to the station in 1842 similarly noted that:

[h]alf an hour before evening muster a ball is suspended at one of the yard arms of the semaphore as a signal to those that work in the bush to make their way to headquarters, any absentee being returned as absconded (Burn 1892:36).

Time balls were also used to regulate the military and guards. Instructions issued to the military detachment at Eaglehawk Neck stipulated that activities such as fishing (by the guards as a means of supplementing their diet) could only take place within visual range of the outstation. If a ball was hoisted on the staff

the men were required to “repair to their post with all possible haste” (Anonymous 1851).

The semaphore system was based upon a simple line-of-sight arrangement, where messages were conveyed across the chain to and from known points in the landscape. From historical documentation and archaeological remains we can reconstruct precisely where the semaphore stations were located (Fig. 7). Atmospheric conditions obviously introduced variables into the network, as did the attentiveness of the semaphore attendants. Intervisibility of the main line signal stations transmitting messages between Port Arthur and Hobart is certain. The minor signal stations attached to the substations (and often at lower levels) did not have to be intervisible, as long as they had a view to and from one of these main line stations so that messages could be received from and sent to the wider network.

The semaphore system exerted a zone of time and routine control across the landscape, through the use of the time ball. As an object that needed to be viewed to be effective, we can use viewshed visualization to understand the catchment of control that a semaphore would have exercised (Fig. 8). Mapping the viewshed of the Mount

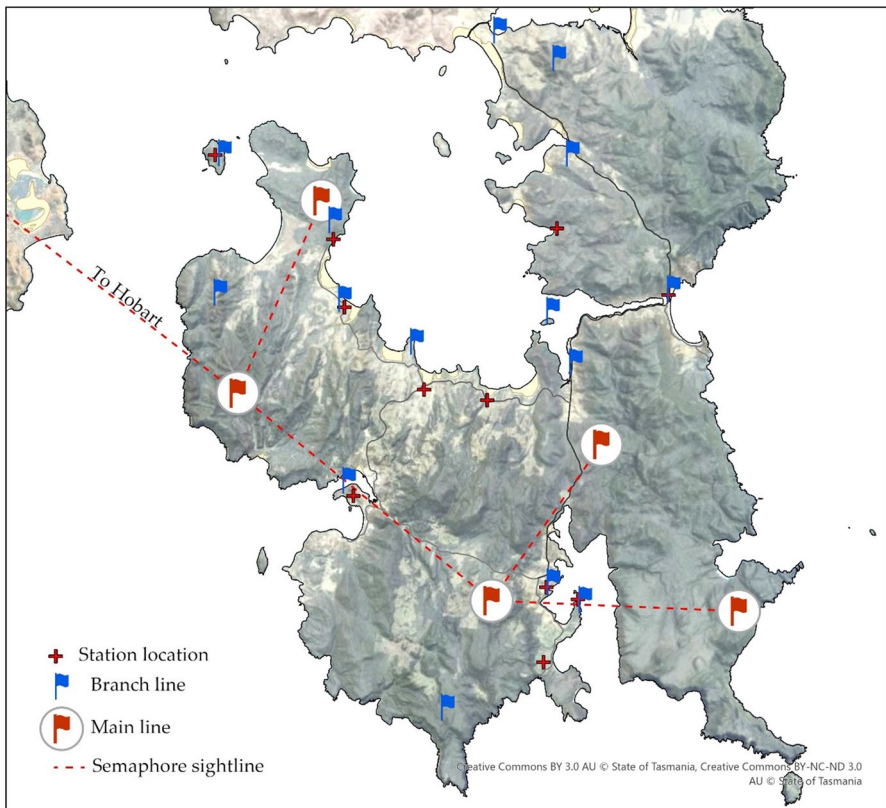


Fig. 7 Tasman Peninsula Semaphore system. Map of line of sight map illustrating the point-to-point nature of the semaphore system (using LiDAR-derived data)

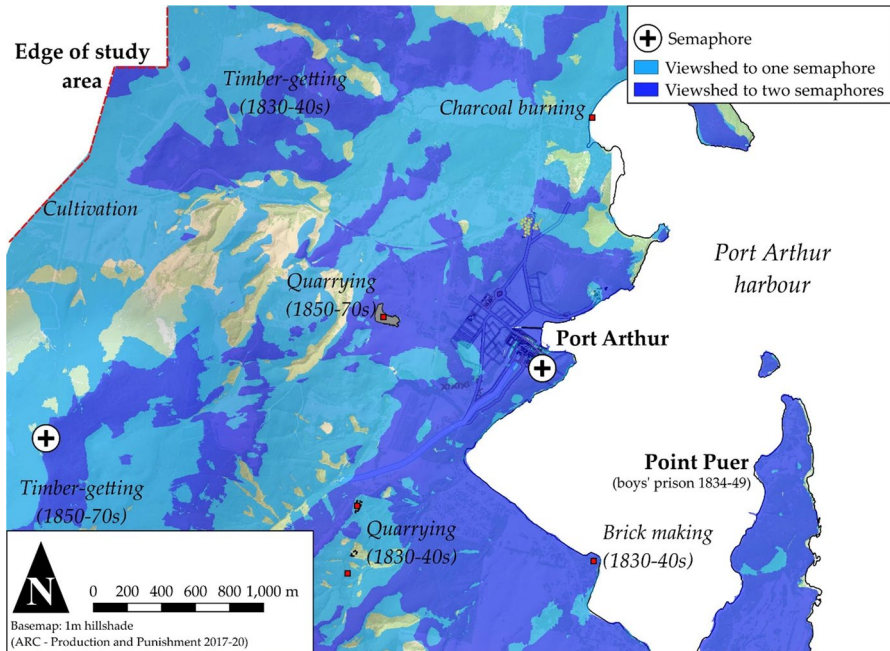


Fig. 8 Map illustrating the viewshed to the Mount Arthur and Port Arthur semaphores. The viewshed was generated from a 1m Digital Elevation Model (DEM, bare-earth). The height of the semaphore was set at 25m, with the observer height 1.6m

Arthur and Port Arthur semaphores illustrates that their control zone extended right across Port Arthur's extended labor hinterland. As such, they provided a clear means of coordination across the carceral landscape. Overseers, military guards and prisoners would all have been incentivized to keep the object in view or at least under observation, as the dropping of the ball indicated an end to work.

Further, it is possible to compute amended viewsheds that consider the impact of vegetation (Fig. 9). Although the effect of vegetation upon historic viewsheds cannot be accurately simulated, the modern vegetation cover around Port Arthur closely approximates that of the later stages of the convict period. Using the classified vegetation returns from the LiDAR-derived data, the DSM's (Digital Surface Models) illustrate that, though the extent of the viewshed was similar, its coverage was drastically reduced.

Placing main points of work on the map indicates that many of them operated within the envelope of the Mount Arthur semaphore – although the level of vegetation growth clearly affected visibility. Figure 10 shows visibility without vegetation cover (bare earth) and some work sites shown. Obviously, the position of labor sites was entirely dependent upon the resource being extracted or manufactured and could not be situated to best facilitate good timekeeping. The provision of portable timepieces may have provided one solution, but in the mid-nineteenth century these were still valuable objects most likely limited to the senior officers and administrators. The simplest solution would have been through the placement of sentries at

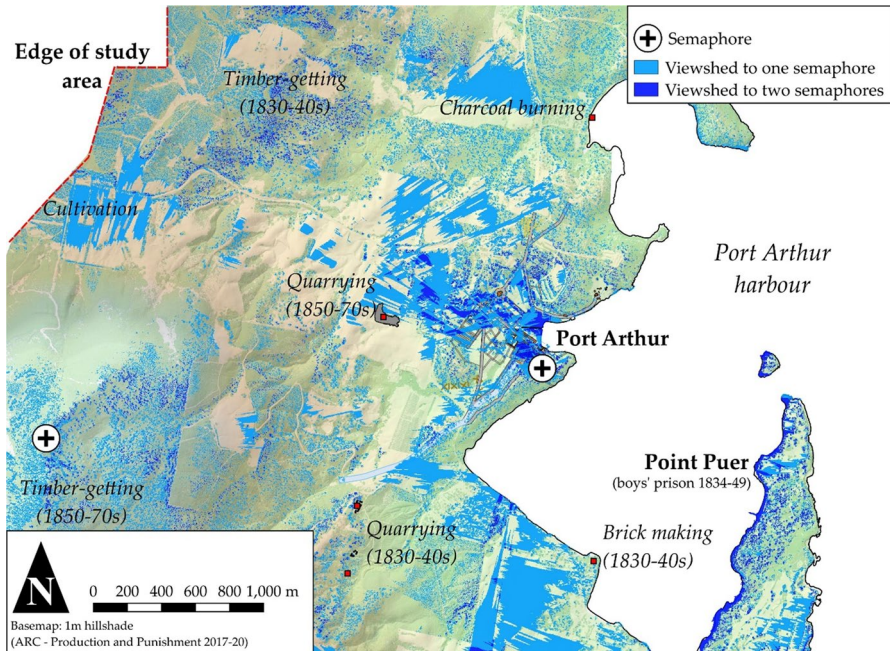


Fig. 9 Viewshed to the Mount Arthur and Port Arthur semaphores (as for Fig. 7), but generating the viewshed based upon a Digital Surface Model (DSM). The drastic impact of vegetation on visibility is clear. The height of the semaphore was set at 25m, with the observer height 1.6m

observation spots and who could then signal down to the work party. When the estimated auditory area of effect of the settlement bell is combined with the visibility area of the semaphores, an indicative “zone of control” can be recreated.

Discussion

The male-only penal settlement of Port Arthur and its substations across the carceral landscape of the Tasman Peninsula present us with a complex carceral landscape, where activities ranged from closely supervised incarceration through to economic enterprises and movement dispersed over a wide area. However, the point we make in this paper is that despite this spatial diffusion and diversity of activity, coordination across the 660 km² of the Tasman Peninsula against a single time reference remained critical, not only for the regulation of the convicts but also for the rigid synchronization of military, guards, and administrators.

We argue that the high degree of coordination across the carceral landscape needs to be understood as also being a function of the industrial nature of the Tasman Peninsula settlements. Petchesky (1993:595) has written on the inseparability of the productivity (and to some degree the profitability) of prison labor “from its ideological function of enforcing discipline and the work ethic.” Port Arthur and its stations embraced an extraordinary gamut of resource extraction, manufacturing, and service

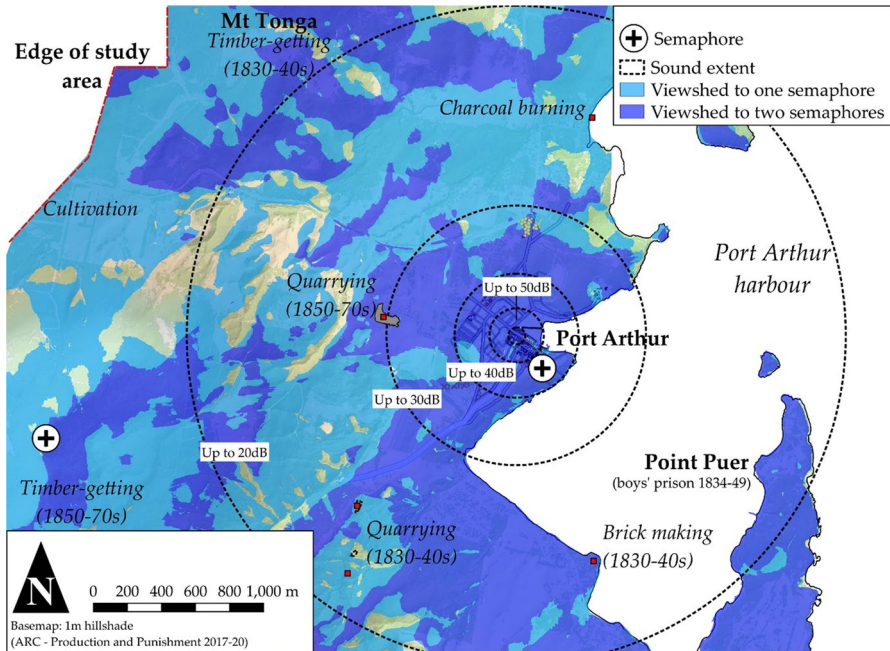


Fig. 10 Combined map showing the estimated auditory extent of Port Arthur's settlement bell overlaid on the semaphore viewsheds

enterprises. Its administrators were increasingly tasked with not only ensuring some degree of economic self-sufficiency, but also with profit generation through supply of materials and goods to other parts of the convict system and the government commissariat, as well as servicing some nongovernment contracts. Managing the flow of materials and labor between the different places and industries to ensure timeliness and productivity, overlain with the ideological requirements of particular labor regimes and the needs for surveillance and monitoring of the conduct of individuals as a means of regulating sentences, created an enormously complex system.

Particularly important for our colonial setting is understanding the tensions between remote administrators based in the UK or metropolitan centers mandating idealized regimes with little notion of the environmental, spatial, or social realities of the colonies, versus practical management of daily routines by the on-the-ground administrators at these stations. To this end, the *Landscapes of Production and Punishment* project has explored the degree to which the requirements and restrictions specified in the formal routines could have been achieved without significantly compromising labor outputs (i.e., Tuffin et al. 2020). Adherence to the standard schedules would have been impossible. Compromise of necessity, regardless of the idealized routines espoused by remote administrators, underwrote the day-to-day experience of free and unfree alike, reinforcing the need to read historical sources as markers of intent only (Lenik 2012; Robbins 1999).

The archaeological and documentary analyses demonstrate how the interlocked and multiscalar (core, hinterland, and intersettlement) systems of visual and audio

time signaling were made essential by the combination of distance and topography (see Fig. 4). Audio systems were primarily limited to the closed internal spaces and local areas of settlement, linked to the semaphore which then spread a zone of control or net of surveillance and time compliance across the peninsula as a whole. The message capacities of the semaphore ensured that even complex administrative and industrial activities and movements within and beyond the peninsula was well informed and regulated. Within minutes not only the penal settlements but Hobart and then the colony at large could be advised of the precise details of absconders and escapees, extending the web even further. However, as autobiographical accounts by convicts indicate, prisoner awareness of these systems and the relentless visibility of semaphore stations extended the feeling of surveillance even to the spaces in between the more formal settings of supervision. Such mechanisms, and the infrastructures of formal and informal policing and surveillance, created the wider colonial landscape as a type of transcarceral space, outside of the institutional area but interacting with and supporting it (Allsprach 2010; Trinca 2006).

Acknowledgments The Authors would like to thank their colleagues in the *Landscapes of Production and Punishment* project including, Prof. David Roberts, Prof. Hamish Maxwell-Stewart and Dr David Roe and Dr Caiti d'Gluyas, as well as the administration and staff of the Port Arthur Historic Sites Management Authority. Thanks also to Louise and Richard Archer of Brickendon for access to their convict era bell. We also thank the two anonymous reviewers for their insights.

Funding Open Access funding enabled and organized by CAUL and its Member Institutions

Declarations

The authors have no relevant financial or non-financial interests to disclose.

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