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Parallax projections: Decay, entropy and obsolescence at Wangi Power Station

Opened in the early 1950s in post-war Australia, Wangi Power Station is a decaying, post-industrial relic that sits on the edge of Lake Macquarie, north of Sydney, and at its height provided one-third of the state of New South Wales's (NSW) electricity. The building embodies an era of architectural ambition for industrial infrastructural development and was the first power station built on the site of a coal seam (as opposed to the site where the electricity was required). It is also the last power station constructed in Australia to follow the English model of industrial architecture, employing intricate brick massing as opposed to the more skeletal steel structures that followed. From the time of its conception, the generation technology utilised in the power station was already mostly redundant and when it closed in the mid-1980s, it fell into disuse and decay. It has sat dormant ever since, laced with graffiti, slowly ravaged by vandalism and overgrown with vegetation like an ancient jungle temple. The precarious state of the building opens questions of the preservation and archiving of industrial heritage and the role drawing plays in documenting both the architecture of these highly complex buildings and their state of imminent collapse.

This paper discusses recent drawing projects of Wangi Power Station exhibited as part of *Counternarratives* (Watt Space Gallery, January 5–28, 2021) that supplement the existing archive of drawn and photographic material from the period. These creative works explore hybridised digital and analogue technology and document the dereliction and decay of this highly complex and threatened building that sits at a critical junction in the history of the twentieth century. The authors of this work develop different but related methods to represent Wangi in its current state of abandonment, with each author bringing their own toolkits and modes of representation to develop a more complete and nuanced picture of industrial ruination.

Permeated by Walter Benjamin's writing on obsolescence and technology, these drawings embody notions of time, decay, and erasure; processes of collapse that have replaced meticulous regimes of maintenance. The *Counternarratives* projects set out some methods of drawing to record decay and decomposition, using a range of media for documenting the complex industrial structures and their geological and social contexts. Hybrid drawing processes augment, stitch together and reconstruct the varying resolutions, inaccuracies, distortions and

incompleteness of photography and drone capture. This process of drawing embodies the rigour and technical detail of the working drawing, and its multiple frames of reference, further inflected by processes of erasure, decay and entropy. The paper positions these documentary processes within a broader context of architectural drawing and its theory, and proposes decay, entropy, and obsolescence, captured through hybrid drawings, as a new form of architectural knowledge.

Wangi Power Station

With the rapid mobilisation of industry in the early twentieth century, through the pressure on cities after the World War II, the relationship between architecture and industrialisation became one of mutual interdependence. Where the early avant-gardes, such as the futurists, saw the promise of a utopian future city, in the dams and power stations of the pre-war decades, the post-war city embodied industrialisation as an essential engine in the development of the modern city, embracing the programmatic connectivity of the machine, as much as its towering aesthetic. However, this was also accompanied by scepticism of machinic industry, tied to its perceived lack of emotion, its complicity in the horrors of the two world wars, and its increasingly dialectical relationship to nature and the environment. The twentieth century saw industry framed in successive architectural histories as a paradigm of both the new and the obsolete, both discovered and recovered as innovation and ruin. As industrialisation advanced, it left behind a trail of dormant and rejected technologies, rusting in the shadow of newer ones. For Benjamin, it was in its obsolescence that technology assumed its ultimate form of cultural expression, binding aesthetics of ruin and new within technologies of industry (Benjamin, 1978a). As Sigfried Giedeon observes in *Mechanisation takes command*, by 1948 the processes of industrialisation had directly and dangerously impacted humanity's relationship to nature. Technology

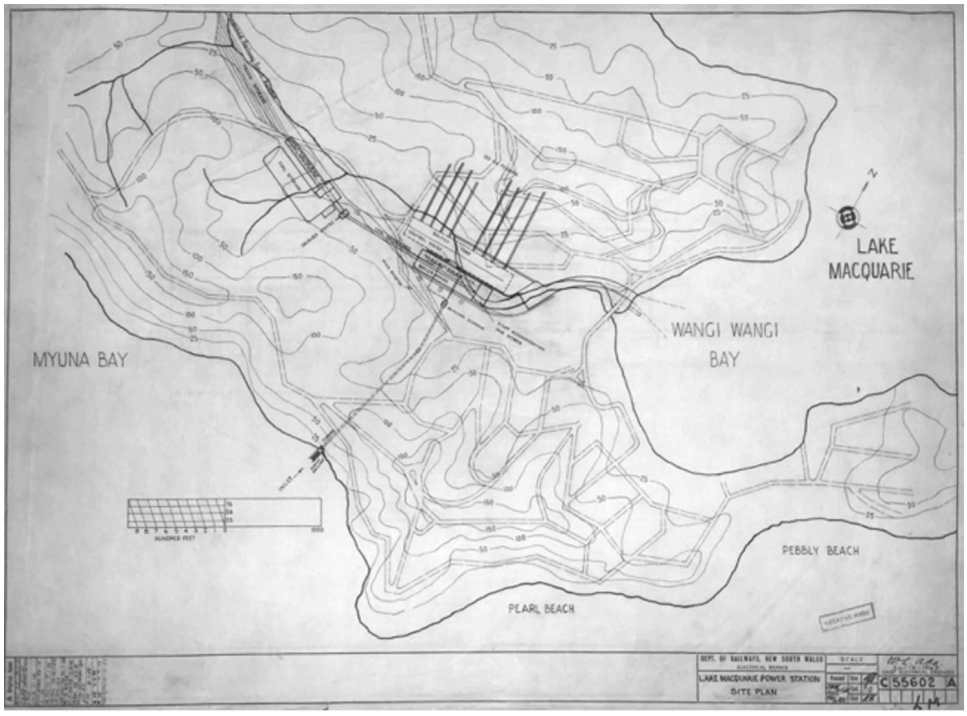


Fig. 1 Site Plan from the Wangi Archive, (1947) . [University of Newcastle Cultural Collections]

was no longer an adjunct to everyday life, but a barrier to genuine and authentic human existence (Giedeon, 1969; see also Chapman, 2012).

It was from this vantage point, in the aftermath of World War II, that the epic project for Wangi Power Station first emerged. Sited within a tranquil, and largely untouched area of bushland, next to a large lake, the power station at Wangi was a complete transformation of the environment and the demographic and cultural character of the region (Fetscher, 2018). The initial construction took over a decade and involved over a thousand workers. Not only did the site offer access to clean and consistent water supply, but also direct access to coal, critical to the production of power. The history of the Hunter Valley is inseparable from the extraction of coal (Ellis, 1959), but in the 1940s this changed: it became more economical to transport power than coal, and power stations were built close to coal's extraction, rather than near cities where power was needed (Anderson, 1955). Wangi was the first power station in Australia built on this model. It linked to vast infrastructure projects that connected Sydney with state regions in a network of production and distribution unprecedented in Australia's history (Thornton, 2020; see also Thornton, 2015). The power station is imposing and prominent in the landscape, but it is the layers of coal seams below it, unseen beneath the landscape's surface, which define its historical and cultural significance and legacy. The original drawings of the site, preserved in the Cultural Collections archive at the University of Newcastle, show the extent to which architectural decisions impacted upon landscape's industrial transformation. Interwoven across hundreds of pages, drawings mark out the shape, space and directionality of a new industrial machine, designed to extract the fuels required for its sustenance (Fig. 1).

Amongst the first drawings undertaken for the *Counternarrative* show were drawings of this geological relationship, of co-located industrial extraction, through drawing the sectional relationship of the power station with Lake Macquarie. The drawing *Rockbottom: Section* (Fig. 2) is an east-west section through Newcastle, cutting through Wangi and Lake Macquarie. This drawing was in response to two sections produced by BHP in 1961 that recorded coal seams deep within the landscape, and the points where they surfaced. The *Rockbottom* drawing was across 11 panels, each 600 x 1200mm, and used a methodical scoring technique to texture the page, prior to graphite rendering which revealed these marks. The primary role of the drawing was to open questions in the relationship between time and scale. A meticulous and labour-intensive drawing process resonated with the 300-million year history of the 22 coal seams under Newcastle. An enormous drawing captured geological dynamics over several weeks, with graphite removed and then built up in a sedimentation of temporally charged marks over the page.

The outcome of the Wangi power station's siting was the complete and total transformation of the environment. Large areas were deforested to make way for the power station and supporting infrastructure, with tunnels and slipways being constructed to manage complex natural hydraulics. By the time the power plant opened on November 7, 1958, it was a symbol of innovation and modernity that put Wangi on the geopolitical map, and a source of pride that shaped a new identity for the working class region of the Hunter Valley around the purposeful production of the state's power. The architecture itself (designed by C. H. Smith & Johnson Architects) appeared to make a nod to this futuristic imagery, with

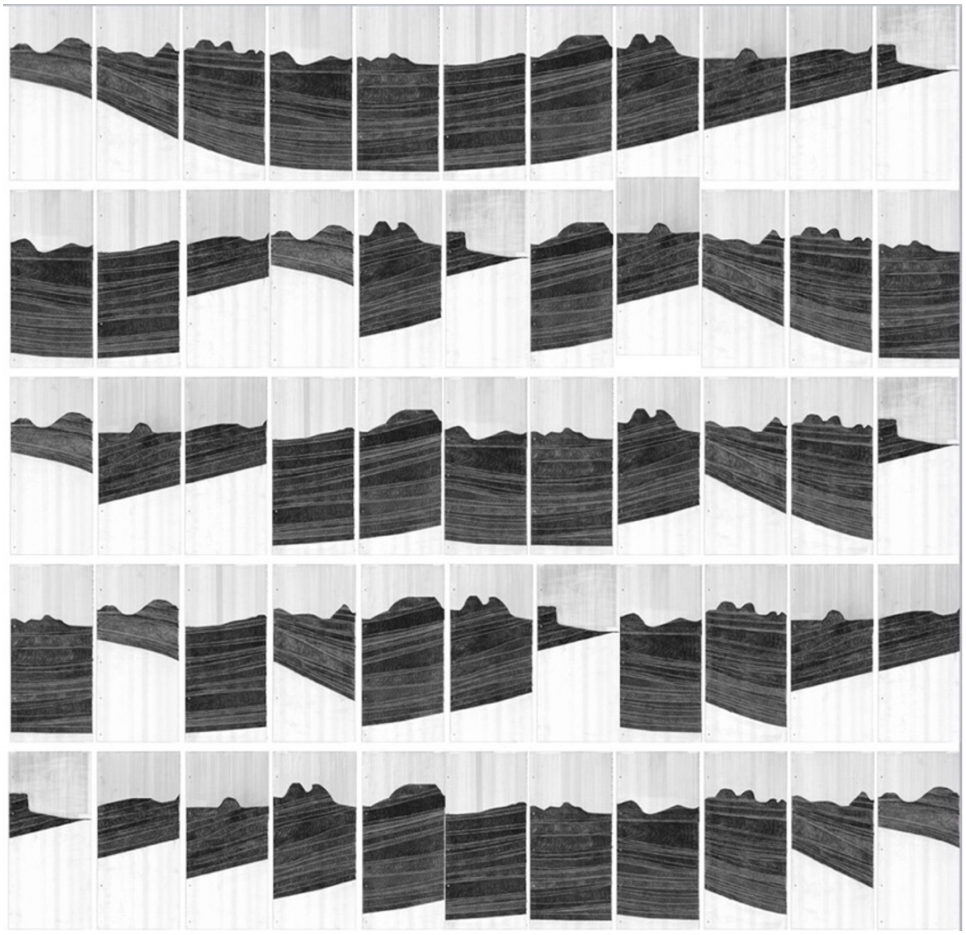


Fig. 2 Michael Chapman (2020). *Rockbottom*. [Section, Newcastle Coalfield. Courtesy: Author]

chimneys layered with space-age flourishes and details that belied their purely functional purpose (New South Wales Office for Environment and Heritage, 2018; C and M.J. Doring (Firm), 1990). The archival drawings show an obsessive and meticulous documentation of the power station machine, and its refinement into a sophisticated architecture, merging futuristic aesthetics and technical processes (Fig. 3).

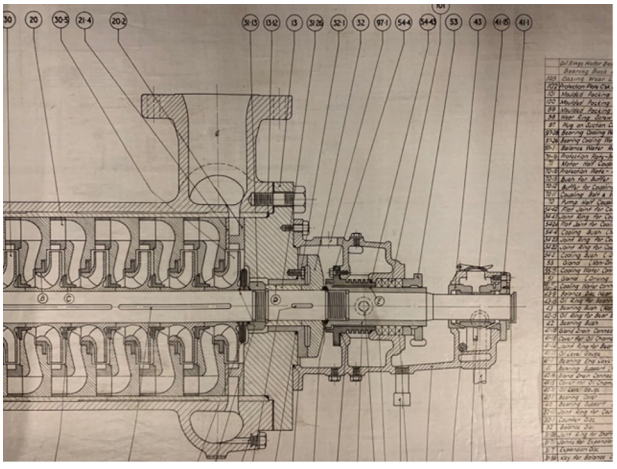


Fig. 3 Mechanical Section from the Wangi Archive. [Section, Wangi Power Station. Courtesy: University of Newcastle Cultural Collections]

Despite its transformative twentieth-century history, Wangi Power Station now provides a quite different historical vantage point. Decommissioned in the mid-1980s, as nearby Eraring Power Station came online, the vast complex was sold in the early 1990s and has been abandoned ever since. Arriving at the site, the visitor peels back layers of history, disuse, and vandalism in order to uncover the monolithic structure, now covered in weeds, graffiti and rust. Like the encounters with ruined ancient sites that mobilised the imagination of the French Enlightenment architects, the overrunning of the building by nature creates a distance with its functional past and the histories it embodies. The trajectories of modernism, industrialisation and energy production have all taken dramatically different paths, but the rusting edifice of Wangi has stayed where it is. In this sense, it provides

unique access to ideas around fixing, maintenance and care. Through the absence of these, through its abandoned degradation, the architecture of Wangi can be revisited to construct an alternative history of the twentieth century. The tools for this re-presentation of history are radically contemporary: the drone, the terrestrial scanner, the hybridised computer drawing, and the digital camera. These contemporary machines provide techniques to record the obsolescence of this distant and collapsing mid-century machine.

Optical entropy

Within the *Counternarratives* exhibition, the work titled *Entropy* deliberately set out to explore these contemporary technologies to record broader historical cycles bound up in the phenomenon of Wangi. The premise for the project was to look at the rusting power station through three separate but inter-related media: photography, drone photogrammetry, and hybridised drawing. Five triptychs framed different but simultaneous views of Wangi Power Station, firstly, from a camera, second as a drone photogrammetry mesh and then finally as a hybridised drawing (Fig. 4).

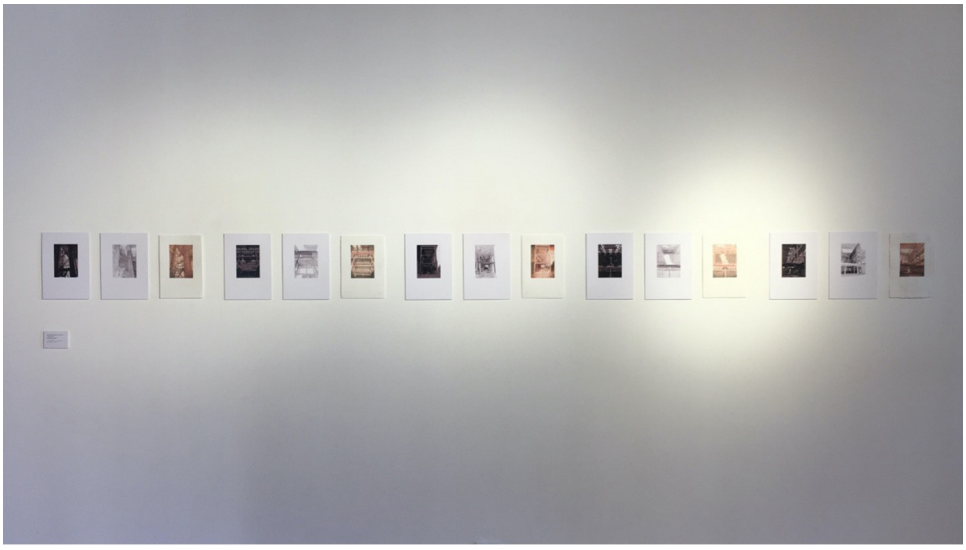


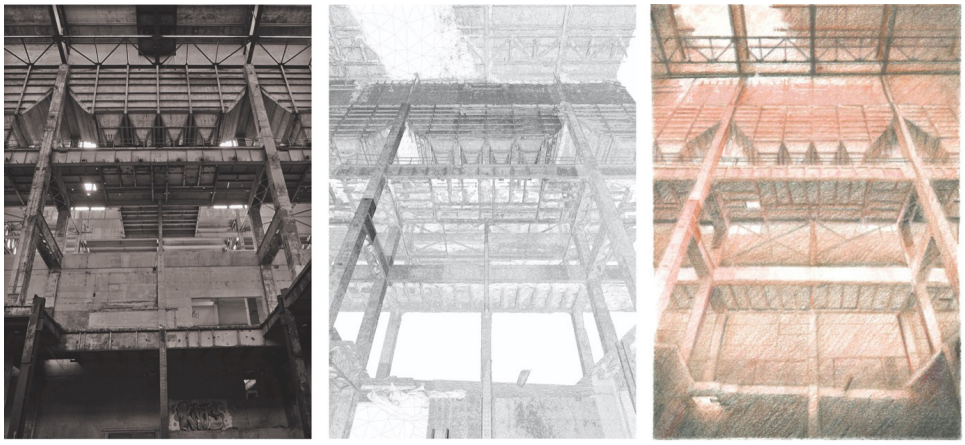
Fig. 4 (2021). *Counternarratives* exhibition). [Photograph, Watt Space Gallery, Newcastle Australia, author]

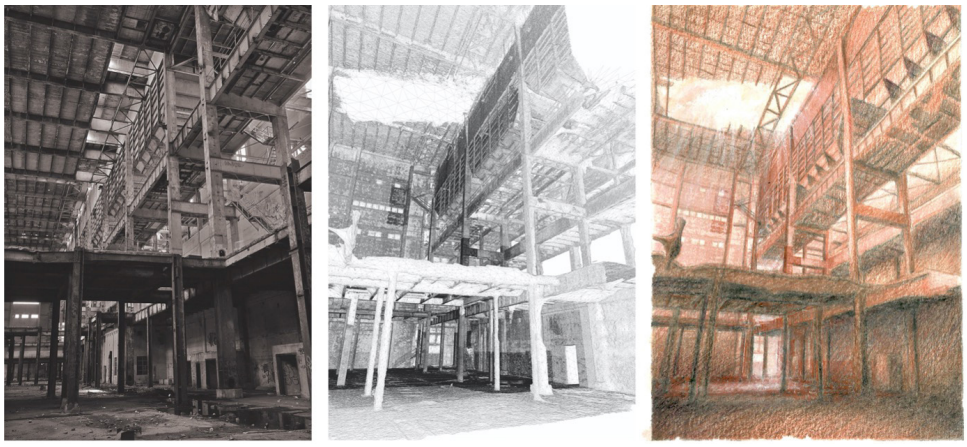
Each part of the triptych was distinguished by medium and by author. The first author used photography to capture and transmit the on-site experience of the space in first person perspective. The next author produced a photogrammetry mesh from several days of intricate drone scanning, capturing the site and machinery in as much detail as possible. Using the three-dimensional mesh, perspectives from the photographs were found within the digital model and replicated as two-dimensional images. The third medium used hybridised drawing that reintroduced atmosphere to the desensitised digital mesh through analogue drawing methods. These drawings were completed away from the site, combining the photography and drone photogrammetry to re-draw a reimagined state of the building by manipulating and repairing fragments and holes left behind in the digital process.

There were five drawing sequences which, as a set, started to reveal the intersection of these tri-partite representational modes, as well as their inherent incompleteness and symbiosis. This provided a process through which the decay

and ruination could be documented and drawn out through the three mediums. The *Entropy* drawings provide a unique record of the state of Wangi, torn between its presence as a highly functional machine of the future, and its ruin and obsolescence. They document, in this sense, a particular junction in the twentieth century, where values, architecture and technology shifted, in a way that the hulking rusting monolith could not (Figs. 5–9).

Site photography is used as the starting point to the *Entropy* work, not only as the first image of each triptych, but in the curation and framing of each vantage point of the series. The photograph provides the datum and index for the





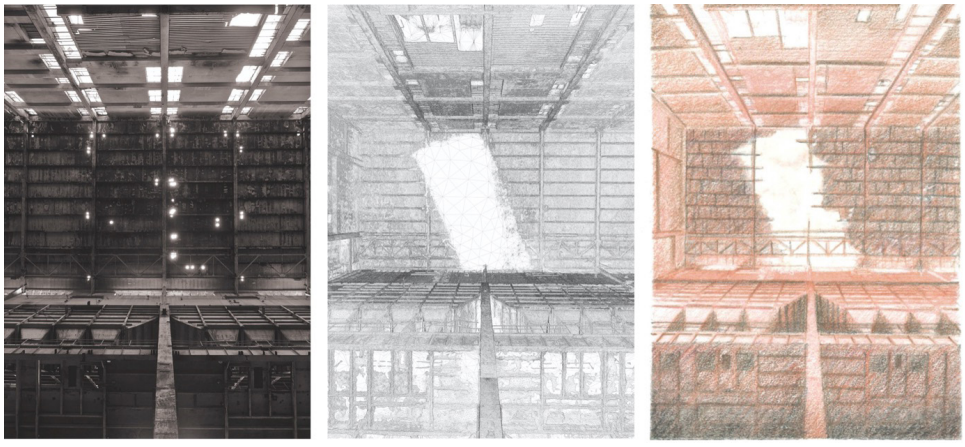


Fig. 5 Michael Chapman, Peter Fisher, and Timothy Burke (2021). *Entropy (Bins)*. [Photograph, digital print, drawing, authors]

Fig. 6 Michael Chapman, Peter Fisher, and Timothy Burke (2021). *Entropy (Hall)*. [Photograph, digital print, drawing, authors]

Fig. 7 Michael Chapman, Peter Fisher, and Timothy Burke (2021). *Entropy (Roof)*. [Photograph, digital print, drawing, authors]

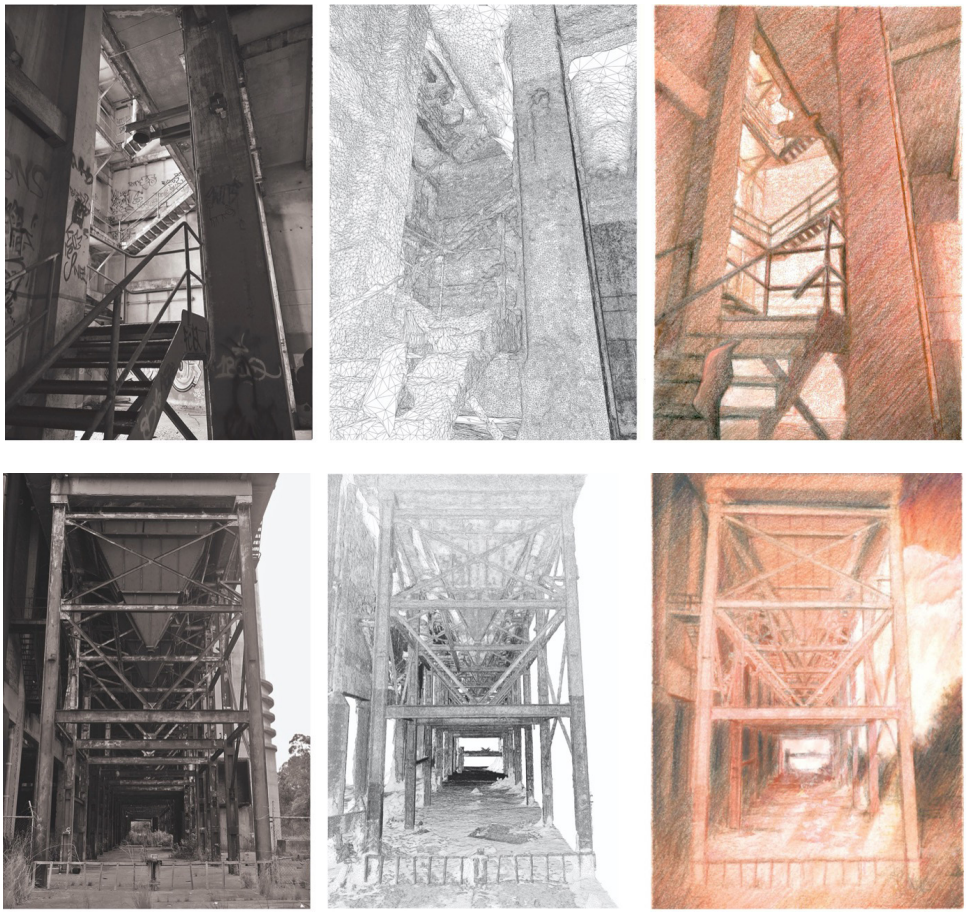


Fig. 8 Michael Chapman, Peter Fisher, and Timothy Burke (2021). *Entropy (Stair)*. [Photograph, digital print, drawing, authors]

Fig. 9 Michael Chapman, Peter Fisher, and Timothy Burke (2021). *Entropy (Exterior)*. [Photograph, digital print, drawing, authors]

parallax modes of seeing in both the drone and the computer drawing techniques. Through the photographic gaze, qualities such as scale and volume, decaying surface qualities, the palimpsest of graffiti, and the play of light against the complex structures are captured. In sites such as Wangi, this encounter between the world, and moments in time, is particularly poignant. Carefully framed images of the plant after its opening in 1955, paired with highly evocative contemporary shots of its ruination and decay, exaggerate the atmosphere and presence of layers of neglect and vandalism. If the opening photograph was a *fixing* of social mores from the 1950s, framed against the glistening machine, the contemporary images capture the site in its current state, its unravelling and *unfixing*. Not only has the machine lost its lustre, but it expresses a vulnerability and fragility as the layers of its structure are first rusted or weathered, and then vandalised. In Wangi, the human experience of the handheld camera provides a direct and intimate encounter with the scale and scope of the power station, which is notably different to the objectivity and scrutiny of the mechanical drone. The camera provides a relationship to the human and its mortality, which appears paired with the mortality of the building. This emotional encounter between an individual and the building, where the camera is the only interface, records time and emotion in ways unique to the late capitalist condition, where a sense of frailty and inevitability has replaced the optimistic faith in the future and progress.

There is a resonance in this with the taxonomies of industrial archaeology in

the work of Bernd and Hilla Becher, who developed a systematic and objective photographic style to record the industrial structures of Europe and America throughout the 1960–1990s. In an attempt to document heavy industry during a time when abandoned and disused industrial structures were disappearing from the landscape, the Bechers developed a distinctive method of photographing elevations of structures such as gas tanks, winding towers and blast furnaces. Driven by a desire to protect the historical, cultural, and aesthetic value of the structures, the photographs can be read in the same way that Benjamin viewed photographic images of emerging industrial forms. He saw these as "fossils" or works that interpret the collective political values of society embodied within them (Buck-Morss, 1989: 56). Benjamin was interested in the political value of the photograph, as an emerging technology, particularly in his 1930s essays: *A Small History of Photography* (1931), *The Author as Producer* (1934), and *The Work of Art in the Age of Mechanical Reproduction* (1936). For Benjamin, photography "[...] can no longer depict a tenement block or a refuse heap without transfiguring it" (1978b: 230). This alludes to a dialectical relationship with the machine. For Reyner Banham too, the value of photographic documentation is akin to archaeology, where the Bechers' archival process creates, in effect, "a dusty *Corpus Machinorum* awaiting the attention of some dry scholar with his magnifying glass and box of file cards" (1993: 7). Banham was interested in how the Bechers' way of representing the machine not only uniquely cultivated the value of industry in the post-industrial age but also formed a language of post-modernism through the medium. As Banham writes:

> the industrial vision of the Bechers has become part of the way we see today; our shared experience of their dead-pan portraits of pit-head gear and water towers and blast furnaces has been an essential part of what one might properly term (paraphrasing le Corbusier), *la Formation de l'Optique Post-Moderne*. (1993: 7)

When taken out of their own local contexts, the ubiquity of these alienated industrial forms makes obvious the inevitable future of technology to eventually become obsolete and fall into ruin. This is true too for the *Entropy* photographs of Wangi Power Station. These photographs provide a visual reference point, capturing the machine not only in the present but also backward in time, as the layers of degradation are revealed on its skin.

Digital archaeologies

Central to understanding the relationship of Wangi to a broader history of the twentieth century is an appreciation of shifts in technology that dramatically influenced industrialisation in the period since World War II. When Wangi was constructed, extensive hand-drawn technical drawings obsessively documented every junction, machine, housing, and process that this architectural machine would deliver. An archive of more than 5,000 drawings recorded the relationship between the future plan and its execution through technology (Mbembe, 2002: 19; see also Kauffman, 2018). In the decades since, this relationship has been inverted. The ravages of time, decay and obsolescence have framed a new archive of historical material. Technology, specifically digitisation, has enabled a vast diversity of data to be collected and disseminated, providing unprecedented ways in which fragments of history can be recorded and reassembled. Where

the technical drawing was once a contractual relationship with the future, the digitised and hybridised drawing of the twenty-first century allows a new relationship to the past, allowing moments across this historical trajectory to become simultaneously available. The technical drawings that provided the basis for the construction of Wangi are not the endpoint, rather the starting point for this radical archaeology of obsolescence.

Drone photogrammetry is a technique that is naturally suited to sites such as Wangi, where there are layers of complexity, issues with safety and access, and an imposing scale. The premise with drone photogrammetry is that large amounts of photographic material are collected from a constantly moving source and software is then used to compile this data into a three-dimensional mesh, constructed from the multiple perspectives in the drone imagery. The ability of automated drones to fly in and out of narrow passages and between different components of complex machinery provides a large amount of detail not only of the three-dimensional form, but also of surface texture. In situations such as Wangi, where these surfaces have often been extensively corroded with rust, and layered with graffiti, this technique can record and map the surface in ways not available from other vantage points. This information can be then compared and mapped to technologies such as terrestrial scanning, which collects data from a fixed point, and then used to triangulate this data as the point is moved around the space.

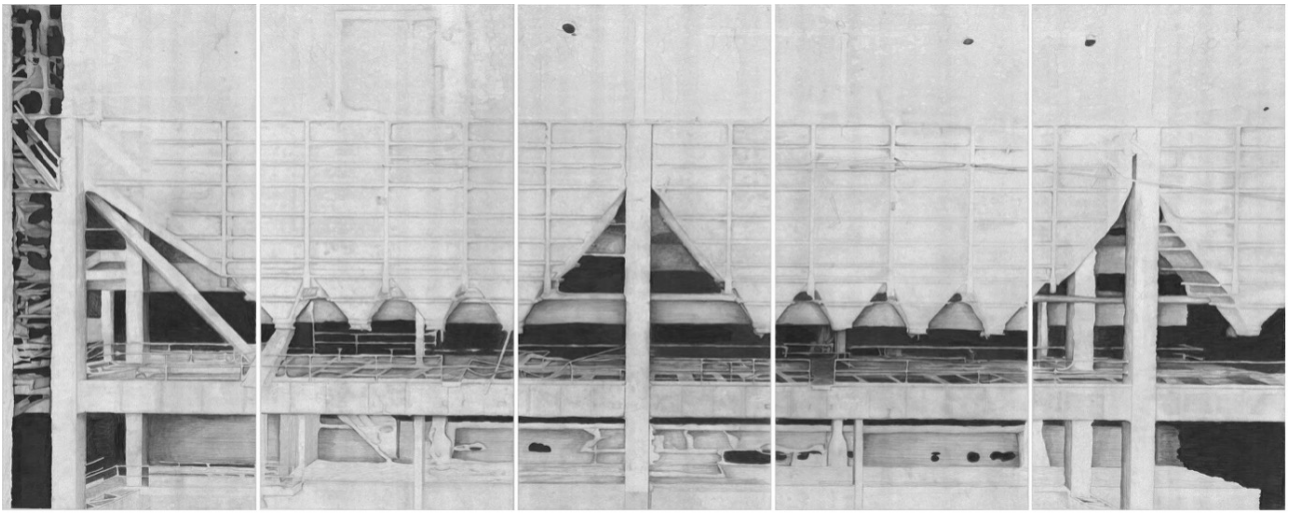


Fig. 10 Michael Chapman and Kati Ross (2021). *Section: Scar.* [Drawing, authors]

The large five panel drawing *Section: Scar* (Fig. 10) was undertaken as part of the *Counternarratives* exhibition. It was a large format hybrid drawing that used the imperfect mesh from the drone photogrammetry as a starting point. The drawing process wove graphite in and out of the triangulated mesh, building up detail and three-dimensionality over time, and a detailed tracery of hierarchical lines. The drawing was undertaken as a collaborative process, between drawer and digital media, where the pencil became a kind of stitching together of the holes left by imperfections in the photogrammetry mesh. Correlations and black holes between these were accentuated to resonate strongly in some parts and provide chasms of emptiness in others. Architectural drawing, as a process of observation and documentation, can be used to fill these technological chasms. This can be directly compared to the archival technical drawings describing the same machinery. This hybridised drawing technique documents the processes of decay,

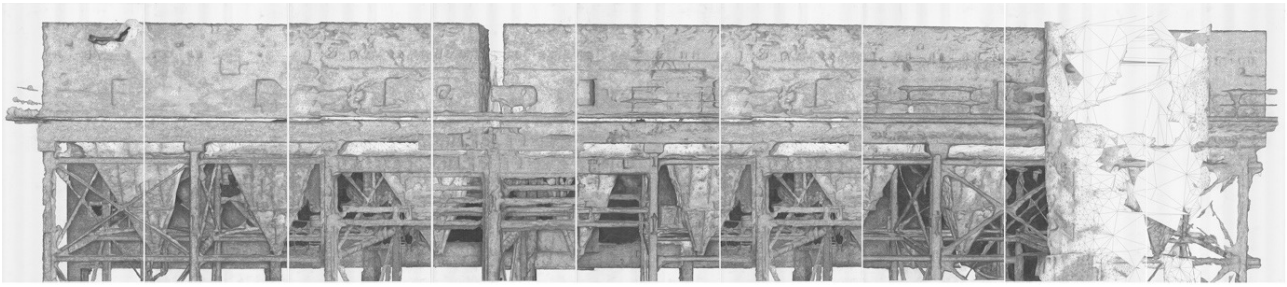


Fig. 11 Michael Chapman and Kati Ross (2021). *Section: Alchemy*. [Drawing, authors]

ruination, and entropy in a way that the technical drawing, in its contractual optimism, can't. *Section: Scar* constructs a narrative not only of the building, but of the role of technology across the landscape of the twentieth century.

The capacity of digitisation provides new modes of encounter with this industrial archaeology, bringing multiple forms of data and information into play and comparison. The hybridised drawing provides a framework for assembling data, but also enriching it and making it available to a broader history of architectural representation.

In another large format drawing entitled *Section: Alchemy* (2021; Fig. 11), the decaying machinery of Wangi is deliberately paired with drawing processes of medieval anatomy, placing the machine on the table like a medieval corpse. This stylistic rhyming with medieval drawing is intended to resituate the plant within a surgical context, where it is no longer a functioning and reliable machine, but one that is wounded and in pain. The drawing is instructive in understanding obsolescence, in the same way that medical data was collected and disseminated for the greater good of science. This forensic mode of recording the ruination of industrial infrastructure is only one of a number of representational devices that archaeological heritage can now engage with in reconstructing the dominant narratives of the Twentieth Century. In this sense, the historical archive and that given by contemporary techniques offer bookends to a process of industrialisation, with start and end repackaged within a new canon of architectural representation.

Drawing decay

In comparison to the opportunities for accurate documentation provided by photography and photogrammetry, traditional hand drawing remains significant in its capacity to *draw out* qualities that escape those technologies. As a point of departure, and the final stage of this process, the illustrations of the *Entropy* series speculate on an imagined future of continued decay and ruination. By drawing in pastels and coloured pencils, accurate representation is abandoned in favour of creating atmosphere through the looseness of how sepia tones are applied to the surface of the paper. The inaccuracies of the digital model from the photogrammetry process are amplified in these drawings, as a means of abstraction. The drawings maintain the distortions from the model which manifest as organic shapes, or missing sections of structure. This creates an artificial decay where the works receive their namesake: entropy, understood as the gradual decline into disorder or disarray. This incremental distortion from photography, three-dimensional mesh, to pastel drawing is central to this creative process, of distancing the actual matter of the building. The drawings are in deliberate

contrast to the accuracy and fidelity of the original photographs, to provoke the imagination of alternative narratives.

The *Entropy* drawings connect to a broad history of speculative architectural drawings, that use narrative to construct meaning. These are where the primary purpose of the drawing is as a communicating vessel, rather than to construct buildings. Works by Giovanni Battista Piranesi, Iakov Chernikhov, and Lebbeus Woods create narrative-rich drawings that use fantasy to explore expansive ideas of architecture. For example, accompanying the drawings of *Gothic Industrial Architectural Fantasy* (1932–36), Chernikhov writes, "Architectural fantasy stimulates the architect's activity, it arouses creative thought not only for the artist, but it also educates and arouses all those who come in contact with him; it produces new directions, new quests, and opens new horizons" (2019: 33). This is played out in *Cycle of Architectural Landscapes* (c. 1930), where Chernikhov's perspective drawings of expressive constructed landscapes are overlayed with complex space-frame structures and cranes.

These drawings share a visual similarity to Piranesi's *Carceri d'invenzione* (*Imaginary Prisons*, c. 1749–50), where dramatic subterranean interiors are composed to create a seemingly infinite interiority strewn with archaic machines, cranes, bridges, and torturing devices. Compared to the fineness of detail in Piranesi's etchings, Chernikhov is far more expressive, enabled by applications of gouache and ink on paper in harsh, scratchy strokes. Of far more significance, is the ideological shift in replacing the classical architectural forms in favour of industrial structures that simultaneously appear in a state of construction and ruin. Embedded within Chernikhov's atmospheric drawings is an aestheticisation of the ruin which bears provenance to Piranesi's interest in archaeology. His highly influential four-volume publication, *Le Antichitá Romane* (1756), which contains over 250 etchings of historical Roman ruins (Wilton-Ely, 2013), inevitably carries into his own imaginary architectures, but so too in works such as John Soane's *Architectural Ruins: A Vision* (1798). These drawings imagined London in ruins, the most iconic being Joseph Gandy's *Rotunda of the Bank of England* (1788). This provenance carries through to Lebbeus Wood's *Centricity* (1986–88). While the science and technology Woods draws from is more advanced than Chernikhov's, it shares the same indistinction between destruction and construction. Similarly, what distinguishes the *Entropy* series is its post-industrial context which, far from being an advancement of industrial technology, is one of valorising abandoned structures of the recent past. The narrative reorients the focus from drawing new forms of architecture to reimagining the fallout of a growing landscape of obsolete post-industrial ruins left in a state of decay.

In this way, the *Entropy* drawings are interested in capturing industrial fantasies more closely oriented towards Walter Benjamin's *phantasmagoria*, where a collection of "dream-images" or "wish-images" are dialectically urban and industrial, real and imaginary, past and future (Buck-Morss, 1989: 56). In one such example in the *Arcades Project*, Benjamin quotes the French journalist and economist Eugéne Buret who writes "[t]he most fantastic creations of fairyland are near to being realised before our very eyes… Each day our factories turn out wonders as great as those produced by Doctor Faustus with his book of magic" (Benjamin, 1999: 462). This phrase captures the optimism and wonder at the beginning of the industrial revolution where the difference between magic and technology was indistinct. This childish reverie can similarly be seen in the

cartoons and works of fiction of William Heath Robinson, and Hayao Miyazaki. The *Entropy* drawings directly draw precedence from Japanese artist Minoru Nomata's coloured pencil studies of imaginary structures in his book *Elements* (2013), and Sydney-based children's author and illustrator Shaun Tan's *The Lost Thing* (2000). The Wangi drawings reference both technical and narrative elements of these precedents, in the graphic possibilities of coloured pencil drawings, and how this drawing style is used for storytelling. In those illustrated works the difference between what is real and what is imaged is of no consequence. The narrative is still capable of evoking imagination, empathy, humour, morality, and delight. These illustrations are a proposition, a conversation, an invention where something is brought into being through the act of drawing, and where meaning is actively embedded. Drawing Wangi involves a similar bringing into being. Rather than simply capturing matter, the Wangi drawings allow the spirit of the building to be captured, they create interest and intrigue to invite audiences into the story of Wangi and reframe its perception.

Conclusion

The *Counternarratives* projects provide a glimpse into the twentieth century through technologies twisted and contorted into the twenty-first. In this process, the very notion of perspective and representation has been shifted and modified and is now situated directly between binaries of new and old, natural, and mechanical. Where the mid-century mobilisation of the machine, as an agent of industrialisation, initiated widespread and long-lasting transformations to the natural environment, the late modernist machine provides a lens through which these failures can be documented and reconstructed, as well as the social and technological shifts that orchestrated the modernist machine's obsolescence. Through all of this, Wangi provides an effective and faithful backdrop as both the machine of industrialisation and the lens through which it can be viewed. It repositions industrial architecture in an expanded canon of architectural drawing and representation and resituates decay as an agent of innovation, rather than collapse. This shifting of narratives, and the techniques for documenting it, provide a lens through which to reconstruct the history of the modernist project, its optimism, its pessimism, and its ultimate incompleteness.

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