

A comprehensive anthology, *The Aotearoa Digital Arts Reader* provides a snapshot of digital art practice in Aotearoa New Zealand. Editors Stella Brennan and Su Ballard present essays, artists' pageworks and personal accounts that explore the production and reception of digital art. Ranging from research into the preservation of digital artworks to the environmental impact of electronic culture, from discussions of lo-tech aesthetics to home gaming, and from sophisticated data mapping to pre-histories of new media, this book presents a screen grab of digital art in Aotearoa New Zealand.

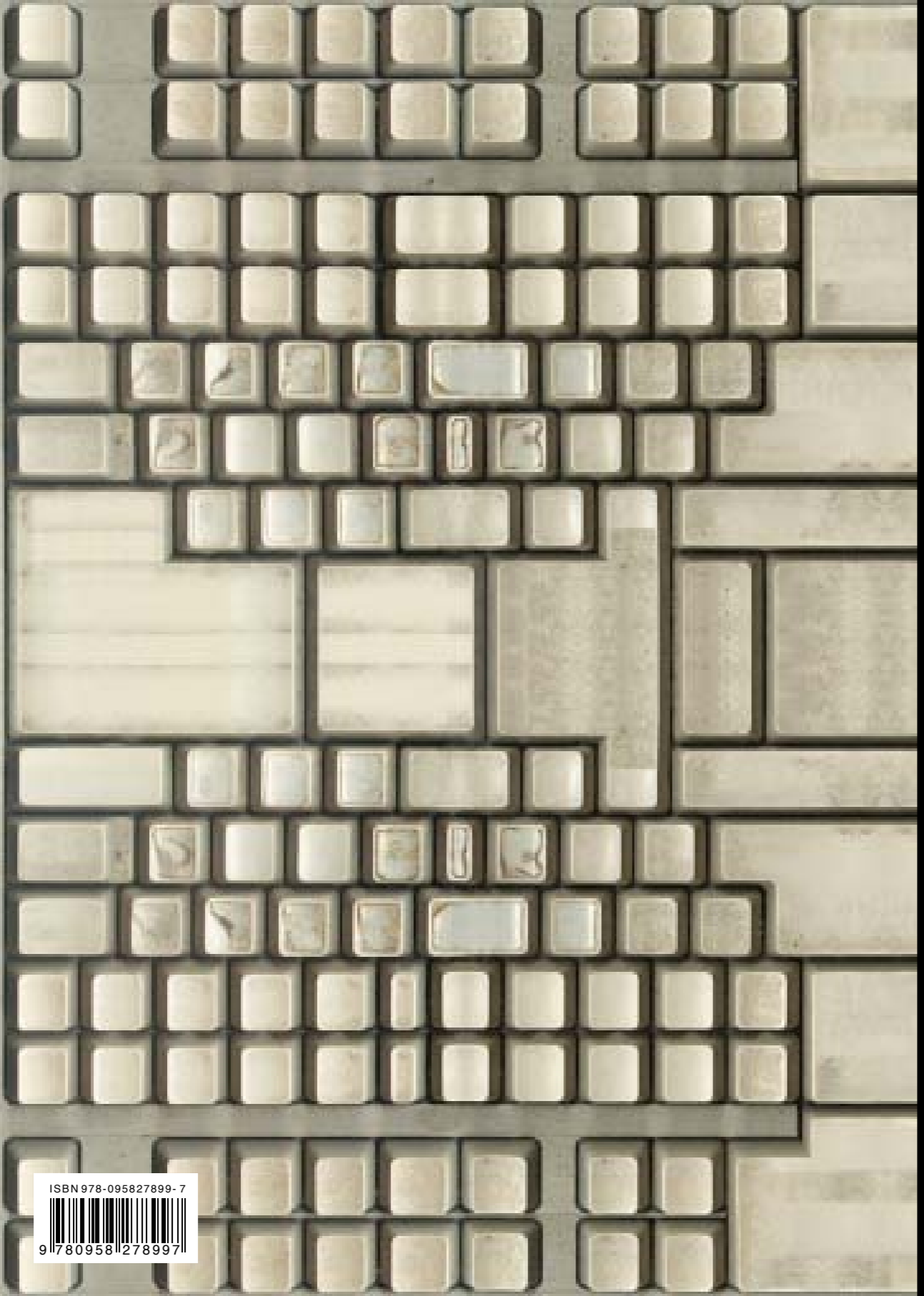
All contributors are members of Aotearoa Digital Arts (ADA), New Zealand's only digital artists' network. With its mix of work by artists, theorists and educators, this reader presents fresh thinking about digital art in Aotearoa, reflecting the politics of location, yet highly relevant to the wider contexts of digital media art and culture.

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Cover: Hoon Lee, *Salvation*, 2006, digital print, 1200 x 900mm.

Fore-edge: Raewyn Turner, *Perfumes for Fear: No. 1 green*, 2008. This flip-book animation reproduces some of the colours sampled by Turner from around Mount Taranaki and from the site of the former Ivan Watkins Dow chemical plant at Paritutu, New Plymouth, which manufactured the dioxin-producing defoliant 2,4,5-T until 1987. Turner collected a palette of 400 greens from the lush but contaminated surrounding landscape. These shades were then animated into a movie which a commercial perfumer used to create a fragrance synaesthetically matching the sequence of greens. For more details of this project see essay by Trudy Lane and Ian Clothier.



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Designed by Jonty Valentine
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ISBN: 978-0-9582789-9-7

A catalogue record for this book is available from The National Library of New Zealand

Title: The Aotearoa Digital Arts Reader
Author/Contributor: Brennan, Stella (ed); Ballard, Su (ed)
Publisher: Aotearoa Digital Arts and Clouds



Aotearoa Digital Arts Trust
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Editing a book takes a long time, and many people have helped along the way. Stella and Su would like firstly to thank the authors and artists who have contributed to this book, and the institutions and individuals who shared their image archives with us. We would also like to acknowledge the work and support of the following: Nova Paul, Leoni Schmidt, Col Fay, Khylla Russell, Justine Camp, Letitia Lam, Pam McKinlay, Geoff Noller, Sarah McMillan, Robert Leonard, Melinda Rackham, Mercedes Vincente, and Gwynneth Porter, Deborah Orum and Warren Olds from Clouds. And of course, Jonty Valentine for the hours spent in design. Thanks also to the ADA community, and especially to the other ADA trustees, Janine Randerson, Douglas Bagnall and Zita Joyce.

Thanks most of all to our families: Nathan, Moss and David.

The *Aotearoa Digital Arts Reader* would not have been realised without the support of AUT University, Otago Polytechnic and Creative New Zealand.



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Foreword

Sally Jane Norman

Aotearoa is marked by movement, from the tectonics that wrenched it into being to the journeys of ocean-faring humans seeking a new land. This movement continues as both geological processes and flows of people inward and outward. Art is founded and grounded in movement, in the action conveyed by terms such as expression, communication, cognition, provocation, and emotion. In turn the movements of art, those of its makers and its materials, are manifest as erosions and eruptions and shifts of creative volition. So-called new media are transient markers: like the tectonic processes that shape our physical environment, digital media form a fleeting phase of our evolving cultural landscape. Yet we experience the movement of our own time as being fraught with the seismic heaving that gives birth to mountains. Digital orogeny. Through the compressions and folds and faults of digitised data, reproducible, transportable and infinitely malleable, we are rendering and revealing untapped topographies for the imagination.

As a shoot or runner sprung from the soil of Aotearoa to grow elsewhere, my place in this book disseminating the creative energies of a distant homeland is an uneasy honour. By virtue of what knowledge or insights does one preface the words of others? Can I, as a Pakeha claim roots in a birthplace (Ahuriri, Napier), or in the place where my parents dwelt for over fifty years—Titahi Bay? What of the decades of being far away, including in this country that once ruled New Zealand and spawned a large part of its population? What relevance have these personal existential questions to the arts of Aotearoa, and how can experience working overseas across a range of cultural practices map to that of artists of Aotearoa? This foreword stands as a necessarily, wilfully subjective prologue, whose essentially interrogative tone attempts to open up a relational field, a textual weaving (con-text) to interlace with the creative works of Aotearoan compatriots.

Whenua and the Longing to Belong

Tāngata whenua: descendants of the first people to settle the land. This expression conveys the uniquely earthed quality of Aotearoa's indigenous culture. *Whenua* designates both the land and the afterbirth whose burial symbolises a kind of renaissance, a ritual connection to home territory instating the newborn as its custodian. After centuries of indifferent incineration of the afterbirth by Europeans and their followers, the vast therapeutic potential of cord blood stem cells, which by three-dimensional bio-engineering techniques can be grown into highly differentiated functional tissues, today opens up miraculous links between afterbirth and rebirth. Thus we encounter the intertwining of past and present inherent to Māori concepts of *mua* and *muri*, and to the fugitive sense of present that echoes through *The World of the Unborn*, Chapter XIX of Samuel Butler's *Erewhon*:

The Erewhonians say that we are drawn through life backwards; or again, that we go onwards into the future as into a dark corridor. Time walks beside us

and flings back shutters as we advance; but the light thus given often dazzles us, and deepens the darkness which is in front. We can see but little at a time, and heed that little far less than our apprehension of what we shall see next; ever peering curiously through the glare of the present into the gloom of the future, we presage the leading lines of that which is before us, by faintly reflected lights from dull mirrors that are behind, and stumble on as we may till the trap-door opens beneath us and we are gone.

Because of the immensely variegated landscape in which it is grounded, the indigenous culture of Aotearoa is multiple. Since place in the *whanau* (family) and *hapu* (sub-tribe) is inextricably meshed with place in the natural world, lifestyles and histories are indissociable from the mountains, rivers, plains and shores that form their habitats and landmarks. Impregnated with notions of belonging and identity, the living body of localised culture is soaked in stories and beliefs and values. Material and spiritual realms are one. Obdurate features of the environment reify and convey symbolic forces: the land tells the stories of the people who tell the stories of the land. At the same time, for all the wealth and diversity of narratives wrought by the landscapes which seed them, stories of Māori resonate with a powerful meta-narrative, telling of the emergence of the dwelling place of humans, *Te Ao Mārama*, from the dark night *Te Po*, which in turn emerged from the initial void *Te Kore*.

Continuing tales of Aotearoa recount the upheavals and uprootings of European colonisation, disrupting stories and traditions, and subsequent increases in Asian and Pacific Island settlement. The resultant mix and intermingling of foreign and indigenous presence yields a motley cultural fabric, sometimes tightly woven, sometimes loosely overlaid. It is a fabric heavily marked by Pakeha motifs that create openings for new binding interactions, spinning out the yarns of Aotearoa into unforeseen designs and dimensions. In this patchwork where strange stuffs veil the sonorous patterns of *Māoritanga*, it can be hard to make out the threads of *iwi*, the braidings of tribe and place. Yet we Pakeha, borne by fleets whose white sails announced displacement and pillage have also become enfolded in the mantle of Papatuanuku, the only land we know as home. Acknowledgement of our forebears' infringements cannot mitigate our longing to belong as children of Aotearoa. And this belonging and this longing to belong poignantly permeate much art of our country.

New Zealand's people relate in very different ways, some sharing and some exclusionist, to these islands celebrated all over the world as a paradise. The layers making up our identity mesh variably with the histories and geographies that underlie our manifold origins, and our art, like our lives is imbued with tensions between loyalty and insularity, the modest and the majestic, the local and the universal. As a small population capable of large feats, we are equally quick to justify unpretentious international dealings with our modest size as to brandish outstanding endeavour as world class. The sense of commitment to our country fires faraway ventures seen as typically home grown, or alternatively draws into our midst outsiders eager to contribute to the New Zealand ethos. The resultant diasporic and immigrant movements compound an already complex cultural landscape. In this place which is as mythically embodied as it is a feast for the senses, the advent of digitisation, ostensibly freeing computer-generated productions from the thrall of the material world, goads precariously unfolding creative

identities. To fulfil the promises of virtuality sung by the sirens of contemporary media arts, Aotearoa's distinctive interlacings of symbolic and physical domains call for a novel poetics of transubstantiation.

Sightings, Sitings and Bearing

Ipurangi: the vessel of Rangi, one of many Māori words for the Internet—blue-sky technology. The cosmos features at the heart of Polynesian mythology and knowledge, informing readings of the stars which guided tribal *waka* thousands of miles across the world's largest ocean to sight new land. The ability to interpret environmental cues to gain bearings in unknown territory is essential to exploratory navigation, which demands a mix of hermeneutic and cybernetic mastery to jointly steer mental and physical processes. Aotearoa's history and culture are rich in the arts of helmsmanship: New Zealanders are the sea-faring, surfing offspring of Kupe and of Cook—and more recently of William Pickering, kiwi-born pioneer of lunar expeditions and Mariner flights to Venus and Mars—all navigators versed in the ways of the oceans and the constellations, and in interpreting the signs and processes whereby they are linked to the earth. Perhaps because our country often appears twice on continent-centred maps (although our truncated eastern edge may barely protrude from the left margin, and our western edge from the right), when it is not altogether out of the picture, New Zealanders may irreverently view dominant representations of the planet with their oddly one-sided east-west clichés. By its very nature and its geographical situation, Aotearoa heightens our awareness of navigable expanses, of the relativity of position within the broader cosmos, whetting desires to move across and between sea, land and sky-scapes, to employ and if necessary invent path-finding skills to deal with uncharted terrain. The ability to adapt to different physical environments and to map our movements through their media and boundaries nurtures a propensity to traverse different symbolic systems, from the meta-narratives of cosmogony, epochs and epics, to the locally anchored stories of everyday individual acts. This physical and virtual path-finding, this hodological faculty (*hodos*, Greek for path) takes us beyond normative conceptions to build new associations and thence new renderings of the world.

Installation, landscape and environmental art forms inherited from last century are riddled with conceptual questions positing novel relationships between creative artefacts and their localisations, giving these works a quasi-systemic dependence on their physical contexts, a quality of irremovability. At the same time, the immediacy and presence inherent to live performance have tuned us to the fleeting qualities of embodied art and its correlative mobility, since performing humans are endowed with the same viscerally recognisable potential to move and to relocate as the rest of us. Notions of site specificity are thus challenged from diametrically different standpoints: on the one hand, we savour the rootedness of art which, in keeping with the concept of *whenua*, is bound as though by life-blood to the land, and on the other hand, we savour the mobility of art which is inseparable from roving human bearers who incarnate our penchant for journeying. Through their respective uniqueness, both these standpoints override the duplicitous powers associated with the era of mechanical reproduction. Creators from Aotearoa readily engage with these positions and indeed with the full spectrum of approaches to aesthetic loci that

they span: we are used to contemplating the environment in its holistic physical and symbolic manifestations, just as we are used to roaming and scouring the land, sea and sky to glean bearings as inveterate wanderers.

Nowadays, as we explore the potentially lively hybridity of digital and mixed media, skills acquired navigating earlier art forms, their physical instantiations and conceptual frameworks, can be immensely valuable. Identities sufficiently grounded to convey the feeling of authenticity arising from embodied, localised existence, whilst inclusive enough to allow engagement with outsiders, are crucial for those expressing themselves with digital tools. Because computer data can be reproduced, reconfigured and redistributed as it is shipped in packets through the networks, digital art can theoretically attain the most distant shores and disparate peoples. But because sheer mobility does not equate with aptitude to make meaning, artists of Aotearoa, like those of other nations, must extend their sensibilities to assert creative difference in ever more international situations. This requires us to steer clear of idle dabbling in exotic local colour, despite pressure from funders seeking quick-fix boosts to international profile. Similarly, it requires us to avoid the vapid universality and indiscriminate world-speak of all-purpose artists and events sometimes painfully, if not wastefully, grafted onto fragile, unreceptive stock.

On a less wary note, 'glocal' challenges can be productively contextualised by exploring the liminal zones reconciling old and new media, highly personalised and generically universalist expression. Works whose digital affordances are offset by singular physical settings, or computer-bound productions rich in the grist of the corporeal world present welcome alternatives to weary digital-analogue oppositions. By virtue of a curious kind of homology, creations which fuse the discrete binary processes of computing and the heady sensuality of matter seem to tenuously mirror the couplings underlying Māori visions of the temporal and the symbolic, the personal and the mythological, striking up deep resonance within and as the culture of Aotearoa.

Scales, Rhythms and Patterns

"What time is it there?" For New Zealanders, this question crops up with incantatory or even irritating insistence throughout our incoming and outgoing communications with the rest of the world. Aotearoa seems to be in and of another time, simultaneously ahead of others, yet through our distance haunted with a sense of being behind. *Mua* and *muri* again, still. Thus we abide in a present suffused with the headiness of past and future, stubbornly half a day ahead of Greenwich Mean Time established by our British colonisers, of International Atomic Time and Coordinated Universal Time, of Network Time Protocol, of the planned Primary Atomic Reference Clock in Space and other such systems designed to uphold our civilisation's temporal coherence. Beyond the ever perfectible chrono-logics and mechanics of these time-pieces, Māori stories of time typically mix muscle and macrocosm: Tane Mahuta's wrenching asunder of earth and sky is one such story, as is Maui's cudgelling of Te Ra, the sun, till he limped across the heavens, gracing us with lengthier days. These narratives dramatically leap the yawning gap between human scale embodied by a sympathetic half-god trickster, and the cosmic scale of unfathomable heavenly bodies.

Having long boasted one of the world's highest miles-per-capita road infrastructure ratios, Aotearoa's fast-growing ICT networks speak for our constant readiness to employ a range of different media to convey bodies and symbols. The signs in the sky which first guided us to our homeland have flourished and migrated to recently discovered frequencies, becoming information-laden waves relayed by terrestrial radio bases or geostationary satellites which challenge our ability to develop conjoined physical and virtual modalities of expression. How then might we identify and exploit the aesthetics inherent to differences in signal, in bandwidth, so that they convey the humanising colour and savour of locations and persons? What manifestations and manipulations of earthly and celestial energies might serve as sources for meaningful sensory and symbolic constructs? Conceptions of graspable scale are being stretched beyond belief by processing and instrumentation bequeathed to us by Tumatauenga, the formidable god of mankind, war and technology, striving for mastery over the world. Today we seek to enmesh freshly revealed human and superhuman phenomena in forms worthy of our forebears, worthy of the vibrant rhetoric of Māori mythology which frames, populates and animates memorably moving stories.

Telepresence, manifest through sonic, visual or haptic channels, is ushering in notions of immediacy that enrich shareable phenomena, and thence our culture of time-based arts. Possibilities for making collective works are occurring at all levels, from the elaboration of open source platforms that attract users to freely circulating means of expression, to the creation of online environments which solicit participatory energies. The ways that digitally-borne rhythms of encounter are imprinting novel social patterns defy superficial analyses of consumer trends and ambivalent terms like 'creative industries' and 'user-generated content', terms often expediently wielded without vital critical reflection. Recent digital affordances are pushing us to profoundly redefine human relationships and their communicational modalities. Short-term, market-driven approaches to these issues cannot recognise their influence on contemporary artistic practice any more than they can describe their effects on wider cultural experience and expectations. Artists, on the other hand, have been quick to tune to the extensive expressive possibilities of social networks. As they draw collaborators and respondents from geographically unbounded online fora, planetary communities of interest are both superseding and stimulating traditional neighbourhood feedback.

Artists of Aotearoa, who know how the objectivity of maps and clocks can be twisted by tricks of the gods or gut feelings of nearness or distance, are forging original approaches to proxemics and co-presence in the media agoras of the twenty-first century. They are designing new media environments to assume a host of functions, transposing online the conventions of familiar cultural watering holes (galleries, theatres, cafés, etc), or staking out terrain to serve as creative software repositories, navigational frameworks or games offering unprecedented forms of social agency. Strictly digitally processed creations of sound, light and word, which readily lend themselves to electronic and networked distribution, are being spawned alongside hybrid works whose virtual attributes contrast starkly with anchorage in physical place and substance. Integral to all these works are attempts to craft realms of beholding, patterns of movement and poetic entanglements of insights to make fresh sense for the senses.

Since it was launched five years ago, the Aotearoa Digital Arts network has built up a dedicated community across and beyond New Zealand, characterised by a sharing of resources and practices, and a congenial sparring of ideas. Critical cultural and intellectual mass is today increasingly equated with social networks rather than with immediate physical communities, and these networks are increasingly widely spread over the face of the planet. This raises the question of how to reconcile the fiercely idiosyncratic experiences and creative energies used to snag the emotions of others with the formal rhetoric required to shape communicable, shareable aesthetics. An age-old question for sure, but made more acute when audiences conceivably or even primarily live far from home. As unsettled settlers of a restless tectonic landscape, where the long white cloud fleeces jittery signals buzzing with past and future, New Zealand's artists hold their ground whilst looking to sea and sky to fire their navigational yearnings.

Introduction

Stella Brennan and Su Ballard

A sampler containing many voices and visions—histories, critiques and calls to arms—this book has developed out of a particular networked community. A network both evokes and elides. For as Danny Butt asks in his contribution to this book, “How do we think what is not connected?” Or, for that matter, how can we know what (or who) we do not know? Do we as editors have a responsibility to make definitions, despite our awareness that any definition is partisan? Have we not already done so? Can we describe what is digital, what it means to make art on, influenced by, or manipulated through the computer, and do this without falling into the trap of valorising some things and rejecting others in order to construct a plausible progression? Despite Vasari's sixteenth century attempt to codify a linear method for art history, history has never been progressive. Nor has digital art. What you will find here are a wide range of accounts and artworks, some analytical, some personal, many offering provisional glimpses or definitions of digital art, and often in disagreement. This is the very foundation of ADA.

Aotearoa Digital Arts is New Zealand's only digital artists' network, a gathering point for artists in or from Aotearoa working with digital media and technologies. ADA grew out of an email list launched in 2003 by Stella Brennan and Sean Cubitt during Brennan's time as the inaugural Digital Artist in Residence at Waikato University. ADA was born of the observation that although new media artists were often highly networked in terms of both their own practice and their professional relationships, there was no national organisation drawing together those with a common interest in digital art. This recognition suggested the ineradicable importance of place against the frictionless communication enabled, in theory, by network technologies. A sense of place is important to this community, ranging from the nostalgia of the expatriate to the new eyes of the immigrant, from the concern of the environmentalist to the indigenous notion of the *whenua* forming the ground for belonging and experience.

Key to this book are discussions of the relationship of digital and analogue, of presence and distance, of technology, discipline and media. Here definitions begin to form. Technology too, like the art with which it is entwined, has never offered a clear trajectory, and our history must reflect a formation through rupture, through the losses and possibilities of colonisation, of industrialisation, of computerisation.

Part apologist for, part conscience of technology, where does digital art come from? There are many starting points. Some can be drawn from the steam-powered crash and muscle of the machines of the Industrial Revolution, some from the cybernetic experiments spurred by war-time code-breaking, and some by way of the ordinary magic of everyday appliances, by computers that have become as much shackle as prop and tool. Here, Melanie Swalwell's investigations of home coders in the 1980s describes a playful curiosity driving an exploration of personal computers whose true usefulness had yet to be defined. Morgan Oliver continues this legacy of homemade interventions,

hacking his way into game space. Meanwhile Julian Oliver is taken for a spy as he remaps the spaces of data transmission into virtual gardens. Oliver records the anxieties embedded in our relationships with technologies whose inner workings we often don't fully understand.

ADA is born from the Internet and critically reflects a social and cultural engagement with it. The projects Window and The Big Idea both manifest the ability of net spaces to connect and critique. Caroline McCaw evokes the multiplicities of location and connection that new technologies allow, while Vicky Smith and Adam Hyde discuss the possibilities and pitfalls of using communication technologies to link communities of interest, be they artists or school students. Bringing these discussions back to earth, Julian Priest asks us to pause to consider the intricate material networks these communications thread through; his is a realpolitik that examines the environmental impact of plugging in our laptop.

In making this book we solidify things that may have existed as electrical impulses, or film grains in emulsion, or jotted notes, or discontinuous fragments of Internet discussion. Nevertheless, like the radio waves captured and mapped in Zita Joyce's discussion, this paper-bound state is a temporary moment of being. This reader documents a desire to create a lineage for practices and methods that often seem obsessive about their own futures, yet willfully amnesiac, heedless of their own impending obsolescence. As Lissa Mitchell's account of digital archiving prompts us to ask, what broader assumptions about permanence does the evanescence of much digital work force us to reconsider? Douglas Bagnall's fundamentalist analysis of digitality describes the temporal and cultural pervasiveness of the digital as idea and method. With a sense of historical depth shared by Janine Randerson and Eu Jin Chua, Bagnall questions the 'newness' of new media.

A locus for our ancestral yearnings, we count Len Lye as a key influence, invoking his curiosity, his innovative thinking and his respect for indigenous art. We share this ancestry with the post-object art practices of the 70s that opened up galleries to intrusions of sound, movement, and performativity. Andrew Clifford traces this history, sensing a shift towards a total artwork, and ambitions enlivened by collective, interdisciplinary practices. The breakdown of the notion of artworks based on the specificity of media is a thread running through the book. These cross-disciplinary preoccupations manifest in many forms: from Karl Willis's interactive screens to Kurt Adams' gritty 3D drawings and Avatar Body *Collision's* remote acts of cyberformance.

In *The Open Work* Umberto Eco writes: "If I draw a square around a crack in a wall with a piece of chalk, I automatically imply that I have chosen that crack over others and now propose it as a particularly suggestive form."¹ To label an artwork digital is to enact a similar delineation, turning the artwork into an artifact now somehow meant to contribute something to our understanding of the essence of digital art. In this collection we have attempted to both draw a square and maintain the indeterminacy of its edges. We do not offer a conclusive definition of digital art but steer the reader toward a "particular field of possibilities."²

In their variety, the contents of this volume demonstrate the vitality of digital art in Aotearoa. ADA has enabled the sharing of practices and contributed

towards a very real sense of a digital media community in New Zealand.

A collection that began in a series of symposia and networked discussions, the *Reader* reflects ADA's scope, our gradual, self-generated growth and our focus on the broad sweep of digital media practice—its origination, production, distribution and critique. Formed from a particular community and moment, this compendium maintains a degree of uncertainty; a number of the concerns captured in these pages will be rendered redundant and today's marginalia may become the key issues of the next decade. It is our hope that, rather than offer any kind of final word, this book begins a conversation that will continue as digital art in Aotearoa evolves.

1. Umberto Eco, *The Open Work*, trans. Anna Cancogni. (Cambridge, MA: Harvard University Press, 1989), 99.
2. Eco, *The Open Work*, 99.

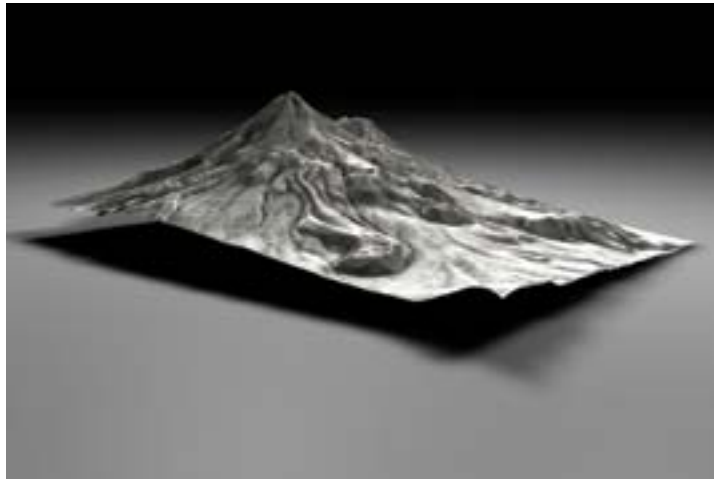


fig. 1



fig. 2

ADA: A Web of Sites

Caroline McCaw

A recent Air New Zealand marketing campaign produced by the Auckland-based office of Colenso BBDO for television and cinema promotes the importance of ‘being there’. The agency’s website claims the brand campaign reinforces the emotional connection New Zealanders have with their national airline through a sense of flight, celebration of the landscape and powerful moments of connection.¹ One commercial depicts a man working in a kitchen in Auckland. Looking doleful, he walks outside to a jetty. Leaping into the air he flies the length of New Zealand (with backing soundtrack in *Te Reo Māori*), touching down outside a landmark building in Dunedin, some two hours away by plane, to kiss his girlfriend.

These commercials explore the displacement and re-connection made possible by travel technology. However, the visualisation of travel does not refer to airplanes at all, but the sense of disembodied flight made familiar by new media and popularised by online worlds and digital game play. One by one, lonesome New Zealanders fly out of windows and glide low over iconic landscapes and green rolling hills to join the ones they love. The perspective is first-person. Empty plains and mountains roll out beneath us as distance is compressed to keep the story snappy. We see through the eyes of the traveller flying disembodied, above—but not too far above—the landscape below. It is our journey too, personal and romantic. None of the clutter or delay associated with airport lounges or security screenings accompany this flight.

The idea that space can be actively and socially produced is explored by Marxist sociologist Henri Lefebvre. He writes:

*We are confronted not by one social space but by many. ... Considered in isolation such spaces are mere abstractions. As concrete abstractions, however, they attain ‘real’ existence by virtue of networks and pathways, by virtue of bunches or clusters of relationships. Instances of this are the worldwide networks of communication, exchange and information. It is important to note that such newly developed networks do not eradicate from their social context those earlier ones, superimposed upon one another over the years.*²

The production of space is for Lefebvre a creative act, a process: organic, fluid and alive.³ Lefebvre’s spaces flow and collide with other spaces. They are not a fixed geography but respond to social life. Spaces formed within different timeframes are superimposed upon one another to create a present space. We can recognise these simultaneous flows of different types of space, both in the example of the Air New Zealand advertisement and with the kinds of space that is cultivated through online communities.

In the Air New Zealand commercial, different types of space are depicted quite literally as geographic locations: beautifully shot, iconic places, empty and ‘natural’ landscapes. And while New Zealand has plenty of these postcard scenes, in these commercials, there are few depictions of urban space and no industrial landscapes. Extraneous people and places are just not visible.

1. Colenso BBDO. <http://www.colenso.co.nz/>
2. Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith, (Oxford: Blackwell, 1991), 86.
3. Andy Merrifield, “Henri Lefebvre: A Socialist in Space,” in *Thinking Space*, ed. Mike Crang and Nigel Thrift, (London and New York: Routledge, 2000), 171.

The gaps between these locations are articulated through isolated individuals emoting visible longing and sadness, perhaps enacting New Zealand painter Colin McCahon's "landscape with too few lovers."⁴ The message of the advertisement is that Air New Zealand can reconnect people in the same way that online worlds can. The campaign overlaps connection and distance in one story in a manner resembling the way meeting a close friend online, or receiving a sister's text message connects us in a way that feels intimate. Air New Zealand is selling physical presence, but their imagery draws on virtual presence.

Colenso's strategy identifies vernacular circumstances, experiences that are personal and familiar, connecting these moments to their corporate clients. Other advertisements featured on the agency's website include advertisements for New Zealand Insurance associating 'stolen stuff' (Pavlova, Split Enz, Dame Kiri) with the insurance company, and 'Bum Cracks' and 'Girl Germs' (New Zealand pop culture mythologies) in the 1970s with drinking L&P today. In layering these two types of messages a space is created: a siting of New Zealandness. New Zealand culture is located in the network formed between these (and other) stories and images in common, the result of accumulated knowledge and signifying processes.⁵ These advertisements explicitly invoke 'us' as viewers, inviting an inclusive and participatory relationship to their story, evoking and constructing a shared nostalgia.

Generating another kind of shared imaginative space, the Aotearoa Digital Arts list brings together people who may be separated by distance and time zones. Participants in this self-selected community are imaginatively connected, primarily through an identification with Aotearoa New Zealand as one of their sites of belonging. Artists working overseas, some who seldom return to New Zealand, discuss and share ideas about digital art with others who may have never left these shores. Readers, like watchers of television commercials, do not need to post to the list to feel included in this group's membership. While the media we share is literally connected, the communication we share connects us too. Like Lefebvre's space, ideas of site form and stick to the discussion list, also a site. Layers of meaning about what it is to live in New Zealand are established through talk of art researched, made and exhibited, and this talk produces and reproduces 'New Zealand', not as a subject of the list, but as a result of our 'being in common'. Aotearoa is produced as the first A of ADA, as an ongoing site for discussion and recognition, of *not* being the space we nominate as the rest of the world. As the ADA website describes it:

*In the absence of a dedicated physical space for development of new media projects, ADA enables the sharing of practices, and contributes towards a very real sense of a digital media community in New Zealand.*⁶

The result then is that ADA, as a site for discussion, produces its own identification about what it is to be a New Zealand digital artist. The community forms a fluid and dynamic space, embracing action and lived situations. Our participation, whether silent or spoken, contributes to the active representations of a shared space. These spaces have social form, embodied and performed through ongoing, and archived, lived relationships.

Through examining the 'digital' (as in Aotearoa Digital Arts) we can recognise an historic moment as it passes, like the tail of a comet perhaps.

4. Colin McCahon, *Northland Panels*, 1957–58, collection of Museum of New Zealand Te Papa Tongarewa.
5. Richard Peet, *Modern Geographical Thought*, (Cambridge, MA, and Oxford: Blackwell, 1998), 101–104, 176.
6. Aotearoa Digital Arts (ADA) website. <http://www.aotearoadigitalarts.org>

This moment we are nodding to—this era of digitality—is a time when computers and their metaphors and methods have come to be a part of our media experiences. With this has come a change in the way we use and experience the term 'media'. Whereas the term 'media' once referred to the format or objects of transmission (the television, radio or newspaper) media now also refers to the very process of transmission.

As processes, media can be read as dynamic operations working within social and cultural frameworks, not limited to their historical moment of transmission and reception yet embedded in the context of that moment. In a discussion on the ADA list surrounding the terminology of digital art Sean Cubitt suggests: "media mediate—they are physical and dimensional and informational structures of real materiality that communication is embodied in."⁷ A few months earlier on the ADA list however, Adam Hyde used the term media to describe a deliverable package of content in his explanation of the term "streaming media":

*What is Live Streaming? Streaming media is the term used to describe the real-time delivery of moving images, moving text, and sound over the Internet. [Hyde continues]... Streaming media techniques work in the following way: as you listen or watch one portion of content, the next portion is downloading at the same time. The ability to simultaneously load and play distinguishes streaming from other types of Internet media. Streaming allows for live transmission over the Internet, which enables a transformation of the Internet into a broadcasting medium. Content can also be saved and archived, allowing Internet users to experience recordings of live events online after they happen.*⁸

Hyde's definition encourages us to think of media as small units that can be received, experienced at times that we choose, archived, and importantly, in turn, transmitted. This is a different sort of media relationship from tuning into a radio or television station. Where we used to wait on the couch for the next episode of our favourite television show, we are now able to search and download any episode, via TVNZ OnDemand or peer-to-peer filesharing. Not only is the moment we engage with the information no longer contingent on the choices of a programme director, but this information shifts from being an object of consumption to exchangeable packages in a different kind of system, one that is potentially porous and open. And increasingly, the literacies and equipment required to produce and distribute independent media are being employed by a wide range of communities.

Cubitt's definition, by comparison, emphasises that the term media has connotations as both a verb and a noun. Media he claims *does something* in its social and cultural circulation, an operation that has a relation to the material world through its ability to communicate with and affect the people who engage with it. It could be argued that both uses of the term media are enabled by the new digitality of these forms. Digital media has enabled an exchangeability of files and formats, encouraging a shift in the relationship between those of us who consume and those of us who produce media. This is both a technical and cultural shift. And at some point soon we will no longer need to use the term digital; its use value dissipated like that comet tail, its relationship no longer 'new' to the operations of media.

7. Sean Cubitt, "[Ada_List] Digits and Names," *Aotearoa Digital Arts* [discussion list], 18 July 2004. <http://www.aotearoadigitalarts.org>
8. Adam Hyde, "What is Streaming Media?," *Aotearoa Digital Arts* [discussion list], February 2003. <http://www.aotearoadigitalarts.org>

In both descriptions—as a mobile unit of information and as a shifting process of communication—media is actively and socially produced. Our busy mediascapes interpenetrate and superimpose over other spaces. As Lefebvre suggests, in engaging ‘new’ media, we do not abandon other, older sorts of media. Increasingly we engage with several types of media simultaneously, for example, reading a magazine while watching television and intermittently sending and receiving text messages. Media spaces overlap but do not obscure. Rather, media forms start to imitate each other. The recent popularity of the YouTube website is in part because it seems like we are watching a larger world of television. Conversely, as in the Air New Zealand advertisement, we see the metaphors of the Internet being used on television. In addition, older media forms are digitised for archiving and distribution.

A colleague of mine once conducted management research to analyse where the best place in an office was to conduct effective communication. All his results turned to the photocopier room. While standing around waiting to reproduce pages of text, other sorts of texts were being produced. These conversations often began with stories of media consumption ‘did you see that great programme on TV last night?’ and these shared territories become opening scenes for discussion. However, as peoples’ lives are less frequently related to synchronous media consumption, so there are fewer opportunities to develop relationships around shared media stories. For example, it is more efficient to forward the URL of a favourite or newly discovered YouTube clip directly to the email address of a colleague or friend than to discuss it at the photocopier. As a result different kinds of ‘photocopier communities’ are beginning to emerge. We choose what we want to consume and when, and then seek out people who like the same sort of stuff.

Social networking sites such as Myspace, Bebo and Facebook are commercial examples of asynchronous media consumption and communities of shared interests. Through collecting, editing, crafting and distributing content, people of all ages (and particularly youth) develop communities who together develop a sense of ownership and place online. These communities in turn become demographics for advertisers.

My examples so far don’t necessarily include art. What might art and artists (the final A of the ADA acronym) contribute to these contested and emerging spatial practices? I keep returning to the ideas of Lefebvre and his busy, fluid, responsive and living states of space as a connecting theme.⁹ Lefebvre’s spaces that flow and collide create for me a simultaneous confusion and enjoyment, a sense of not knowing where I am, but being stimulated by this not knowing. I am drawn to try and map these many states of space, and in particular my ‘being here’. What do we bring with us and what do we leave behind when we travel through the mediated spaces of the digital? And why does this sense of place, of belonging and not belonging, feel important to me? How may the works of artists help me in my disorientation? Can art show me how to understand, or rather to *know* about this conflation? I have chosen two artworks that may be useful as points of reference in this consideration, although they are slippery and more like the comet tail than the Cartesian allure of cartographic pegs.

The first explores knowing through data, part of an interest in locative media. In 2006 I met two American artists, Steve Durie and Bruce Gardner at

9. Merrifield, “Henri Lefebvre: A Socialist in Space,” 171.

the SCANZ encampment.¹⁰ Durie and Gardner had joined a group of thirty digital artists to consider the importance of location through two themes: environmental response and connection/disconnection. Durie and Gardner are part of a larger collective of artists based in San Jose, California, who work under the name C5. The *C5 Landscape Initiative* is a five-year programme of expeditions exploring data visualisation systems as art. The *Landscape Initiative*, “examines the changing conception of the landscape as we move from the aesthetics of representation to those of information visualisation and interface.”¹¹ Through plotting their journeys using GPS technology these artists collect information about ‘being there’. While in New Zealand Durie and Gardner planned to create their own maps of Mount Taranaki by climbing the mountain and collecting data. Previous C5 projects have included a similar collection and re-presentation of landscape as information from iconic locations such as Mount Fuji and the Great Wall of China, which, in a Situationist-style misreading of the map, they attempted to re-plot onto California.¹² These artists visualise connections, tracking their process of travel and building three-dimensional computer models of landforms from their bits of data. C5 is planning research expeditions to twenty volcanoes along the Pacific Rim of Fire. Their attempts at ascent in New Zealand were, however, thwarted by clouds and rain; vaporous meteorological complexities harder even to trace than the earth’s surface.

With the availability of Geographic Information Systems and big data sets such as Google Earth and Google Maps we are able to see locations in new ways. And as Google Earth increasingly shifts from 2D satellite photographic montage to 3D representations more akin to game spaces that we can navigate through, I find the experience both fascinating and chilling. I like being able to catch the view from the London Eye without paying a penny, or to investigate the carpark of a shopping centre in Dubai, or even to see who was parked outside my house that day the satellite passed us by. But the feelings that stick with me include: being alone. The spaces Lefebvre describes just don’t exist without people: “The form of social space is encounter, assembly, simultaneity.”¹³ And isolating spaces separate from lived experience, as data and images, seems to suggest something inhuman. I can imagine a similar eeriness surrounding the introduction of photography. The machine’s ability to isolate a sliver of time, and to reproduce that moment with such confidence and likeness, must have made it difficult to remember that moment was ever part of something bigger, something more contingent on personal relationships. Google Earth’s depopulated images remind me of Daguerre’s 1838 photograph of a Paris street from his apartment window. The minutes-long exposure meant that moving objects like pedestrians and carriages don’t appear in the photograph. The busy street appears deserted, except for a man who stops for a shoe-shine and unwittingly becomes the first person ever photographed.

Prior to photography it was the painter’s brush or the artist’s sketchpad that reproduced these moments, and told particular stories about them. C5’s art operates through investigating the relationship between digital landscape data and the experience of the landscape that it represents. The contingent and embodied experience this detailed information omits or obscures is the

10. SCANZ, Solar Circuit Aotearoa New Zealand was organized by Ian Clothier and Trudy Lane, and hosted by WITT and the Govett-Brewster Art Gallery, New Plymouth. <http://www.scanz.org>

11. C5, *The C5 Landscape Initiative*. <http://www.file.org.br/file2005/textos/symposium/eng/C5corporation.doc>

12. C5, *Other Path*. <http://www.c5corp.com/projects>

13. Lefebvre, *The Production of Space*, 101.

interesting part. As C5's Matt Mays puts it: "knowing where you are does not mean that you are not lost."

New Zealand artist Rachael Rakena's work *Rerehiko* (2004) envisages place, technology and location in a very different way, exploring negotiation and contingency. *Rerehiko* lays footage of traditional Māori dancers from *Kai Tahu Whanau* moving together underwater over a flow of text extracted from emails between the group's members. The two fluid movements, of scrolling text and swimming dancers, both mobile and without fixed positions, create a powerful and evocative image.

As email travels through the network it produces and supports a collective culture and identity. Rakena suggests that, "The digital text of the email and its aesthetic of pixellated patterns create the new *tukutuku* for the *wharenui* (atea) in cyberspace in which a community often meets."¹⁴ The flickering surface of the screen helps form and embellish a new meeting place.

Like the expansive notion of cyberspace, the watery realm within which the video occurs is specifically non-land-based. Rakena's fluid metaphor evokes freedom from constraint and references travel and migration, but also suggests a loss. "I decided that immersion in water space would create a question, 'who are we without land?'"¹⁵ *Whakapapa*, the genealogical foundation of Māori identity and belonging, has been undermined by separation from the land through colonisation and later urbanisation. Rakena explores how contemporary *Kai Tahu* identity is maintained both through revival of traditional artforms and through the flows of electronic communication.

Rakena and C5's artworks explore the negotiations and superimpositions of 'being there', of being in specific and located geographic and cultural spaces, while being simultaneously immersed in mediated spaces. Rakena's video is located between traditional knowledge of place and belonging and contemporary Māori communities. But unlike the empty landscapes of the C5 collective, who may find themselves lost in this fissure, Rakena finds a populated space, actively generated by its participants.

What do we keep and what do we leave behind when we travel through the mediated spaces of the digital? How do we articulate a sense of belonging? While the physical reality of 'being there' is the key message of Air New Zealand's advertising campaign, the manner in which this is depicted evokes the new metaphors technology offers for presence. In these layered, socially-produced spaces, resisting fixed positions opens up the possibility of disorientation, but it also allows new perspectives to be developed and older stories to be maintained. As the works of Rachael Rakena and C5 suggest, feeling lost or floating both disrupts and expands our sense of place and of home.

14. Rakena, "Toi Rerehiko," unpublished MFA dissertation, School of Art, Otago Polytechnic, Dunedin, 2003, 3.

15. Rakena, "Toi Rerehiko," 23.

What is Digital? Concepts and a Chronology

Douglas Bagnall

The road sign in *figure 1(a)* uses two kinds of symbols. The arrow approximates the shape of the road ahead, while the numerals advise a speed at which to travel.

The form of the arrow is an analogy for the shape of the road, so this kind of symbol is called analogue. Analogue symbols belong to a continuum of possibilities. There are an infinite number of understandable arrows, all meaning something slightly different. They form a family of symbols that, by convention, maps a continuous range of form onto a continuous range of meaning. The symbol doesn't have to look like the thing it symbolises. An analogue clock maps the passage of time onto the rotation of dials—this doesn't look like the passage of time unless you are used to the analogy.

Numerals, as symbols, do not lie on a continuum. They are discrete. There are only ten of them, and they are formally isolated from each other. Symbols that are discrete are called digital, partly because numeric digits are exemplary digital symbols.

That is the entire definition of digital and analogue symbols—it has nothing to do with microchips.

Digital symbols are arbitrary in form. There doesn't need to be anything five-ish about the symbol '5'. It follows that a system of digital symbols is always finite, because you can't read arbitrary signs that you haven't previously seen (as you could with a newly encountered shape of arrow). These restrictions—that meaning can't be improved by refining the form of a symbol, which belongs to a smallish known set—mean that elaborate meanings can only be conveyed through the juxtaposition of multiple symbols, usually in series. '3' followed by '5' means something more than their sum, and less than '5' followed by '3'. The symbols create context for each other, and a complex message arises from the whole. Digital messages are read, not beheld.

One practical difference between digital and analogue messages is shown in the lower signs of *figure 1*, which started the same as *1(a)*, but have suffered various amounts of random distortion. Sign *1(b)* has changed just slightly. The corner looks tighter and the numbers, although wonky, still say '35'. Digital symbols are immune to mild corruption, but distortions in the analogue will alter the message. Sign *1(c)* has had a far worse time, and while the arrow still indicates a path, the numbers are unreadable. This shows the all-or-nothing tendency of digital communication. It is hard to get the wrong message, because it is unlikely for the '3' and '5' to distort into other numbers. This clarity is the trade off for throwing away the infinite possibilities of the analogue.

The real world is neither analogue nor digital, because on the whole it is not making a communicative effort. These terms describe modes of symbolic interaction, not physical reality. The distinction is in our heads. It might seem that the world is inherently analogue, given the apparent lack of physical discontinuities, but this raises the question: if the world is analogue, what is it an analogy for? At the same time, it is now quite respectable to speculate that the universe is a digital simulation in someone else's big computer. But the supposed underlying



fig. 1

nature of things is undetectable under either hypothesis and makes no difference to our use of the world. It is best just to accept that the universe allows both. The genetic code of life works digitally, based on sequences of four symbols, but the surprise and short history of this discovery show how little effect the written nature of DNA has on the experience of living.

The analogue and digital can carry each other quite comfortably. Imagine a digital photograph of the road sign. The picture is known to be somehow digital, but as a photograph it is pure analogy—a likeness. Then again, if you read the ‘35’, you are seeing it digitally. The digital road sign lies in an analogical image which is encoded digitally. This nesting of analogue within digital and vice versa can repeat to infinity, but it doesn’t make the embedded symbols any less pure in their digital or analogue nature. If you read a message digitally, it is digital, regardless of the framing, while an image is an image if it looks like an image.

All messages depend on context, and many, like the road sign, have digital and analogue aspects that provide context for each other. It doesn’t usually pay to separate the components. They are tightly bound and complementary, at least at any particular time. Across time, though, the digital and analogue aspects of a work tend to separate and follow different paths. This is due to the way their transmission works. Purely digital messages can be copied without any loss of information. Minor errors in the form of symbols are irrelevant. When the copy is read, or itself copied, the Platonic forms are seen through the glitches, and the mistake is not repeated. Larger errors lead to catastrophic failure. Analogue messages, on the other hand, will drift in meaning through repeated copying. There is no way, within the analogy, to identify mistakes.

Examples of this separation are Shakespeare’s plays. They were written to be performed in a particular analogue style and setting. The digital aspect, the words, have been transmitted via books and performed using the theatrical techniques contemporary to each time. What little is known or surmised of the works’ original non-digital aspects stands more for the period than for the plays, signifying late Elizabethan London.

While digital messages can travel intact through time, their meaning may not. They suffer from what could be called referential drift. The entire system of signs can shift on its foundations, and the perfectly preserved message ends up meaning something else. Numbers on road signs, for example, implicitly refer to kilometres, whereas some time ago they meant miles. The shift can be more gradual, subtle, or ambiguous, as when words adopt new meanings, but the continuity of change doesn’t reduce the message’s digitality. The form of the symbols doesn’t change to reflect the meaning; there is slippage, but no analogy.

The meaning of a message is irrelevant to the question of whether it is digital or analogue. Meaning operates on another level; from its point of view a message’s form is a mere technicality. Any message’s gist can be conveyed in other ways, both digital and analogue. Although a meaning will be suited to particular forms of expression, it is not bound to those forms (and nor is a message fixed to any particular meaning). At all levels the interpretation or composition of a message is determined by convention and context, but simple formal operations, such as transmission, can be carried out without higher level understanding. This is particularly true of digital messages, where the only conventions necessary are

those relating to distinguishing symbols. That is why even machines can do it.

Another property that digital systems have is that they all map onto each other, perfectly.¹ This is not fully demonstrated by *figure 2*, but it is a beginning. The row of punch card holes is a digital message, or part thereof. This could be read as a row of binary bits, and depending on whether you take a hole to mean zero or one, you read the numbers in lines a or b. If the holes are read as the bits in *line a*, which is then interpreted as an ASCII character, the holes mean ‘f’. If they are interpreted as in *a*, but meant as a pure number, that number would be 102. The number represented by *line b* is 153, which corresponds to ‘r’ in the EBCDIC character set.² The same few holes can encode a huge number of different things depending on what convention is used to interpret them.

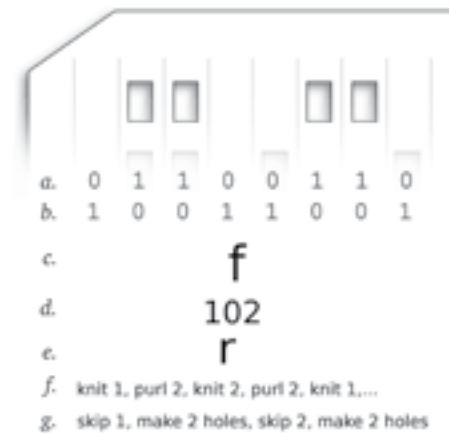


fig. 2: A punch card row with interpretations.

The holes could be read as a knitting pattern, as in *line f*. (Punch cards were invented for textile patterns). Or they could simply be instructions for their own replication.

In any case, the meaning of the holes is determined by convention. This is unremarkable—it is true of all communication—but it is key to the utility of digital technology. The corollary of this mapping (of multiple messages onto a single digital form) is that of a single message onto multiple forms. An ‘f’ might be converted into a binary form, into knitting, or into instructions on how to reconstruct an ‘f’. It could go through any number of digital transformations and encodings, and at the end of it all it could still be converted back. Any digital system can be converted into any other, with no loss or gain of information. They are just different views of the same thing.

This concept is sometimes explained as ‘it is converted into zeros and ones’, but that lessens the idea. All digital systems are equivalent, so binary has no claim of primacy. It is a convenient system for some technical and information theoretical reasons, just as decimal counting and the Latin alphabet are convenient for cultural reasons. No particular form of encoding has precedence over the other—you could equally claim that all digital messages are converted into letters or words. So, while digital information is always somewhere represented as a series of Platonic forms, itself it has no essential form. This is partly what makes it useful.

1. This aspect of digitality (among others) was a topic of discussions on the ADA list in July 2004. You can find the archive at http://list.waikato.ac.nz/pipermail/ada_list/2004-July/thread.html

2. EBCDIC stands for Extended Binary Coded Decimal Interchange Code, and ASCII for American Standard Code for Information Interchange. They are two of the many codes that have been used for mapping between binary and Latin alphabets. Both were developed in the early 1960s. Most modern character encodings are extensions of ASCII, but EBCDIC is still in use.

With the definition out of the way, I will now look at the development of digital technology through a falsely episodic, universalising narrative. I've avoided dating most of the events and trends discussed—either the dates are well known or nobody knows them, and in any case they are distracting.

Language

Obviously then, speech is largely digital. Words are, on the whole, discrete symbols. There are not words with sounds between, say, 'cat' and 'cot' which mean a bit of both, which would be the case within an analogue system. Spoken words might seem inseparable from their paralinguistic context—the manner in which they are pronounced—but this does not reduce their essential digitality. The linguistic and paralinguistic elements of speech provide context for each other, working in parallel, whether in counterpoint or with no regard for each other. The degree of digitality of ordinary conversation is demonstrated by the way people reading dialogue in novels become oblivious to the utter lack of non-digital information.

This does not mean that you consider a system of signs when constructing an utterance. You just open your mouth and babble, but to the extent that you say anything, the communication is best understood as digital. For what its worth, a computer doesn't think about being digital either.

Some readers with educations of dubious economic value will be reminded of Saussurean linguistics, structuralism and semiotics. Indeed you could, like Roland Barthes, discuss digital and analogue modes in those terms.

Song

Music purifies the digital aspect of speech. The prosody of a song or chant reduces the scope for paralinguistic communication, and by suggesting its own continuation, pre-empts errors. The analogue sound pattern serves as mnemonic reinforcement for the digital message.

Songs regularly transmit digital patterns across centuries, often long after their referential contexts are forgotten. It is well known, for instance, what the grand old Duke of York did with his ten thousand men, although nobody knows when or why. A tune can even carry a digital message in a language unknown to the singer—as when monolingual Pākehā recite stories about Frère Jacques or Te Rauparaha. Advertisers use music to keep their messages coherent when recalled. Many people learn the order of the alphabet through a Sesame Street song, and recite a poem to work out how many days a month has.

If oral usage could be looked at in isolation, song and poetry would be seen to be sticking up for literal verisimilitude, while prosaic speech aims for semantic adaptation. Song is conservative; chatter liberally adopts the forms of its surroundings.

Counting

Numbers, being words, are already digital. But in extending out indefinitely, as some cultures' numbers do, they allow a one-to-one mapping between any sets of countable things. This leads to simple digital conversions or at least numerical shorthand, like street numbers.

Weaving

A weaving pattern can be expressed as a pixel grid, or as the set of rules for the arrangement and manipulation of thread. Both forms are digital, and weaving is the process of translating between them mentally in order to physically replicate the pixellated form, see figure 3.



fig. 3: The digital image (a) is encoded as a set of weaving instructions by the weaver (b). These instructions are then decoded by the weaver back into a pixelated representation (c). The original pattern is thus digitally replicated. Automatic looms perform the (b>c) transition, and additionally store the representation of (b) in physical form: expert knowledge is only needed for encoding, and only once per pattern.

In the early days of the Industrial Revolution weavers flourished while spinners starved, because their information processing skill defied mechanisation. Even after the introduction of machine looms artisan weavers could handle more intricate patterns, and handwoven cloth persisted as a dwindling luxury item. In the end, though, weaving was fully automated using the digital punch cards of the Jacquard loom. This achievement inspired efforts to automate other digital tasks, notably Babbage's imaginary engines and later in the nineteenth century, the tabulation machines that made IBM's fortune.

Less directly, it inspired a greater awareness of the possibilities of material digitality. Charles Dickens in *A Tale of Two Cities*, writing after the mechanisation of weaving, about events prior to it, has Madame Defarge encoding revolutionary messages in her knitting, presumably in a binary code of knits and purls. This kind of thinking made perfect sense in the nineteenth century, but would not have in the eighteenth, when the digital nature of fabric was still hidden in the form of a craft.

Writing

Alphabets and syllabaries are obviously digital.³ You don't get new letters by conflating the forms of old ones, and little changes in their shape have no significance. The digital reproduction of a text is simple, whether you know the meaning or not—you just copy it letter by letter.

The first writing was used for accounting, but it was soon used to augment traditional methods of digital cultural reproduction. Epic poems were put into writing, preserving with the stories relics of oral information management techniques. The oldest written works have a short episodic structure, regular metre, and stock phrases, all of which make a work easy to recount but tedious to read. It was novel to imagine a digital work existing when nobody could properly recall it. As each newly literate culture became used to the written form,

3. Readers are likely to quibble and claim that this is not so clear with, for example, Chinese text, where the range of symbols is so large that it could be seen as effectively open-ended. But this is wrong in a number of ways. Firstly, the terminology was technically deliberate: Han characters do not form an alphabet or syllabary, but a logographic system. Secondly, in any case, they are not infinite or malleable, and do not lie on a continuum. There are not in-between characters. There is a calligraphic tradition that introduces pictorial elements to writing, but this, as I understand it, does not change the underlying digital message but adds an analogue channel in parallel, much as prosody does in speech. Thirdly, the actually used symbols are routinely treated as digital. For example, mainland Chinese text is usually encoded using the 6,763 symbols of the GB2312 code set. Chinese newspapers are not printed from individually shaped blocks.

its works became more complex and casual. Prose is the abandonment of song, not necessarily as a means of presentation, but as a means of storage. People read the Histories of Herodotus and the Icelandic Sagas aloud, but nobody expected to memorise them.

Digital reproduction as worship

During one difficult period in Jewish history, cultural independence was threatened. Rather than let traditional stories adapt, which would risk an overwhelming influx of foreign ideas, the Jews forbade themselves any textual adaptation, making the digital integrity of their beliefs a cultural tenet. It is a sin to introduce errors in the reproduction of the Torah, and more latterly, in the Bible or Qu'ran. This emphasis on verisimilitude bred expertise in digital reproduction and preservation, and the core concepts of transcribing and distributing multiple copies are still used today in the storage of digital data.

Later, the injunction spread to secular law. For example, the constitution of the United States of America contains statements that are now ridiculous, or merely, through language change, unclear, but nevertheless are retained in letter perfect form. Prior to the invention of sacred text, written works were allowed to evolve, mutating as necessary at each reproductive juncture. To some extent they have since, with translations and revisions allowing textual leaps.

Digital music

Western musical notation is digital. There are only so many meaningful musical symbols, and although they contain elements of analogy, as the symbolic notes rise and fall on the staff in tune with their expression, the symbols must jump in discrete quanta. Musical notation maps onto MIDI as easily as text maps onto ASCII, for the same reason—each form expresses identical information.⁴

Written music represents an interesting inversion: music was originally an analogue aid for digital transmission, while musical scores are a digital means to repeat a tune. The vessel becomes the cargo.

Digital automata

In the twelfth century, the engineer Al-Jazari made a programmable drum machine that used a cylinder with regular holes. To programme a rhythm you would put pegs in the holes. This was digital technology: the presence or absence of a peg, and the spacing of the holes are discrete options, not continuous variables.⁵ It maps directly to a musical score, or to MIDI. The bumps on the cylinder of a music box are likewise a manifestation of a musical score, with each notch corresponding to a written note.

Automated digital replication

The printing press is not inherently digital—an etching, for instance, is analogue—but movable type is. It makes graphological expression difficult and reduces the set of possible symbols to those found in the printer's cases. Because it is reused and mass-produced, movable type helps standardise symbols between books and across time, as well as within each text.

Movable type was first used in China, where the size of the character set prevented it gaining much advantage over analogue printing. But when it was

combined with the small European alphabets, digital printing shattered the existing symbolic order. Miracles are analogical while immutable law is digital, and the reformation and the dramatic invasions of modernity were driven by a shift in thinking toward the latter.

Computers

I'm sure these are mentioned in the rest of the book, so I shall not say much. A digital computer can, by definition, be made to perform any kind of digital work. It can be programmed to process weaving patterns, copy text, orchestrate sound, add numbers, correct spelling and lay out text. Because computers are so digital, it is sometimes forgotten that digital processing precedes and extends beyond computers.

Digital processing for digital effect

Google, BabelFish, and OpenOffice are text-to-text functions. You put a series of words in, and some other words come out. These are examples of digital processing for digital effect—the output is meant to be read.

Digitisation (digital processing for analogue effect)

An image or photograph is analogue, yet there are machines that will treat it as an array of digital symbols. The picture thus gains replicability and endless processability, without anyone having to actually read or write it in digital form. The breakthrough is in the automated conversion between analogue and digital forms, rather than anything to do with computation in itself. A digital image is nothing but a written description of the analogue, and the process is reversed by depicting the described. The whole point of digitisation is to not notice the digital.

Digital age

So what the digital age really means is that the digital disappears. It swallows itself, hiding within every apparently analogue thing.

4. MIDI is an acronym for Musical Instrument Digital Interface. It carries essentially the same information as a written score—the timing, pitch and volume of the notes to be played.

5. The Jacquard loom, which I have already mentioned, is based on an elaboration of this idea, but with punch cards standing in for pegs on a cylinder.

Cloud 29837, found by a Cloud Shape Classifier.

The Cloud Shape Classifier can be seen at
<http://cloudy.halo.gen.nz> and in superior galleries.

The Classifier assists people by learning their taste
in clouds and extrapolating these preferences to
unseen images.



Local Knowledge and New Media Theory

Danny Butt

Over the last four years, and with the support of numerous people including many in the Aotearoa Digital Arts network, I have been writing articles, giving talks, editing books, producing creative works and organising events that ask what it means for new media to consider the implications of indigenous knowledge, culture, and ways of being.¹ These have all been experimental activities: they have been undertaken to create change but without certainty about what the results would be. The methods have been relatively simple: to attempt to work collaboratively with (rather than on behalf of) indigenous artists and practitioners, and to take a lead from the work of indigenous commentators and researchers in what might be important questions to explore in this engagement at what Martin Nakata calls the “cultural interface.”²

Given my low level of previous experience in indigenous culture and communities, it is unsurprising that this engagement has sometimes turned out to be challenging to achieve in practice. The challenges emerge from not just my own lack of experience, but from the deficit of resources that are available to indigenous arts and artists in comparison to non-indigenous artists. However, undertaking this work has also been a great source of learning for me about what the possibilities of something called ‘digital media’ might be, and my goal is to use this learning to increase the opportunities available for indigenous and non-indigenous artists alike.

What has led me to pursue these questions? A fundamental factor is that Aotearoa New Zealand has a distinctive social and cultural environment where indigenous issues have a high level of visibility compared to other English-speaking nations. These questions are around us on a day-to-day basis, and the sensitivities that Aotearoa fosters have something to offer the consideration of culture in other former British colonies and possibly further afield.

Secondly, my initial political and academic development occurred within the context of the feminist movement, where the politics of difference has always been a central theme. From feminist work I learnt that experience is irreducible. While it is not possible to say how a person of a particular sex/gender will or should behave, it is also true that it is clearly not possible for someone who is not a woman to experience the world as a woman. Once women’s perspectives are taken as important within a particular discussion, it becomes clear exactly how male-focussed language and structures of power are. Or as Gayatri Spivak suggests, to introduce the question of woman changes everything. This is obviously the case in a male-dominated technological media environment, and it is no surprise that some of the most interesting works in new media’s history have foregrounded issues of gender. For me, the work of cyberfeminist collective VNS Matrix, designer and writer Brenda Laurel, and net artists such as Melinda Rackham were all influential, in part due to an emphasis on the politics of desire, intersubjectivity, and embodiment. In the field of science and technology studies, the work of Donna Haraway has always made me aware of how the politics of technology always carries with it questions of gender.

The other thing I learnt from feminism is that it is possible and necessary, if not straightforward, for someone from a dominant subject position to work with those from non-dominant positions on changing structures of dominance. So it seems to me that identity-related (or, I would prefer to say, experience-centred) social movements ask deep, difficult and significant questions of the political and the aesthetic in both dominant and non-dominant cultures. Feminist work is specifically useful in this problematic because sex/gender is an originary binary within the Western philosophical tradition. Feminist thinkers have done the most significant interrogation of the political effects of such binaries and this work is directly relevant to the dichotomy of coloniser and colonised.

A third reason these questions are interesting to me is because the dominant understanding of ‘the user’ in new media discourse is limited by the subjective experience and imaginations of the creators of electronic interfaces, who have for too long been dominated by a narrow demographic (almost always white and male). But there are a whole lot of other ways of being in the world. From working as an interactive designer in the commercial sector I learnt time and again that whatever you might think the user might do when engaging with a website or program, what users *actually* do when they engage with new media is something different. New media theory, with its overwhelming focus on the formal aspects of networks and systems rather than the people who use them, has mostly neglected the very different subjectivities of people who engage with new media outside of the dominant cultural assumptions of Europe and North America.³ Projects of cultural self-determination by indigenous peoples offer models for reading technology outside of the narrow and specific cultural imaginaries that are too often prerequisites for participation in the new media environment. A hint of the potential can be found in the suggestion by Cheryl L’Hirondelle that “the current lack of attention being paid by programmers to Indigenous communities around the world represents a missed opportunity, because our languages are eloquent, concept and process-based, and fully capable of describing various complicated technological dynamics.”⁴

A fourth and final prompt for pursuing this work is the centrality of colonial myths in the cyberspace. The language structuring the Internet has always involved spatial metaphors—domains, multihoming, namespaces. This terminology has developed from a distinctly frontier cultural imaginary described by Cameron and Barbrook as “The Californian Ideology.”⁵ To take a well-known example, John Perry Barlow’s 1996 *Declaration of the Independence of Cyberspace* is an influential text in early web culture, which captures the epic mythology of the new online world. The text was critical in forging a collective sense of possibility in the English-speaking settler nations where web fever was catching hold. Barlow was a Wyoming cattle rancher, and for those of us working in the commercial new media industries the Californian Ideology was a Wired magazine-sponsored rerun of the Wild West’s escape from the limits of government, and from politics:

Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather. [...]

1. Examples include the Cultural Futures event co-organised with Jon Bywater and Nova Paul, and the accompanying edited collection *PLACE: Local Knowledge and New Media Practice* currently in press with Cambridge Scholars Publishing. <http://culturalfutures.place.net.nz>. Other works are available at <http://acp.dannybutt.net>

2. Martin Nakata, “Indigenous Knowledge and the Cultural Interface: Underlying Issues at the Intersection of Knowledge and Information Systems,” *IFLA Journal* 28, no.5 – 6 (2002): 281 – 91.

3. Lisa Nakamura, *Cybertypes: Race, Ethnicity, and Identity on the Internet* (New York: Routledge, 2002).

4. Cheryl L’Hirondelle, “Sub-rosa.” *Horizon Zero* 17: Tell—Aboriginal Story in Digital Media, 2004. <http://www.horizonzero.ca/textsite/tell.php?is=17&file=0&tlang=0>

5. Richard Barbrook, and Andy Cameron, *The Californian Ideology*, 1995. <http://www.hrc.wmin.ac.uk/theory-californianideology-main.html>

*Your legal concepts of property, expression, identity, movement, and context do not apply to us. They are all based on matter, and there is no matter here.[...] You are terrified of your own children, since they are natives in a world where you will always be immigrants.[...] In our world, whatever the human mind may create can be reproduced and distributed infinitely at no cost. The global conveyance of thought no longer requires your factories to accomplish.*⁶

From today's vantage point, we can simply note that the anti-immigration provisions of Barlow's declaration haven't aged so well, and the cowboy's identification as a 'native' seems all too resonant with the 'Pakeha as a second indigenous culture' trope promoted in New Zealand by some European commentators.

Virginia Eubanks highlights the problematic eloquently in her essay 'Mythography of the New Frontier,' which includes a discussion of historian Frederick Jackson Turner's nineteenth century analysis of the frontier in the U.S., and Neal Stephenson's 'epic hacker travelogue' *Mother Earth Mother Board*:

*In much internet discourse, progress and conquest are suspiciously tightly coupled. When combined with the pioneer ideal of flexibility (translated for 20th century use as flexible accumulation of capital) and framed in terms of the 'new frontier' this mix becomes even more troubling. The concept of progress as social evolution is deeply embedded in the metaphors of the 'new frontier.' Turner masked the political and economic impetus and consequences of conquest in his pioneer ideal—the genocide of the Native American population, the exploitation of the natural environment, the aggression towards other nations with colonial holdings—by defining conquest as progress, discovery, the invention of new ways of life. The conquest of the frontier, for Turner, was about evolution, not aggression. This conceit is equally visible in Stephenson's epic, and like Turner, Stephenson insists that this world-wide reach will have a naturally democratising and egalitarian effect.*⁷

Deconstructing and reconstructing the binary

So, four impulses: a local context; the need to consider feminism and the politics of experience; the need for a culturally diversified theory of the user; and the need for a decolonising of the cyberspace imaginary. Looking back at the itinerary of these interests, I can see them emerging from my experience of the cultural environment of Aotearoa New Zealand, with its unique mix of Pacific, Asian and European peoples. These cultures meet in a nation state straining under the pressure of the two cultural systems joined in the Treaty of Waitangi. The Treaty's *bicameral* approach to legal administration could give us a clue on how to rethink new media protocols in a more diverse way. The work of both feminist and postcolonial theorists testifies to the power of this binary in freeing thinking from dominant assumptions.

Internet culture often reflects a distinctly European history of social thought, which begins with the concept of the individual subject, and extrapolates to that larger collection of individuals which is the 'public.' We can draw an analogy here to how the singular identity promoted under cultural nationalism (that of the 'New Zealander') becomes the basis for the pluralism of the multicultural state (it is this singular culture which defines the acceptable relationships

6. John Perry Barlow, *A Declaration of the Independence of Cyberspace*, 8 February 1996. <http://homes.eff.org/~barlow/Declaration-Final.html>

7. Virginia Eubanks, "The Mythography of the 'New' Frontier," paper presented at *Media in Transition* Conference, MIT, 1999. http://web.mit.edu/mit/articles/index_eubanks.html

between 'multi' cultures). Multiculturalism or liberal pluralism is a different way of thinking than the host-visitor model (*tangata whenua—manuhiri*) which is common to Pacific cultures. Of course, a host-visitor model can admit many—but a visitor will always exist in relation to the host. There is a dyad.

Psychoanalytically-inflected feminist philosophers such as Luce Irigaray show that to think in terms of this 'two' is to raise a very different type of ethical relationship than to think either the individual or the many, which have been more common social structures in European thought.⁸ This relation to an Other calls subjectivity into question in powerful ways, questions we cannot hide from as we can in the singular concept of 'identity' (where we are self-determining) or broader notions of the 'social,' (where we can disavow our subjectivity). Irigaray's metaphor of two lips joined in one organ suggests this alternative, perhaps allowing us to attend to the flipside of the colonial history embedded in new media's dominant discourses. The colonial moment is, as Frantz Fanon made clear, a dyad, a relationship between coloniser and colonised which has a binary logic. The binary relation of zeros and ones, on and off, forms the very basis of the digital. Perhaps critical engagement with this binary, linked and mutually descriptive, offers potential to achieve the Internet's original promise of an international, inclusive, and democratic environment.

It goes without saying that as a foundation for research, these questions do not lend themselves to simple solutions and settled theories. However, they have raised some issues in my thinking about new media that I believe are worthy of further investigation, which I'd like to outline here in the hope of joining others who are also interested in pursuing such work.

1) Is new media a good thing, just because it happens to be good for us?

This first question is a formulation taken from Scott Lash: how do we live in a medium which enables not just the flow of goods, but the flow of *bads*?⁹ New media theory has brought with it an ethic of circulation, exemplified by Stewart Brand's famous comment that 'information wants to be free', emphasising the benefits of sharing knowledge and opposing restrictions on the free movement of information. However, the experience of indigenous peoples with respect to unauthorised circulation of customary knowledge has been one case among many that suggests the circulation of information does not always result in positive outcomes for all.¹⁰ Saskia Sassen notes that informationalisation tends to bring about a centralisation of control activities and a dispersal of routine tasks.¹¹ The dream of millions of cottage industries engaged in telework has not quite eventuated, and instead we have a consolidation of capital in the urban environment and a removal of managerial and coordinating functions from non-urban areas. Geographical studies on the impact of communications on small towns offer a parallel example: building transportation and communication networks is an investment which allows resources to flow out of or through that place. The net effect may even be the extinguishing of an entire productive sector of the economy in that location as consolidation occurs.¹²

Can we push for the development of new media and the attendant focus on development of the digital economy as a necessity, when this medium might be responsible for the deepening inequalities that are well documented in heavily informational economies?

8. This point is based on Spivak's reading of Irigaray. Gayatri Chakravorty Spivak, "French Feminism Revisited," in *Outside in the Teaching Machine* (New York: Routledge, 1993), 141 – 172.

9. Scott Lash, *Critique of Information* (Thousand Oaks, CA: Sage, 2002).

10. Eric Michaels, *Bad Aboriginal Art: Tradition, Media and Technological Horizons* (St. Leonards: Allen and Unwin, 1994).

11. Saskia Sassen, *The Global City: New York, London and Tokyo*, updated edition 2000 (Princeton: Princeton University, 1991).

12. Peter Daniels, *Service Industries: A Geographical Appraisal* (London and New York: Methuen, 1985).

2) Can we think the network via the nodes?

Network theory, in its suppression of the human subject, tends to make a number of implicit assumptions about what kind of a person is on the end of a network. Vine Deloria noted that “Western European peoples have never learned to consider the nature of the world discerned from a spatial point of view.”¹³ Instead of assuming that there is a neutral space from which we can view the network, perhaps we can instead highlight each specific experience and the kinds of network connections such a position allows and disallows. Here we do not to automatically think the connections others have to the networks are the same as ours.

Spivak points out the dangers of bureaucratic egalitarianism when not supplemented by other kinds of thinking:

*Cultural difference is spoken of but, by enthusiasm or convenience, a common human essence is assumed which denies the procedural importance of the difference. There is a related assumption: that the history of a sharing of the public and the private is the same among all groups of men and women as the one that follows through in terms of northwestern Europe or sometimes even Britain. This is the problem it seems to me. It's not so much a universalisation as seeing one history as the inevitable telos as well as the inevitable origin and past of all men and women everywhere.*¹⁴

3) How do we think what is not connected?

We can also begin to identify networks more accurately by observing not what they connect together but what they fail to connect. A positivist mindset assumes that an example can generally be replicated by other examples—in other words, a model of a process can be applied in every situation with appropriate customisation to the environment. This positivist mindset implies that global diffusion of the Internet and its models is inevitable. However, while Internet networks are theoretically ‘global’ there is never an actual globality, and the technocratic new media discourse is generally less eloquent on the reasons why theoretical globality fails to be achieved in practice. As Kerry McNamara points out when talking about Information and Communication Technology for development:

*Despite a proliferation of reports, initiatives, and pilot projects in the past several years, we still have little rigorous knowledge about ‘what works.’ There are abundant ‘success stories,’ but few of these have yet been subjected to detailed evaluation.*¹⁵

Immanent methodologies are not sufficient to understand new media networks, we have to supplement them with experiences *outside* our networks to sensitise ourselves to their limits.

4) What systems are unknowable to us?

While the previous point might be seen to support anthropological or ethnographic methodologies (encountering the Other in order to understand our own issues), there are also genuine aporia or unbridgeable differences between our ways of being and those of others, which mean that any connection we seek is always deferred and never quite achieved. How does someone with experiences we cannot have (for example, those native to other language groups) think the network? Here is where the value of dialogue and intercultural conversation comes into play, where instead of smoothing over differences in the name of

13. Vine Deloria, *God Is Red* (New York: Grosset and Dunlap, 1973), 3.
14. Gayatri Chakravorty Spivak and Jenny Sharpe, “A Conversation with Gayatri Chakravorty Spivak: Politics and the Imagination,” *Signs: Journal of Women in Culture and Society* 28, no.2 (2002): 617.
15. Kerry McNamara, “Information and Communication Technologies, Poverty and Development: Learning from Experience,” paper presented at the infoDev Annual Symposium, 9 – 10 December 2003. <http://infoDev.org/en/Document.17.aspx>

standardisation, we can foster multiple *protocols* for engaging with new media content. As poet and librarian Robert Sullivan suggests, such questions of protocol and holistic context are integral to indigenous cultural maintenance.

*How do we send a message that strengthens the holistic context of each cultural item and collection? How do we ensure that both indigenous and non-indigenous peoples receive the message? How do we digitise material taking into account its metaphysical as well as its digital life?*¹⁶

5) How will the philosophical underpinnings of new media theory be tested?

The construction of hardware and software packages requires a particular kind of test to be made of the developer’s capabilities—the result either works or it doesn’t. As we move into knowledge about the new media field and its social implications, we can no longer test our theoretical constructions so thoroughly, even though there is a tendency to analogise from the processes of software development to the social relationships that users engage in through new media tools. One of the best-known examples of this thinking is the Creative Commons, a form of intellectual property rights management for digital content drawing its inspiration from the GNU General Public License, a licence traditionally applied to software in the Open Source movement. The rigor of evaluation which operates in software development is however rarely present in the analogous social theories which spring from it.

This leads to the question of how we test a knowledge system. In the worlds of philosophy and social theory, the emphasis is usually placed on evaluating conceptual or descriptive work in relation to previous methods and concepts. In more applied forms (say the visual arts, or politics) we tend to look to circulation and effects to prove a concept. One of the questions that continues to haunt interdisciplinary work (not just in new media, but also in fields such as cultural studies) is that centering the community of knowledge around the *object of study* rather than the *methods of inquiry* tends to result in a lack of interest in or knowledge of precursors from times before that object came into being. To name one example, new media thinkers tend to valorise participatory models (such as ‘citizen journalism’) without reference to the investigations of the limits to citizenship and participation in pre-Internet media. This ethic reflects a particular instance of what Stephen Turner calls “settler futurism” and Barthes called “neomania”, a focus on “making over and moving on” that is incompatible with cultural systems based on a different sense of time.¹⁷

Where could these questions take new media and its future? There is no endpoint I can visualise—in fact, this approach to new media is orientated against a philosophy that takes development as a given. My questions are part of a search for an ethic of new media that can make the openness and diversity of Internet content manifest in its interactions and structure. The Internet has been described as a series of diverse monocultures, but our skills in working with other knowledge systems will have to improve as the demographic base of the Internet expands. Against tropes of speed, connection and movement that are so common in Internet discourse, this ethic could emerge from a focus on gaps, nodes, difference and incompatibility—spaces of unsettlement and possibility. Such a development of the imagination is surely the role of the arts—to imagine outside of the given, the instrumental and the immediately useful.

16. Robert Sullivan, “Indigenous Cultural and Intellectual Property Rights—A Digital Library Context,” *D-Lib Magazine* 8, no.5 (May 2002). <http://www.dlib.org/dlib/may02/sullivan/05sullivan.html>
17. Stephen Turner, “Aotearoa/New Zealand: The Homeland of Make-over Culture,” paper presented at *The Concept of ‘Home’ in Settler Societies* conference, University of Auckland, 2007.

Following pages: Brit Bunkey, Mushroom, 2005. Mushroom is painstakingly built from hand-shaped bricks. It resembles some kind of Victorian relic—a turned final or misplaced chimney-pot. The clear, rendering antipodean light and idyllic setting make the image of the installed artwork appear almost synthetic. Beginning life as a 3D model, the work is based on mathematical manipulation of the form of an atomic mushroom cloud. Mushroom mixes mundane bricks and mortar with intimations of the annihilating power of atomic technology.



Open Interactions

Karl D.D. Willis

Using the term ‘interactive’ to describe anything never seems to communicate much. At best it might entail a relationship with computers, games, or perhaps the Internet. At worst we could be talking about a doorbell—press the button and the bell chimes. The vagueness associated with the term interactive is not new, by some accounts stemming from the proliferation and diversification of all things ‘interactive’ in the 1990s.¹ Artists such as Rafael Lozano-Hemmer have described the word as ‘exhausted’ and avoided using it, while disciplines such as architecture are seeking to re-examine its meaning through the current wave of interactive architecture.²

So when exactly does something become interactive? Speaking in 1957, Marcel Duchamp suggests the participation of the spectator is evident in the art process at large:

*All in all, the creative act is not performed by the artist alone; the spectator brings the work in contact with the external world by deciphering and interpreting its inner qualifications and thus adds his contribution to the creative act.*³

While such cognitive interaction is undoubtedly present, the physicality of interactive art is in many ways what separates it from a given painting or sculpture. Shifts in the broader context of contemporary practice have undoubtedly influenced interactive art, as theorist Jack Burnham noted at the end of the 1960s: “we have already seen in happenings, kinetic art, and luminous art some premature attempts to expand the art experience into a two-way communication loop.”⁴ Performance works such as Fluxus artist Yoko Ono’s *Cut Piece* (1964) in which an audience was invited to snip off her clothing piece by piece, make no explicit use of technology but are undoubtedly ‘interactive’ in the way they require participation from an audience.

Often cited is the Massachusetts Institute of Technology (MIT) Media Labs’ working definition of interactivity: “Mutual and simultaneous activity on the part of both participants usually working towards some goal but not necessarily.”⁵ The model suggested here is described by MIT’s Andy Lippman as “a conversation versus a lecture.” The metaphor of conversation goes some way to defining the unique characteristics of interactivity: it is responsive, interruptible, and two-way.

Lippman cites the MIT-developed *Aspen Movie Map* as an example of conversational interactivity. This system enabled the user to take a virtual tour of Aspen, Colorado by navigating their way along a map of its streets. Lippman makes special note of the interactive ‘granularity’—the size and abundance of the individual elements—in contributing to the interactive experience. For the *Aspen Movie Map*, this equates to giving the user the impression that there is an ‘infinite database’ of elements, that at any given moment they can veer off their current course and tour some other part of the city.⁶

This concept of interactive granularity, which describes the size of the individual system elements, is of key importance in defining what I call ‘open

interactions’. Open interactions consist of an even finer degree of granularity than the *Aspen Movie Map*, often using mere pixels, sound samples, words or letters. Participants interact with such open systems by arranging these elements, for example: pixels into drawings, sound samples into rhythms, or letters and words into texts. Open interactions result in highly participatory creative experiences, where those engaged with the work can interact in an unstructured way as opposed to navigating heavily authored content or narrative formats.

Mapping Interactivity

Artist-researcher Douglas Edric Stanley addresses the evolution of interactivity in what he sees as a “move away from specific interactive objects as an end-all, and the emergence of a culture of software, instruments, and platforms for artistic creation.”⁷ To this end Stanley has created what he labels a *moral compass* to map such systems for artistic creation:

*Reactive—Automatic—Interactive—Instruments—Platforms*⁸

Stanley’s use of this scale is linked to his research on the use of algorithms for artistic creation. However it is possible to reinterpret the scale as a means to locate interactive works based on their interactive *granularity*. Coarser granularity, with larger individual elements, occupies one end of the scale, labelled by Lippman as merely *selective* rather than truly *interactive*, with the user choosing from a finite number of presets. On the other end of the scale, finer granularity provides smaller individual elements with which the participant can begin to construct and create in diverse ways.

A similar paradigm can be found in computer science, where programming languages are referred to on a scale from low to high level based on the degree of abstraction between the programmer and the machine. Low-level languages offer great control, but at the same time require attention to huge amounts of detail when programming. High-level languages automate many of these lower-level tasks and consist of larger blocks of code for specific needs. In reinterpreting Stanley’s scale, it is worthwhile to take a closer look at each category to clarify how it relates the notion of interactive granularity.

Reactive Systems

Interactivity is often associated with control structures. Architect Usman Haque and researcher Paul Pangaro label such interactive systems the “one-way, reactive interaction model”, which they suggest:

*...got a firm foothold in the minds of interactive designers (in both art and industry) because it provided short-term results that were easy for people to grasp and use. In other words, because it relies on a causal relationship between ‘human’ and ‘machine’ (‘I do X, therefore machine does Y back to me’), people are very quickly able to understand the system.*⁹

The field of Human-Computer Interaction evolved according to a model of user as master and computer as slave; a far cry from interactivity as a conversation. Artist Jim Campbell addresses this relationship:

The computer industry’s goal of making computers and programs smarter is simply to make computers more efficient at being controlled by the user to get a job done. Why should they do anything else? This is generally what we want

1. Erkki Huhtamo, “Seeking Deeper Contact: Interactive Art as Metacommentary,” *Convergence* 1, no.2 (1995): 81.
2. See Usman Haque, “Distinguishing Concepts: Lexicons of Interactive Art and Architecture,” in *Architectural Design, 4dsocial: Interactive Design*, ed. Lucy Bullivant (London: John Wiley and Sons, 2007), 24 – 31; also Alex Adriaansens and Joke Brouwer, “Alien Relationships from Public Space: A Winding Dialog with Rafael Lozano-Hemmer,” in *Transurbanism*, ed. Laura Martz, (Rotterdam: NAI Publishers, 2002), 138 – 158.
3. Marcel Duchamp, “The Creative Act,” *Art News* 56, no.4 (1957): 29.
4. Jack Burnham, “The Aesthetics of Intelligent Systems,” in *On the Future of Art*, ed. Edward F. Fry, (New York: The Viking Press, 1969), 99.
5. Stewart Brand, *The Media Lab: Inventing the Future at MIT* (New York: Penguin, 1988), 46.
6. Brand, *The Media Lab*, 49.

7. Régine Debatty, “Interview with Douglas Edric Stanley” *We Make Money Not Art*, 2006. <http://www.we-make-money-not-art.com/archives/008594.php>
8. Debatty, “Interview with Douglas Edric Stanley.”
9. Usman Haque and Paul Pangaro, “Paskian Environments,” paper presented at *Game Set and Match II*, Delft, The Netherlands, 28 March 2006.

computers for: we want them to be passive slaves. One can see this in the software, hardware and interfaces that are currently being used. This model is fine until it collides with art.¹⁰

A form of simple responsiveness through a branching series of decisions is now omnipresent, for example in automated teller machines, mobile phone interfaces and websites. From the outset, artists such as Lynn Hershman have sought to experiment with this form of interactivity. Her installation *Lorna*, developed from 1979 onwards, is a video-based non-linear narrative that predates the popularisation of media such as LaserDisc, CD-ROM, and later DVD media. In *Lorna*, visitors interact with a monitor via a remote control, navigating through the story of a woman alone in her apartment with only her television for company. In providing a series of choices programmed by the artist, *Lorna* operates reactively, a paradigm of interaction described by Lozano-Hemmer as akin to a “top-down 1-bit trigger button—you push and something happens.”¹¹ In Hershman’s work this control structure is problematised by the character *Lorna*’s own lonely dependence on (and control by) the television that provides our view into her world.¹²

Automatic Systems

Automatic systems function without interaction, relying on a set of author-determined rules or algorithms to run independently. Lacking any physical interaction, automatic systems inhibit the user from making any choices that can directly influence the form of the artwork, however automatic systems are capable of surprisingly complex behaviour. Simon Ingram uses off-the-shelf Lego robotics to build self-creating *Painting Assemblages*. Attached to the gallery wall, clutching a brush, the machine’s ‘paint head’ moves over the canvas on an X Y rack and pinion system, dipping into its gluggy Lego paint pot before making a stroke. Over the course of the painting’s exhibition, the robot renders an algorithmically-described T square fractal. Although the format of the finished work is pre-determined, the sequence of brush strokes and decisions on their length and density are randomly generated on the fly, contributing to the painting’s complex visual field.¹³

Interactive Systems

Over a decade on from Hershman’s early experiments with branching narrative structures, interactive CD-ROMs reached mass audiences in the 1990s. Such projects typically ported *old* media into *new* media; reducing interactivity to a mere gateway to the ‘real’ content inside. Andy Polaine, co-founder of art collective Antirom, notes that “from navigational menus to videogames, interactivity is often part of an interface to other content. This ignores the experience of the moment of interaction and relegates it to a mechanism of control at best and something to be mastered and ‘got through’ at worst.”¹⁴ Antirom chose to react against such interfaces, instead creating works where “the interface was the content and the purpose of the interaction was the experience of the interaction.”¹⁵ This approach allowed Antirom to explore interactivity without being tied to models such as cinema or literature.

1. Simon Ingram, *Painting Assemblage* No. 6, 2007, 2400 x 2400mm, courtesy the artist and Gow Langsford Gallery, Auckland.
Far right: The painting at 10, 50, 100, 200, 2,000, 10,000 and 18,000 strokes. Simon Ingram’s paintings use off-the-shelf Lego robotics to build a work that paints itself. The robot painter bolted onto the stretcher moves on a rack and pinion system, clutching its brush as it travels over the work’s surface, dipping it periodically into its dripping Lego paint pot. Over the course of the exhibition, the robot executes an algorithmically-described T-square fractal. Although the format of the finished work is pre-determined, decisions on the length and density of the brushmarks are randomly generated on the fly, contributing to the complex visual field of the painting.

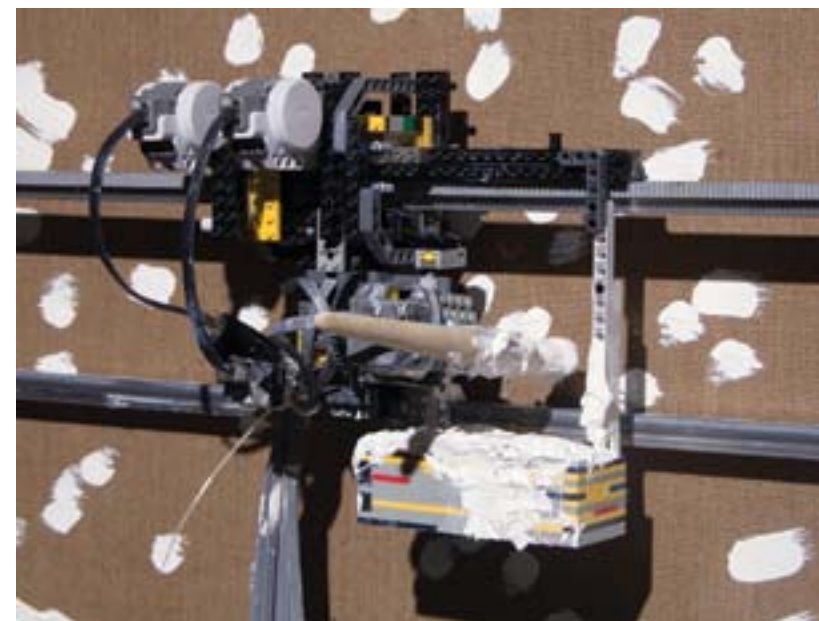


fig. 1



- 10. Jim Campbell, “Delusions of Dialogue: Control and Choice in Interactive Art,” *Leonardo* 33, no. 2 (2000): 133.
- 11. Adriaansens, and Brouwer, “Alien Relationships from Public Space.”
- 12. Gabriella Giannachi, “Gabriella Ginnachi introduces Lynn Hershman Leeson,” 2007. <http://presence.stanford.edu:3455/LynnHershman/264>
- 13. Stella Brennan, email interview with artist, 19 December 2007.
- 14. Andrew Polaine, “The Playfulness of Interactivity,” paper presented at the *Fourth International Conference on Design and Emotion*, Middle East Technical University, Ankara, Turkey, 12 July 2004.
- 15. Polaine, “The Playfulness of Interactivity.”

Just as interactivity can be limited by the paradigms of old media, a technologically determinist notion of interactivity elides other factors. Media archaeologist Erkki Huhtamo notes:

*Most people are content to define interactive media as a certain kind of technology, without considering the uses to which it is put. ... The problem lies in the failure to grasp the fact that media products cannot be defined as interactive merely because they use or have access to certain kinds of hardware and software. The crucial question is one of contextualisation.*¹⁶

This technological focus ignores the all-important social and aesthetic context of interactive art. Rather than the technological make-up of the system itself, how the participant interacts and the subsequent results of that interaction should remain the point of focus.

Instruments

Instrument-like art systems have a level of granularity that enables the raw elements of the system (sound samples or pixels as the case may be) to be combined to create a virtually unlimited range of output. However rather than focus solely upon the creation of an artefact, the emphasis is on the interactive experience that develops.

In my own work I have created instrument-like art systems, most notably with the interactive drawing installation *Light Tracer*. *Light Tracer* invites the participant to write, draw and trace images in physical space using a series of light sources. The motivation behind the project was to make something that would allow others to create, leaving how the system is used up to participant.

With no pre-existing content provided, all imagery must be created from scratch by either drawing with a light emitting device (penlights, cellphones, lighters etc) or tracing physical objects with brighter lights such as a camera flash. Participants decide on both the tools they use and what they create—imagery ranging from impassioned Hezbollah slogans to trivial tic-tac-toe games.

Another project I have developed in collaboration with Dr. Ivan Poupyrev at the Sony Computer Science Laboratories in Tokyo is *TwelvePixels*, a drawing system for mobile phones.¹⁷ The interface uses only the twelve keys of the handset to create simple pixel-based imagery. The underlying interface maps the conventional mobile phone keypad to the onscreen grid. Using the directional keys, the size and position of the drawing area can be changed to allow the creation of incrementally smaller pixel-cells.

Rather than attempting to re-engineer existing drawing interfaces on the mobile phone, the project aims to develop new techniques that are uniquely suited and native to the phone itself. Using this instrument-like system the possibility remains to develop a new style of imagery and expression that is unique to the mobile phone.

Platforms

As artists evolve along Stanley's scale towards *instruments* and *platforms* they move away from one-off interactive objects, towards broader structures for creation. David Rokeby's interactive sound installation *Very Nervous System* (1986-1990) is one such example of an artwork that was subsequently developed into a general software package called *SoftVNS*.¹⁸ Users of *SoftVNS* can now

2: Karl D.D. Willis, *Light Tracer*, 2005, interactive installation (<http://lighttracer.darcy.co.nz/>).
 3: Ivan Poupyrev and Karl D.D. Willis, *TwelvePixels*, 2007-2008, mobile phone interface, Sony CSL ©2007 (<http://12pixels.com/>).
 4: Nao Tokui and Karl D.D. Willis, *Sonosphere*, 2003-2004, generative audio-visual application, screenshot (<http://www.sonosphere.com/wip/>).



fig. 2



fig. 3

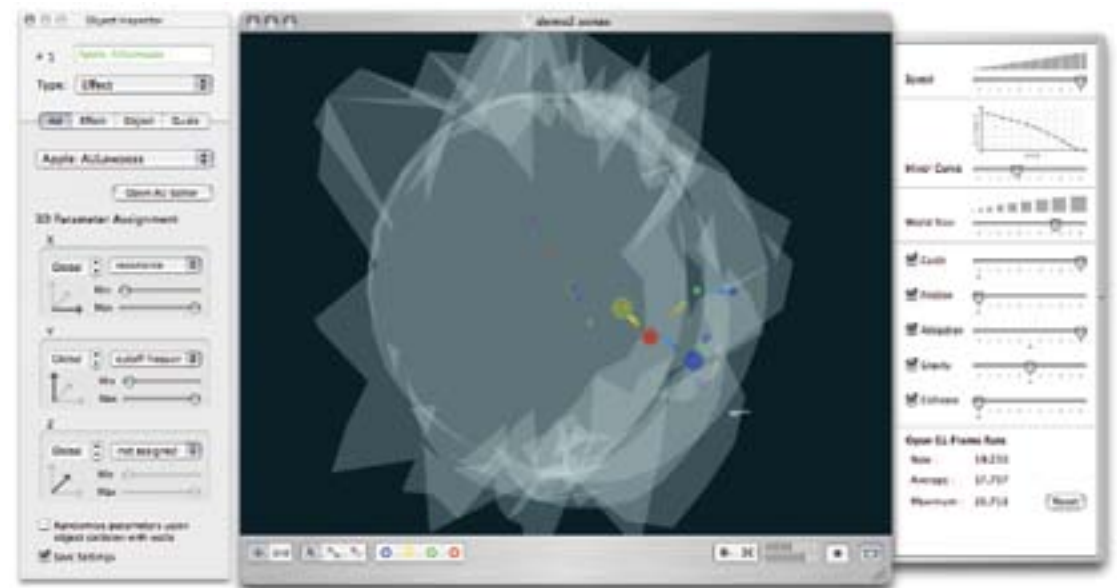


fig. 4

16. Huhtamo, "Seeking Deeper Contact," 87.
 17. Ivan Poupyrev and Karl Darcy Daniel Willis, *Twelvepixels*. Mobile phone drawing system. Tokyo Japan: Sony Computer Science Laboratories, 2007. <http://12pixels.com>
 18. David Rokeby, *Softvns 2.0*, 2002. <http://www3.sympatico.ca/drockey/softvns.html>

utilise the same computer-vision-based technology created by Rokeby in their own works.

Perhaps the best-known instance of artist-developed software spawning further artistic creation is the 2005 Prix Ars Electronica Golden Nica recipient *Processing* (2001) by Benjamin Fry and Casey Reas. *Processing* is an open source programming language and environment that enables artists and designers to create and control image, sound and other elements using accessible yet powerful programming functions.

Emergence

To extend Stanley's scale beyond *instruments* and *platforms*, it is useful to again frame interactivity as a conversation that gives weight to both the participant and the system. In a real life context Haque and Pangaro suggest the most productive conversations we have with others are generative, leading to new perspectives and actions.¹⁹ But how exactly can we 'converse' with computers in such a way?

From 2003 to 2004 I was involved in the development of an audio application created by Nao Tokui, which attempted to address this question. *Sonosphere* implemented aspects of complex and chaotic systems into an audio production and performance context. The software acts as a virtual three-dimensional environment with nodes representing audio samples, effects, and mixers. By loading an audio file into a sample node then connecting it through an effect node to a mixer node, a network is formed that applies the given effect and plays the audio file. Nodes interact with each other in accordance with the virtual physics of the environment, which can be modified by the user. Relationships can be mapped out between the nodes, for example the Z axis of an audio sample node can be mapped to the 'resonance' setting of a 'low pass' effect, so that the deeper the node moves into the virtual space, the more resonance is applied, and the sound changes dynamically.

As the number of nodes increases, *Sonosphere* starts to exhibit characteristics of a chaotic system. While users contribute their own audio samples and effects, in such a chaotic environment they are unable to exert full control over the system. Tokui, himself a DJ, producer and musician, speaks of the desire to create moments of inspiration when interacting with computers and to apply the methodology of generative systems to a wider creative context.²⁰ *Sonosphere's* uses vary from live performance to the creation and processing of audio samples.

For interactive artworks, rather than one-off transformations of input into output data, the focus is on a loop of constant feedback and perpetual transition. To move beyond simple action/reaction structures toward more generative forms ultimately extends into the broader domain of emergence and machine creativity. Neuroscientist Peter Cariani notes:

*The pragmatic relevance of emergence is intimately related to Descartes' dictum: how can a designer build a device which outperforms the designers specifications? If our devices follow our specifications too closely, they will fail to improve on those specifications. If, on the other hand, they are not in any way constrained by our purposes, they may cease to be of any use to us at all. Thus, the problem of emergence is the problem of specifications vs. creativity, of closure and replicability vs. open-endedness and surprise.*²¹

19. Haque and Pangaro, "Paskian Environments."
 20. Nao Tokui, "Sonosphere," seminar presented at Auckland Art Gallery, Auckland, 8 December 2004. <http://www.sonosphere.com>
 21. Peter Cariani, "Emergence and Artificial Life," in *Artificial Life II*, ed. Christopher G Langton et al. (Santa Fe: Santa Fe Institute of Studies in the Sciences of Complexity, 1991) 776.

Open Interactions

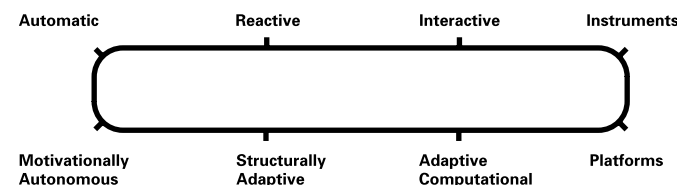
To produce emergent properties from a machine-based system an optimum level of autonomy is necessary. Within the field of computer games, the work of game designer Will Wright is a notable example of managing the balance of specification to allow for further creation. Wright speaks of the simple underlying cellular automata rules behind the ground-breaking city building game *Sim City*.²² Despite the simplicity of the rules pertaining to such elements as crime, traffic, and pollution, Wright noted complex emergent phenomena such as urban gentrification evolving. Rather than being hard-coded into the game system, these emergent behaviours evolved through user interaction, capturing the "something for nothing" feeling of emergence.²³

Adaptive Devices

Cariani's research into adaptive devices has relevance for interactive systems seeking to exhibit more complex behaviour.²⁴ He describes *adaptive computational devices* capable of altering their computational parts based on their performance. A learning mechanism and evaluation criteria are required to document past interactions, judge performance, and make subsequent adjustments. Douglas Bagnall's *Filmmaking Robot* is an example of a computationally adaptive system that captures live video footage of its environment and edits films from this raw data. The robot's editing choices are based on a set of evolving criteria, ranging from initial training of the robot's 'preferences' with Impressionist paintings to heuristics that identify novel compositions from its memory.²⁵

Structurally adaptive devices are capable of constructing sensors and actuators based on their performance. In the late 1950s cyberneticist Gordon Pask created and experimented with an electrochemical device capable of growing its own sensors. Using an aqueous ferrous sulfate/sulphuric acid solution Pask developed an 'ear' that could be trained over half a day to distinguish between several sound frequencies.²⁶

Beyond these could be *motivationally autonomous devices* capable of establishing their own performance-measuring criteria: "Such devices would not be useful for accomplishing our purposes as their evaluatory criteria might well diverge from our own over time, but this is a situation we face with other autonomous human beings, with desire other than our own."²⁷ With *motivationally autonomous devices* interactivity comes full circle back towards machine autonomy, albeit with a nature very different from the 'automatic' systems labelled on Stanley's moral compass.



Interactive specification

The above illustrates a combination of the categories established by Stanley and Cariani, describing a balance of specification between human interactor and computer system. The balance of specification shifts from open interactions on

22. Will Wright and Brian Eno, "Playing with Time," *The Long Now Foundation*, 26 June 2006. http://fora.tv/media/rss/Long_Now_Podcasts/podcast-2006-06-26-wright-and-eno.mp3
 23. David Chalmers, "Varieties of Emergence," in *The Re-emergence of Emergence: The Emergentist Hypothesis from Science to Religion*, ed. Philip Clayton and Paul Davies (Oxford and New York: Oxford University Press, 2006).
 24. Cariani, "Emergence and Artificial Life."
 25. Douglas Bagnall, *A Filmmaking Robot*, 2006. <http://halo.gen.nz/robot>
 26. Peter Cariani, "To Evolve an Ear: Epistemological Implications of Gordon Pask's electromechanical Devices," *Systems Research* 10, no.3 (1993): 19 - 33.
 27. Cariani, "Emergence and Artificial Life," 789.

the right side, towards system autonomy on the left.

- *Automatic Systems* that run without interaction or intervention from outside sources. For example, Ingram's *Painting Assemblages*.
- *Reactive Systems* that allow a minimum level of interaction, often defined by low definition input devices and coarse interactive granularity. For example, the branching narrative structures of DVDs.
- *Interactive Systems* that incorporate a fundamental level of interactivity involving a continuous feedback loop of action and reaction. For example, goal-based games.
- *Instruments* with a rich level of interactive granularity and a focus on interactions promoting creativity. For example, Rokeby's *Very Nervous System*, the author's *Light Tracer*.
- *Platforms*: comprehensive systems to be utilised for further production and creation. For example, *Processing*, Rokeby's *SoftVNS*.
- *Adaptive Computational Systems* with the capability to alter and adapt their computational parts based on their performance in past interactions. For example, Bagnall's *Filmmaking Robot*.
- *Structurally Adaptive Systems* with the capability to change their structure based on their performance in past interactions. For example, Pask's electrochemical ear experiment.
- *Motivationally Autonomous Systems* capable of establishing their own performance-measuring criteria.

These categories are not intended to be either definitive or mutually exclusive. Interactive systems could be classified as, or contain elements pertaining to several categories across the spectrum. Moreover interactivity is highly user specific; while one user may be tentative and reactive, other users may push the same system towards the realm of instruments.

It is hard to steer clear of value-judgements about what the outcomes of interactivity should or should not be. Interactive art has often been self-referential, providing a metacommentary on interactivity itself. Such works can potentially provide useful critiques on the role of technology, however too many fall short and amount to mere 'naïve celebrations' of technology.²⁸

While open interactions are by no means new, they evolve a step beyond the so-called transformation of passive observer into active creator. Haque and Pangaro suggest the time is right for adopting more productive interactions because "we are no longer 'naïve' in dealing with our technological interfaces, and therefore we expect more from them and are more able to comprehend the structures behind them." They draw a distinction between *intelligible* and *intelligent* interactivity: "Intelligibility requires predictability and a finite language. Intelligence, on the other hand, requires creativity and the unexpected."²⁹

Coming across the unexpected when interacting with computers is almost inevitably perceived negatively as an unintended and unwanted 'bug'. While the promise of systems capable of "amplifying our own creativity" is seductive.³⁰ However, does such a definitive goal contradict the idea of partnership and reduce the system to a mere tool? Truly conversational interactive systems are inherently open-ended and should thus produce positive *as well as* negative outcomes.

5. Douglas Bagnall, *A Filmmaking Robot*, 2004, software, monitors, video cameras, still images from finished films by robot. "Frustrated by his inability to see film as anything other than changing fields of colour, Bagnall decided a computer would be much better at the task of directing. *A Filmmaking Robot* replaces human aesthetic decisions with a series of algorithms. With help from Stagecoach and CityLink, Bagnall directed cameras on Wellington buses to transmit video footage back to his robot whenever they passed through a wireless hotspot. The robot assigns each frame of this footage a series of numbers based on aspects like brightness, saturation, and detail. Each frame is placed into a matrix based on these values—similar images and scenes cluster together, though imperfectly. Throughout the day, the robot weaves through the space of this numerical matrix, selecting its favourite images based on a broad set of criteria (including its 'training' with Impressionist paintings and its preference for images it hasn't encountered before), compiling them into short clips. The robot's unawareness of location and time and its indifference to whether a frame occurs before or after any other, means the resulting montage is dislocated and dreamlike. Fragments of a monotone rain sequence are shattered by hyper-coloured frames deemed to be better. Cars reverse-park and bus routes are played backwards." (Luke Munn)

28. Huhtamo, "It Is Interactive—But Is It Art?," paper presented at ACM Siggraph 93, reprinted in *Computer Graphics Visual Proceedings* (New York: ACM Siggraph, 1993), 133.

29. Haque and Pangaro, "Paskian Environments."

30. Cariani, "Emergence and Artificial Life."



fig. 5

Real Time, Virtual Space, Live Theatre

Helen Varley Jameison

Part of what makes theatre magical for me is its liveness: what I'm seeing on stage is happening now and only now, in this precise 'real time' moment and in the presence of these specific people. It's a shared experience that can't be captured or recorded, never to be repeated exactly the same. In today's digitised, mediated, sampled, recombinant and remixed world, the truly live is an elusive and precious thing. 'Real time' is also elusive. Similar to the theatre concept of being 'in the moment,' real time exists in real life but too often gets lost in our obsessing over what's past or yet to come. Furthermore, real time in the virtuality of cyberspace is both meaningless—for time itself is something quite different in cyberspace than it is in real life—and simultaneously the only way to speak about time; the current moment is all there is.

What does it mean to make live theatre in real time and virtual space? How do we do it and what *is* it? Is it still theatre because of its liveness—or is it not theatre because of its absences? Can a physically absent performer have presence? These are some of the questions that underpin my artistic practice in what I call 'cyberformance.' By cyberformance, I mean live collaborative performance that uses Internet technologies to bring remote performers together in real time; the audience can be online and remote, or in a proximal space. Cyberformance is a form within the wider genre of networked performance, which includes any live performance event that involves some form of networking. This can include computer networks (via the internet or local networks), mobile phone networks, GPS devices and motion sensors, as well as feedback loops between devices where there may be no human involved.¹

Artists were creating networked events long before the Internet came into being—via shortwave radio, telephone, fax and satellite technologies, and even the good old postal system. Although most of what's been documented was initiated in the northern hemisphere, New Zealand wasn't entirely out of the loop. Our geographical remoteness, along with our 'early adopter' attitude to technology, made Aotearoa attractive to international artists looking to extend their performances to the furthest reaches. In the mid-80s, American sound artist and event-maker Charlie Morrow organised *Radio Solstice*, a series of networked events which brought together real time participants from North America, Scandinavia, and New Zealand—where Phil Dadson led a group of drummers in the Maungawhau crater in Auckland.² Morrow gathered musical contributions from around the globe via shortwave radio, mixed them in real time and re-broadcast the result from his New York studio. Although the remote contributors couldn't communicate with or hear each other, their performances were simultaneous and part of a single live event.³

Another early networked project was *Burntime*, an interactive exhibition based at Artpace in Auckland in 1991. Visiting North American artists Cheryl Casteen and Charles Flickinger invited local artists and the public to join in a five-day international art exchange during which participants' art work was transmitted and received by fax and telephone. A speaker phone facilitated the

1. I exclude online gaming and social networks from my definition of cyberformance because although they can be described as a form of networked performance they are not primarily undertaken for an audience or as an artistic activity.
2. Phil Dadson, email communication with the author, May 2007.
3. Scott Westerfeld, "Charlie Morrow Alarums and Excursions," *TDR* (1988 –) 34, no.3 (1990): 129 – 47. See also Jerome Rothenberg, Charlie Morrow, and Richard Schechner, "Making Waves: An Interview with Charlie Morrow," *TDR* (1988) 34, no.3 (1990): 148 – 58.

exchange of music, story and an inter-hemisphere jam session between musicians in Auckland and Washington DC. Reviewer Julia Stoops wrote that "the group psyche blossomed through a sense of joining and of union. There was the thrill of emotionally touching people on the other side of the world at that very second."⁴

Live performances were broadcast over the internet from New Zealand as early as 1994, when Richard Naylor webcast the Tawa Schools Music Festival from the Michael Fowler Centre in Wellington; it was seen and heard in a dozen countries.⁵ At this time the World Wide Web was in its infancy; using the Internet as a broadcast medium was pioneering, and as far as I have discovered there was only one New Zealander engaging in networked performance of the kind that I call cyberformance. This person is only identifiable via a .nz email address in the programme of the first documented online performance, *Hamnet*, which was staged in an Internet Relay Chat (IRC) channel in 1994 and led by American theatre academic Stuart Harris.⁶ The eighty-line script bore some resemblance to Shakespeare's *Hamlet*, with the addition of spirited word-play, IRC jargon and contemporary references. The cast was largely based in North America, with a few international participants including the mystery New Zealander. Harris cast the performance half an hour before show-time, and the debut was interrupted when a lightning storm took out a key player's Internet connection (apparently the second performance went more smoothly).

Online networked performance continued to evolve during the 1990s, mainly led by northern hemisphere practitioners: *The Plaintext Players* further developed the art of IRC performance, and *Desktop Theatre* staged theatrical interventions in the online chat environment The Palace.⁷ Developed as a 2D graphical chat environment, The Palace allowed users to create their own unique visual avatars, speak aloud with Text2Speech audio, and create their own Palace if they had access to a web server.⁸ The degree of customisation, the user-friendly interface, and the possibility of adding your own scripting made The Palace very appealing to both social chatters and online performers. I discovered *Desktop Theater* and their work in The Palace in 1999 and thus began my adventures in cyberformance. I was living in Scotland at the time, and would regularly get up at 3 or 4am to join the group's 'dreaming' improvisations, collaborating with players in Europe and the USA. I discovered a whole new kind of performativity in my fingertips, and became fascinated by the Internet as a site for live performance, creativity and imagination.

As a theatre practitioner, I was curious about the relationship between cyberformance and live theatre: I was interested in the immediacy and 'presence' of the remote performers, and the potential it offered for recontextualisation. I had the opportunity to experiment with this in 2001, when I collaborated with director Jill Greenhalgh on her performance installation project *Water[war]s* at the Transit Festival of Women's Performance (Odin Teatret, Denmark).⁹ I presented a cyberformance element as part of the larger work, with Adriene Jenik and Lisa Brenneis of Desktop Theater. Our audience consisted of contemporary theatre practitioners who had never encountered anything like cyberformance before; some were amazed and intrigued, while others were outraged that this could be presented as 'theatre'. Aside from causing a small storm of controversy, I learned that many in the audience were captivated by my

4. Julia Stoops, "Burntime: Communication between the Hemispheres," *Art New Zealand* 60 (Spring 1991): 3.
5. Richard Naylor, email communication with the author, May 2007.
6. Stuart Harris, Gayle Kidder and the Hamnet Players, "The Hamnet Players: An Archive," 1993. <http://micro5.mscc.huji.ac.il/~msdanet/cyberpl@y/hamnet-index.html>
7. Plaintext Players. <http://yin.arts.uci.edu/~players/DesktopTheater>, <http://www.desktoptheater.org>
8. The Palace was developed by Communities.com from 1995 to 2000 as a free graphical chat application; although the software development has ceased, the 'Palatian' community continues to exist as a social network.
9. <http://www.themagdalenaproject.org/waterwars>

own ‘performance’. I hadn’t actually considered my physical presence part of the performance—I was sitting at the side of the stage with my laptop, mediating and contributing to what was happening on screen, blissfully unaware of being observed as a performer. Laptop performances are often dismissed as visually dull and performatively boring, yet the response of my theatre colleagues suggested that this doesn’t have to be the case. The unconscious intensity of my focus, and the sense of anticipation as I typed and the audience waited for the result, created an engaging performance in itself. This experience led me to consider the actual integration of cyberformance into live theatre.

I first explored this idea in *the[abc]experiment* (2001 – 02) and from that project, formed the globally dispersed cyberformance troupe *Avatar Body Collision* with Vicki Smith (NZ), Karla Ptacek (UK) and Leena Saarinen (Finland).¹⁰ Without ever meeting physically, we have collaborated on ten shows using a variety of technologies and presented our work at festivals and conferences around the world. Some of our shows have been staged in a physical space for a proximal audience, with one or more of the group present in the same space, while other shows have been created and performed entirely online, for an online audience.

<Ru> Vi.
 <Vi> yes
 <Ru> How do you find Flo?
 <Vi> She seems much the same
 <Ru> ...
 <Vi> oh!
 <Vi> has she not been told?
 [...] {lovely head movement Ru}
 <Ru> God forbid
 [...] {flo enter smoothly and slide on, good side}
 <Ru> Holding hands... that way
 <flo> Dreaming of... love
 [...] {Ru pick up your cues}
 <Vi> Flo
 <flo> Yes
 <Vi> How do you think Ru is looking?
 [...] {lovely turn Flo}
 <flo> One sees little in this light.
 [...] {Vi cross AFTER Flo’s line}
 [Vi] { ...}
 <flo> Oh!
 <flo> Does she not know?
 <Vi> Please God not.

The above is an extract from a rehearsal of Samuel Beckett’s dramaticule *Come and Go*, which *Avatar Body Collision* performed at the 070707 UpStage Festival (2007). In a break from our usual devising process, we chose to experiment with the translation of an existing stage text to the virtual stage, and Karla took the role of director. The director’s comments are prefaced by [...] and interspersed among the performers’ lines, curly brackets showing that they are ‘thoughts’

10. <http://www.abcexperiment.org>
<http://www.avatarbodycollision.org>

1: Avatar Body Collision, *Logging With the Lololols*, cyberformance at Virtual Minds Congress, Bremen, Germany, 2004, stills from video by Lola Castro Ruiz.
 2: Avatar Body Collision, *swim—an exercise in remote intimacy*, cyberformance, 2007, stills from video by Suzon Fuks.



fig. 1



fig. 2

rather than spoken aloud. For this performance we worked in UpStage, a purpose-built software for cyberformance that we developed with digital artist and programmer Douglas Bagnall.¹¹

UpStage came about through our desire for a single application with which to devise and perform online, that would also be easily accessible to a wide audience. Initially, Avatar Body *Collision* worked with free chat applications including iVisit (an online audio-visual conferencing application) and The Palace. These and other applications that we investigated were designed for ‘safe’ social chat rather than live theatrical performance, which inevitably meant that we reached limits where the software would not allow us to do what we wanted artistically. Despite these limitations, we created four shows using iVisit and The Palace before developing UpStage.

Three of these shows included a live stage component—one or two performers in front of a proximal audience, while the remote performers appeared on a screen at the back of the stage. The on-stage performers become mediators (as I had been in *Water[war]s*) as well as performers. In *Screen Save Her* (2002), Karla appeared on stage as BP, a sales rep. for a gene-stealing multinational biotech corporation, promoting the latest in body enhancements and dressed in a costume comprising a giant tongue with a head-dress of eyeballs. The densely layered plot was structured as a game in which BP eventually entered the screen as an avatar in The Palace, monitored by three mysterious women in web cam windows (neatly reversing the usual surveillance set-up). Proximal audiences at the two performances were guided by BP’s character on stage, and saw the remote performers via Karla’s projected laptop screen.¹² It was not possible for online audiences to see the performance, as they would miss important on-stage elements, as well as be unable to replicate the ‘screenography’—that is, the precise arrangement of the various application windows on the computer desktop.

The same format was used in *swim—an exercise in remote intimacy* (first performed in 2002), this time with myself on stage and the other three colliders appearing remotely.¹³ Inspired by our experiences of online relationships, we used swimming as a metaphor for reaching out to distant lovers. Myths and legends featuring lovers separated by water enabled us to tap into the universality of separated lovers—the technology may have changed since the days of Hero and Leander but the essence remains the same—as well as provide the audience with recognisable stories and signs as entry points into the work. My character was a mix of technician, spiritual medium and cyber-lover whose physical presence acted as a conduit for the appearance of the remote performers before the proximal audience. Once again, it was not accessible to an online audience.

These performances and *Lagging With the Lololols* (2004), in which both Karla and Leena were on stage, are unarguably ‘theatre’ as they were presented to a proximal audience in a physical space.¹⁴ The projected computer desktop extended the stage area into the ethereal territory of cyberspace. The real-time presence of remote performers was framed by software interfaces and mediated through webcams, avatars and computerised voices. *Lagging With the Lololols* has been the only performance where we’ve had NO technical problems (such as lag or freezing of an image) and afterwards, the audience asked why we risked the live online element. The show had been so ‘perfect’ that they had trouble believing that the webcams weren’t prerecorded video. I’ve had the same feeling

11. <http://www.upstage.org.nz>

12. Performed at the 12-12

Time-based Media Festival, Cardiff, and Riverside Studios in London, May 2002.

13. Swim has been performed at *Medi@terra*, Athens, December 2002; *ANET Festival*, Belgrade, December 2002; *Magdalena Australia*, Brisbane, April 2003; *City of Women*, Ljubljana, October 2003; *Eclectic Tech Carnival*, Belgrade, July 2004; and the *NZ Fringe Festival*, Wellington, February 2005.

14. *Lagging with the Lololols* was performed at the *Virtual Minds Congress*, Bremen, May 2004.

watching other shows when the technology has been so good that it could be a live feed from the next room, not coming from thousands of miles away via the inherently unstable network of computers, routers and cables that makes up the Internet. An awareness of the liveness and tenuousness of the medium is important as it makes the audience complicit in the risk the performers are taking. *Belonging* (first performed in 2007) includes a scene in which the UpStage text chat window is projected onto my body and represented on the online stage via my web cam; audience members have commented that seeing their own chat contribution appear in my web cam avatar reinforced the immediacy of the performance.

Avatar Body *Collision* doesn’t strive to make work that appears to be ‘perfect’, and *Lagging With the Lololols* taught us the importance of visible blips, delays and glitches. There are huge risks in performing live over the Internet, and despite rapid improvements the reality is that the Internet in 2008 is still an unstable environment. Even on the best broadband connection, you can experience lag. Even with a brand new web cam, your image can unexpectedly freeze. Even if you ensure that all the components at your end are as high-spec as possible, there are many other variables that are beyond your control. And power cuts do happen! But this is exactly the magic of live performance, of the relationship between real life and real time: whatever happens becomes part of that unique performance. Just as the lightning’s interruption is now a feature of the first performance of *Hamnet*, technical glitches are part of the fabric of cyberspace.

The move to UpStage and the expansion of our audience to anyone with an Internet connection and a web browser has increased the variables enormously. Every different combination of hardware, operating system, browser and Internet connection creates a specific environment in which someone is receiving our performance. That we can be pretty sure that an UpStage performance should be more or less the same across such variables is an enormous achievement in itself. We still run into some interesting discrepancies, such as particular stages inexplicably loading faster in some browsers than others, but with the release of UpStage V2 in June 2007 we have ironed out most of the idiosyncracies and achieved a much more stable platform.

The launch of UpStage V2 was celebrated with a two-week exhibition at the New Zealand Film Archive in Wellington and a one-day festival of performances, the 070707 UpStage Festival. The festival featured thirteen performances created and performed in UpStage by artists from around the world. Most had already had some contact with UpStage through the workshops and open walk-throughs that we have been holding since 2003, but for all it was the first time they had presented their own UpStage show to the public. For some, such as puppeteer Rebekah Wild, it was their first experience of creating in the digital environment. The shows were presented on Saturday 7 July from 2.30pm to midnight NZ time, live online and screened at the New Zealand Film Archive. Two had a proximal element: *The Best Air Guitar Album in the World Vol. II*, with Anaesthesia Associates ‘lap(top)synching’ at the Film Archive in Wellington, and *the old hotel*, with an audience and web cam performer on-site in London. The London audience were treated to breakfast, as it was 9.30am (8.30pm in New Zealand). The multiple time zones, which extended from Vancouver right around the globe to New Zealand, made programming the festival a challenge; but this is cyberformance—real time is the only time.¹⁵

15. 070707 performers and crew were located in the following countries and time zones: New Zealand (Auckland, Hamilton, Wellington and Dunedin), Australia (Brisbane), Finland, Serbia, Croatia, Germany, the Netherlands, the UK, Canada (Vancouver, Toronto and Montreal) and the USA (New York).

The possibility of playing simultaneously to a remote online audience and a proximal audience has led me to consider the *intermedial* audience—a potentially new form of audience existing in-between the online and the proximal, in the liminal time and space of cyberperformance. Avatar Body *Collision* has begun to explore an engagement with this audience in two recent works, *Familiar Features* (2006) and *Belonging* (2007). Both works can be viewed online as well as proximally, with interaction between performers and audience as well as between the audiences. I am interested in what points of commonality there might be for the separate audiences; and how the online and proximal audiences might interact. Without devolving to a variant of the chat room, what kind of performances can we create in UpStage that engage the intermedial audience?

Some of the 070707 performances continue to explore these ideas. During September 2007, *the old hotel* was re-staged in London for Cherry Truluck's Master of Arts, and *Please Stay Alert At All Times* was performed at Manchester's Green Room.¹⁶ Both performances had proximal and online audiences, and for both I was in the online audience. As an online audience member, it is difficult to get a sense of the proximal audience unless they are shown on web cam or identify themselves in the text chat; however the knowledge that they *are there* impacts on my experience of the online performance. I may be sitting in my bed at 6am with my laptop and coffee, immersed in what is playing out on the screen in front of me, but I am conscious that there are people on the other side of the world having a shared experience in a physical space, and that at least some of their experience is interconnected with what I am experiencing.

As a cyberperformance practitioner, I relish any opportunity to step into the audience role (although it's impossible for me to see it as someone who is new to cyberperformance), and in this respect the 070707 festival and ongoing performances are invaluable. As well as UpStage performances, I also attend performances in Second Life, the Visitors' Studio, web cam performances and proximal events that incorporate Internet technology.¹⁷ The Plaintext Players still exist and are now creating work that integrates online and proximal elements, and Desktop Theater's Adriene Jenik is employing networked technologies in her recent large scale *Spec Flic* events.¹⁸ An archive of networked performance is maintained as part of Turbulence.org's Networked Performance Blog that also links to current networked performance (in the broadest possible sense) happening online and around the world.¹⁹ The Internet, wireless and mobile telecommunications, sensor technologies, Geographic Information Systems, ubiquitous computing, online social networking platforms and multiuser environments such as Second Life offer a wealth of live performance, music, storytelling and installation events involving geographically distributed participants.

Evidence of similar growth in artists working in the field of networked performance in New Zealand is harder to find, but it is there. Dancer/choreographer Becca Wood is experimenting with choreography for geographically dispersed dancers, using software such as iVisit to link dancers in New Zealand and the United States. As part of his doctoral research, cross-media artist Dan Agnihotri-Clark has curated collaborative events that explore (among other things) the indeterminate nature of networked performance.²⁰ Agnihotri-Clark is also using UpStage as a creative platform with Anaesthesia Associates,

16. *Please Stay Alert At All Times* and *the old hotel* were devised and performed by Truluck, Fuks, Bryce and Cunningham. <http://www.cherrytruluck.co.uk/>
 17. Second Life is a commercial online virtual world. <http://www.secondlife.com>. Created by London-based Furtherfield.org, The Visitors' Studio is a real-time audio-visual collaborative platform. <http://blog.visitorsstudio.org/>
 18. <http://www.specflic.net>
 19. <http://transition.turbulence.org/blog/index.html>
 20. <http://www.intimacyandinyer-face.net>



fig. 3



fig. 4



fig. 5

3. Anaesthesia Associates (Daniel Agnihotri-Clark and Paul Bradley). *The Best Air Guitar Album in the World Vol. II*, screen shot from cyberperformance in 070707 UpStage Festival, July 2007.
 4. Rebekah Wild and Vicki Smith. *Baba Yaga*, screen shot from cyberperformance in 070707 UpStage Festival, July 2007.
 5. Marcus Williams (NZ) and Martin Krusche (Austria). *International Smoke-In*, 2009, with participants Dagmar Eberhardt (Graz, Austria), Monochrom (Vienna), Dagmar Kase (Tallinn, Estonia) and mattheu & molnick (St. Gallen, Switzerland), networked performance, ADA 'Emergent' Symposium, Otago University (<http://www.van.at/how/cy/iso/smoke/index.html>). With its contested cultural dimensions and additive biological effects, the act of smoking a cigarette becomes vehicle for exploring the possibilities of physiological connection and emotional resonance under highly mediated conditions. The *International Smoke-In* created a sensation of networked bodily connections through a synchronous cigarette break shared over the Internet

as are other New Zealand artists including Rebekah Wild, Liz Bryce, Gabi Schmidberger, and Vicki Smith and myself from Avatar Body Collision.²¹ Marcus Williams has examined the presence of the virtualised body by exploring ‘limbic resonance’ in highly mediated environment. His *Smoke-In* works give a sense of presence as smoke seems to flow from a body in one distant location to another. Events such as Interdigitate and the ADA symposiums provide opportunities for the presentation of live digital performance, although networked performance or cyberperformance have yet to feature greatly in their programmes.

Steve Dixon has suggested that digital performance peaked during a ‘golden age’ in the late 1990s and this seems to be true at least quantitatively, but it begs the question, why?²² It could be partly that the speed of technological development has failed to keep pace with the imaginations of theatre makers; certainly the actuality of immersive 3D technologies has yet to live up to the hype. But forget for a moment the popular obsession with the latest high-tech cutting-edge rich-media prophesies, and look at what many of us have in our offices and homes—we have such a lot of technology to play with. Today’s online social networking spaces and tools are as “ripe for dramatic play” as the IRC channels and Multi-User Dungeons of the early 1990s.²³ Cyberperformance is lo-tech wizardry that uses accessible tools to playfully interrogate complex notions of time, space and presence— notions that have undergone a massive change since the very first telephone call was made.²⁴ Having accepted that we can speak in real time with someone on the other side of the world, it seems a small step to accept that our presence in the liminal territory of cyberspace can be ‘real’ or solid. There is always a curiosity to know where people physically are, what time it is there and what the weather is like. Asking these questions of those connected to us gives us a shared sense of being simultaneously present, in some way, in multiple other places. For example, I can give a workshop in Romania, attend a meeting in Amsterdam and watch a performance in Brisbane all in the same day and without leaving my house in New Zealand.

The blurring of disparate time zones by events such as attending the premier of a performance the day before it happens disrupts the certainty of measured time. It may be almost tomorrow, but my audience are still staggering through today and yesterday. Somebody’s got to get up in the middle of their night. Cyberperformance exists outside the clock, in a chunk of time shared by all the participants. The shared moment is real time, the venue is a virtual space, and the result is live theatre.

21. Rebekah Wild presented *Baba Yaga* at the 070707 UpStage Festival; Liz Bryce performed in *Indigenous Maniacs* (2006) and *the old hotel* (070707 UpStage Festival and other performances); Gabi Schmidberger performed in *Indigenous Maniacs* (2006) and *Ophelia_machine* (070707 UpStage Festival).

22. Dixon defines digital performance as “all performance works where computer technologies play a key role rather than a subsidiary one in content, techniques, aesthetics or delivery forms.” Steve Dixon, *Digital Performance: A History of New Media in Theatre, Dance, Performance Art and Installation* (Cambridge, MA: MIT Press, 2007).

23. Adrienne Jenik, “The Early Years of Desktop Theater,” *Riding the Meridian* 2, no.1: Women and Technology, 1999. <http://www.heelstone.com/meridian/>

24. The phrase “lo-tech wizardry” to describe cyberperformance was coined by Vicki Smith in 2001.

Centres and Peripheries

Vicki Smith and Adam Hyde

Living mostly on the West Coast of the South Island of Aotearoa New Zealand, Vicki Smith works with two clusters of schools where technology assists in teaching, as well as in social and cultural collaboration. Vicki is a member of Avatar Body Collision, an online performance troupe who devise, rehearse and perform using a variety of Internet technologies.¹ Adam Hyde is based in Europe. An artist, educator, tactical media practitioner, streaming media consultant, and sometime curator, Hyde’s projects have placed him on most continents, including the Antarctic and pervade the online world. For both Vicki and Adam, their most constant address is an email one.

In March 2005 Adam Hyde (along with Honor Harger, Zita Joyce and Adam Willetts) hosted re:mote Auckland, a symposium featuring on-site, online and pre-recorded presentations analysing how digital technologies augment collaborations across geographical and cultural distance. Artists and commentators presented from London, Newcastle, Helsinki, Rotterdam and Sydney. Participants from around New Zealand attended both virtually and in person to share their work.

re:mote Auckland was the first in a series of conferences designed to explore what it means to be remote in an electronic art world. Are there ‘centres’ and ‘peripheries’ within a world increasingly bridged and mapped by digital technologies? Can technologically mediated communication ever substitute for face-to-face dialogue? Is geographical isolation a factor in contemporary art production? Is remoteness a relative concept? The conversation documented below reflects on these questions, negotiating issues of presence, liveness, communication and connectivity.



fig. 1



fig. 2

1. <http://www.avatarbodycollision.org>. The *Colliders* are four women who met online in 2001, forming Avatar Body Collision in 2002. They are a collaborative, globally distributed performance troupe who live (mostly) in London, Helsinki, Aotearoa/New Zealand, Australia and cyberspace. They devise and rehearse online, using chat software that is cross-platform and free to download. For a discussion of Avatar Body Collision and its projects, see the preceding essay by Helen Varley Jameson.

1: Adam Hyde, DIY radio workshop, WAVES Festival, Riga, Latvia, August 2006.
2: Students at South Westland Area School Harihari attend a *kapa haka* lesson delivered by Maori performing arts students at Northland College, Kaikohe. The SWAS students learned *mihī, waiata* and *karakia* while the Northland group achieved tutoring credits, video conferencing via the Ministry of Education NZEDNet Bridge, 1 October, 2007.

Skype [Edited chat history]

2007-08-23 22:54:14

Vicki:

Hmm... says user not online.

Adam:

I am.

Adam:

I am!

Vicki:

Ahh, there you go.

Vicki:

But hey, are you ready?

Adam:

Not yet—in another meeting.

22:55:48

Adam:

Ok, so Vicki, I understand in Harihari you would be considered by most to be 'reasonably isolated'... Would that be accurate?

Vicki:

Yes, geographically we are a long way from what people expect to have handy (public transport, shops, banks, health services). An essential item unfortunately is a good vehicle and a given is a lot of driving. In servicing the Primary and Secondary Schools' Information Communication Technologies contract from 2003 – 2005, I clocked up 155,000 kilometers. Now I am trying to do much of what I used to do offline by using online environments and video conferencing—although I still seem to do a lot of travelling.

Adam:

What sort of connectivity can you get there?

Vicki:

I'm on an ADSL connection, so now get a relatively serviceable 92KBPS (according to a test I did just now). Until the Government's Project Probe initiative forced Telecom to provide broadband in rural areas, some schools, especially further south of here, had horrendous connection issues.² For example, it would take Haast school minutes to access the front page of the Te Kete Ipurangi

website, a resource repository for education.³

Adam:

These issues are now resolved?

Vicki:

Well they are *kinda* resolved—the next stage of Project Probe is currently underway. I am close to the exchange—but further out in this valley they are not so lucky—I think there is also an issue regionally of how many people can actually access 'broadband' from any one exchange.

Adam:

So Te Kete Ipurangi is set up to enable remote learning?

Vicki:

No, actually it is resource for New Zealand teachers, including exemplars and assessment work project sites. There is actually a fantastic resource called the Virtual Learning Network that brokers courses in distance education.⁴ It was started to assist development of Video Conferencing clusters—distributed both regionally and demographically. There are now around thirteen clusters promoting 'multi modal' ways of accessing education.

Adam:

Do you know what tools they use?

Is this a Moodle network?

Vicki:

They currently use the learning management system Interact, an open source software project developed by Glen Davies of the Christchurch College of Education. The network supports (or brokers) virtual conferencing from a variety of sources and each cluster uses a variety of tools—it is through this network that I am using Breeze. Moodle is used by some clusters. There is also Schooodle... and many others.

Adam:

Can you tell me a little about these tools? What are their strengths and functionality in comparison to each other? Moodle versus Schooodle versus Breeze?

2. Project Probe was a collaboration between the Ministries of Education and of Economic Development to provide broadband to Rural schools. <http://tinyurl.com/2meqjw> and <http://www.minedu.govt.nz/index.cfm?layout=document&documentid=7328&indexid=7877&indexparentid=6919>

3. <http://www.tki.org.nz>

4. <http://www.virtuallearning.school.nz>

Vicki:

Interact I know best. It was incredibly useable, allowing a huge range of interaction and sharing between password protected and open access areas. I ran several projects between schools on the Coast and between NZ and UK using that and other tools. Moodle works in the same way. You can create groups, classes and courses and add the functions you require: file sharing, drop boxes, forums, chat, polls etc. etc.

Adam:

I can understand that these tools might be good for organising information, but how do you interact with the students?

Vicki:

Synchronously through a chat function, asynchronously through forum features, polls and journals—guess they'd be called blogs :)

Adam:

Is this interaction 'rich' enough?

Vicki:

The asynchronous functions are great—for example a drama teacher kept in touch with her senior students while away on sabbatical through journals. They had to contribute at specific times. She would read and comment on their work, and they would often go back and review what they had written and comment on their entries. It was a fantastic way to show their reflective processes, which is especially important in assessing in the arts. It was also good for them because their teacher was in the UK and they would often get comments overnight :) You could see from the number of times they were going online that they were engaged with this medium.

Adam:

And the synchronous communication?

Vicki:

Ahh well... we sometimes used UpStage for that.⁵ Now I use the graphical chat in UpStage or I use Breeze, which has all the chat features (including whiteboard notes) but users can also share desktops and files.

Adam:

Do you use these tools because they are suited to the theatrical subject matter of the course, or because of its communication component?

Vicki:

UpStage is especially good for drama, but we also used it for a health project—exploring issues of dyslexia (I can hardly spell it), bullying and relationships. Breeze is good for creating a meeting space.

Adam:

So it's the spatial component that was important for using UpStage?

Vicki:

It is very good for 'presence' somehow and fascinating how engaging it is. Even groups who are in the same room will engage with each other on stage while being almost completely oblivious to their peers sitting right next to them. But the sense of 'inhabiting' space with others is definitely a major factor (it allows the use of webcams) so there is a very real sense of the other there with you.

Adam:

Do you augment these communications with Skype, IRC or other more commonly used tools?

Vicki:

Yes, some of the schools use Skype. Interestingly, some of the schools I have worked with block chat programmes like MSN Messenger.

Adam:

Really? Why is that?

Vicki:

I guess for the same reason some schools ban cell phones—they haven't figured how to add it to their educational *kete* (kit bag).

Adam:

Is there more concern in rural schools about this kind of distraction? Or is this a general issue?

Vicki:

I think it's common to schools in both rural and more urban environments. Some allow cell phones in school but not in class, some ban them totally,

5. <http://upstage.org.nz/blog>. UpStage was designed by Avatar Body *Collision* and artist programmer Douglas Bagnall. It was launched in 2003 thanks to funding from Smash Palace, the Arts Science collaboration fund from Creative New Zealand and the Ministry of Research Science and Technology. Version two of the software was released in July 2007 thanks to the work of AUT Computing Science Students Endre Bernhardt, Lauren Kilduff and Phillip Quinlan, and Douglas Bagnall, assisted by further funding from the Community Partnership Fund from the Digital Strategy (Ministry of Internal Affairs). It is available to download from Sourceforge <http://sourceforge.net/projects/upstage/>

which is incredible when you try and think of a teenager having a social network without one.

Vicki:

What tools do you use? How do you 'engage' with people you work with who are not proximal to you?

Adam:

Well, I use a wider variety of tools as there is no specific group I communicate with. So, for example with the remote events I use whatever tools are easy for the presenter.

Vicki:

What about the issues of ports, is that an accessibility problem?

Adam:

Ports are always a problem. But there is always a way round, for example, talking to someone on the phone, or pre-recording things to video. There is no need to rely on the Internet for networked events, in fact doing so is a bit regressive. The point is not using the Internet, the point is to dissolve distance as best as possible.

Vicki:

Aah, but when you pre-record things does that take away the sense of everyone being at the 'event'?

Adam:

I think there is too much importance put on the idea of 'liveness'. I think liveness is not or not as important as is made out—'presence' is more important. So yes, pre-recorded video is excellent, and much under-used.

Vicki:

Really? But in a conversation tangential elements sometime reveal interesting things that might not appear in a monologue.

Adam:

If there needs to be interaction this can always be augmented by other technologies. For example, at remote Auckland we had a pre-recorded video presentation with Zina Kaye from Australia. Actually it was recorded in NZ a week before because she wasn't in NZ to do it live during the event. Then we did a Skype text chat afterwards

to ask questions. It worked very well. The video itself had a presence—possibly more than some of the live presentations!

Vicki:

Ah yes, I have done support to an UpStage presentation where I could hear the audience. Hearing them really enhanced my sense of presence and sped up my response to their comments. Actually, I presented remotely at remote Auckland. I found it very frustrating.

Adam:

In what way?

Vicki:

I think PowerPoint got in the way of the UpStage window.

Adam:

Hehe...

Vicki:

:)

Adam:

Well, that's the other part of it—in these things technology is another player. Technology is not an enabler, it is a mischievous interloper.

Vicki:

Yes! I also use video conferencing. I do agree with the importance of 'presence'. I think the haptic sense of connecting through technology can be incredibly rich.

Adam:

Video conferencing is a good way to communicate in these environments, providing you have the bandwidth.

Vicki:

I have looked at, but never seen Access Grid in action, except in a video :)

Adam:

Access Grid... ugh. I heard a very good story about it. There was a remote presentation between two big universities. They got the link started... nice video... but no sound. So they did the whole exchange using white cards and writing on them with a marker. Excellent!

Vicki:

lol

Adam:

But I really don't see the need for these big high res. technologies.

Vicki:

I guess that story harks back to presentations using overhead projectors.

Adam:

Yeah, networked overhead projectors, that's what we need!

Vicki:

In the end it's what is being scribbled onto them that counts.

Adam:

More than high res. video conferencing.

Vicki:

Actually the white board function in Breeze allows for scribbling.

Adam:

Nice.

Vicki:

And drawing is also possible in UpStage.

Adam:

Remote desktop sharing is like that. It's an excellent remote teaching tool when connected to a data projector. 'Desktop presence'—that's an interesting one.

Vicki:

Yes it is, because in the end it is the sense that through your fingers you are contacting other people. There is always that slight screen, but it becomes more permeable with the addition of visuals.

Adam:

And sound.

Vicki:

Absolutely! And sound.

Adam:

Synchronous Skype and desktop sharing is pretty powerful. Matthew Beiderman and I did a workshop on Pure Data like that. It worked beautifully.

Vicki:

Great! We are constantly asked why we don't have actual voices in UpStage.

Adam:

Why don't you?

Vicki:

Bandwidth. We tried to keep it accessible to dial-up. In fact I only just got broadband. In the end it was because of the download time for UpStage. I could do other work in schools and dial-up was to me a much easier connection because of its portability.

Adam:

Can UpStage work smoothly at the moment over dialup?

Vicki:

It can—it takes an age to load the stage, depending on the images, but then it seems to be pretty quick.

Adam:

Well, a friend once said 'face to face is the broadest bandwidth'. It's corny but true.

Vicki:

Very definitely. In working remotely with the schools we try to have as many opportunities for face-to-face interaction as possible. In fact, where we can't have 'the broadest bandwidth' I kind of form the network. It's funny though, with Avatar Body *Collision* we have not all met (or ever all been in the same room together). My mental picture of the others is always them kind of leaning into their screens.

Adam:

Hey... I actually have to run.

Vicki:

Ok, I have to go soon too.

Adam:

I will be back later but I think you will be asleep.

Vicki:

I have a massive drive tomorrow...

New Data: Curating and Archiving Digital Art in New Zealand¹

Lissa Mitchell

How do we ensure long term access to digital information? Traditionally art museums and galleries have been concerned with static physical objects, and even those that regularly exhibit video and audio works rarely have in place policy for documenting those works beyond their existing systems for physical artworks. Questions of digital preservation in relation to the arts extend to the struggle the traditional art world seems to have incorporating art of a digital nature as part of institutional exhibition, research and collection activities. Few museums and galleries in New Zealand are purchasing digital works and even fewer have policies and procedures for documenting and caring for them. Venues that do exhibit media artworks, largely leave long-term upkeep of the work in the artists' hands.

In a generic sense, digital art can be divided into two categories: works that use digital technologies as a *tool* and works that use them as a *medium*.² Artworks in the former category—photographs printed from digital files and moving image work—are largely what New Zealand galleries are purchasing. These sit within easily extended traditional art forms; for example, a digital photographic print is a physical object. Equally, moving image on DVD (no matter what the original format: film, analogue video, digital video, software) extends from the acceptance of video as an art form. Another aspect to this categorisation is that works using digital technologies as a tool are generally made by artists with established reputations for producing work in established media. These artists work by selecting the medium best suited to conveying the intent of the work, while technical aspects of production are contracted out to specialists. Programming, for instance, is used as a means to an end rather than a medium with intrinsic artistic possibilities.

Works that use digital technologies as a medium—works made from software programmes or that utilise networks—are not generally acknowledged by New Zealand institutions as a collectable art form, that is, unless they are part of an installation with physical components such as et al.'s *maintenance of social solidarity—instance 5* (2006). This installation, exhibited as part of the *Scape Biennale of Public Art* at the Christchurch Art Gallery, was constructed of multiple media including modified data projections of a live Google Earth feed, newspapers, and installation furniture such as tables, chairs and headphones.

Digital archiving within New Zealand's broader cultural sector can provide a useful context for discussions about curating and archiving digital art. Government initiatives in digital preservation are focused on two areas. The first is the preservation of digitised versions of physical objects. This area involves cultural institutions through initiatives such as the *National Digital Forum* that aims to make collections accessible on the Internet. In the 2007 Budget, the National Library of New Zealand was allocated just over \$8 million over four years to expand the amount of digitalised heritage content online. Besides the public benefit of increased access to heritage collections, the strategy argues that "the availability of unique New Zealand content is expected to help drive

demand for broadband, improve the return on investment in capability, and create opportunities for commercial use."³ Some of the results of government funding in this area over the last few years are available for access from the National Library, Te Ara, and Matapihi websites.⁴

The other more recent area of attention is objects that are 'born digital'. This area of archiving is currently narrow and focused on harvesting websites with content that fits standardised protocols of software formats and scripting. In the 2007 budget, the government allocated \$8.5 million over four years to enable Archives New Zealand to "develop a strategy for archiving 'born digital' materials, material that originated in a digital environment."⁵ Archives New Zealand is primarily a storehouse of government records—this extends to their digital holdings. 2007 was the first year that government spending responded to the need for resources for archiving digital data.

At the other end of the spectrum is the New Zealand Film Archive, a charitable trust formed in 1982. Unlike archives in other countries, which may collect and preserve only feature films, the remit of the New Zealand Film Archive is very broad, encompassing home movies, artists' videos, short film and features. The Film Archive provides *kaitiakitanga* or long term care and management of material donated to the archive, while ownership of the physical tapes and rights to the content are retained by the stakeholders (who variously include the donors of the material, its producers, or those depicted in the work). The Film Archive is already archiving 'born digital' moving image material from a variety of formats including DV tape and digital betacam. The Film Archive also has a programme for the migration of moving image material from heritage tape formats, such as VHS, S-VHS and U-matic, onto a digital format for long term preservation. Currently digital material is stored on removable hard drives and LTO tapes (LTO—or Linear Tape-Open—is a magnetic tape data storage technology developed as an open alternative to the proprietary Digital Linear Tape). The Film Archive's work in this area could be strengthened by the provision of further resources for servers and the development of cataloguing and metadata collection programmes. In the 2007 budget, The Film Archive was allocated \$2 million over four years to boost its "efforts to collect and protect our heritage of moving images."⁶ The issue is not solely one of software or the moving images themselves. During the late 1980s the then National Museum (now Te Papa Tongarewa) purchased historic video works by Phil Dadson and Popular Productions. The format at the time of purchase was U-matic tape. While the tapes sat securely in collection stores, over time the playback equipment required to run these tapes was disposed of and replaced as the institution kept up with technological trends for showing moving image. Recent transfers of these works to digital sub-masters and DVDs for exhibition has been possible because The Film Archive kept and maintained these old machines through its mandate to collect and preserve moving image heritage. Despite these initiatives, there are no New Zealand cultural institutions dedicated to archiving digital art and art remains unmentioned by Government research and policy on digital preservation.

New Zealand has a significant history of digital art made specifically for the web. The online components of *W3* (1998), the last exhibition curated by The Honeymoon Suite in Dunedin is an early example. Unlike other galleries, The

1. This essay owes part of its existence to discussions I have had with my colleagues Adrian Kingston at the Museum of New Zealand Te Papa Tongarewa, and Jamie Lean at the New Zealand Film Archive.
2. Christiane Paul, "Challenges for a Ubiquitous Museum: Presenting and Preserving New Media," 2007. <http://neme.org/main/571/preserving-new-media>

3. Judith Tizard, "Support for Digital Content Expansion," *Budget 2007* [media statement], 17 May 2007. <http://www.beehive.govt.nz/?q=node/29397>
4. The National Library of New Zealand, *Matapihi*. <http://www.natlib.govt.nz/collections/digital-collections/Matapihi> includes online collections of a number of New Zealand cultural organisations. <http://www.matapihi.org.nz/> Te Ara: The Encyclopedia of New Zealand <http://www.teara.govt.nz/>
5. Judith Tizard, "Funding Support to Preserve Digital Archives," *Budget 2007* [media statement], 17 May 2007. <http://www.beehive.govt.nz/?q=node/29396>
6. Helen Clark, "Nationhood Celebrated in Film, Music and Heritage," *Budget 2007* [media statement], 17 May 2007. <http://www.beehive.govt.nz/?q=node/29388>

Honeymoon Suite saw the possibilities of using websites as both an independent gallery space and as a promotional tool for the physical gallery. *W3* included web works by artists Sean Kerr and Douglas Bagnall.⁷

The title of Bagnall's *12,800,000 Views of the South Island and Taranaki* (1998) enumerates the possible permutations of the work. The user produces compositions riffing on the styles and iconographies of well-known New Zealand painters by engaging buttons specifying locale ('city', 'suburb', 'seascape') and imagery. Clicking on the picture adds further elements, including Bill Hammond-ish birdmen, patchwork airplanes in the style of Peter Robinson and lumpy McCahon-esque hills. The user may also choose to add critique to their composition by requesting a randomly generated 'art review'. Employing the computer as both tool for generating imagery and as model for a recombinant approach to art production, Bagnall's work invites the users into a playful reconstruction of New Zealand art history.

Sean Kerr's work *Fake* (1998) renders his title onto an on-screen block of virtual woodgrain. By moving their cursor over each letter the user triggers one of four different audio and photographic sequences. While the components of Bagnall's work were created entirely on computer, Kerr's work uses the Internet to trigger and display externally generated audio and moving image. In 1997 Gary Schwartz argued that "digital imagery at the end of the twentieth century, after all, is still anchored, through its dependence on photography, in the nineteenth."⁸ These two works are an early demonstration of how a fundamental difference had arisen between the expression of the internal modes of computer processes and the importation and re-working of photographic and video imagery.

Other early web art projects are no longer fully functional or online. Codec.org.nz linked four contemporary arts organisations, with each gallery commissioning an artists' project for the site.⁹ *alt.waysofseeing*, Michael Stevenson's project for Artspace was a collaboration using the web expertise of Robert Hutchinson (whose *Spatial State of A and B* was New Zealand's first online gallery). Keri Whaitiri and Mike Dunn created a sound-based project presenting a series of oral recordings of Māori proverbs. The impulse for preservation means that the website is still accessible (on the project curator Danny Butt's website) but this presence is undercut by a lack of functionality—many of the more software-dependant art projects are broken.¹⁰ In this way the Codec site is a realistic example—and warning—of the current fate of digital art in New Zealand. Without the artist's commitment to regular maintenance, the work is rendered no one's responsibility and simply falls out of play.

Although the long-term care of digital art is a new area it is worth looking to the historical context. Films were being produced for years before the establishment of archives was deemed necessary. In video art, it was ten to fifteen years since artists began using the medium before it came to be seen as an area worthy of preservation efforts. Much of what has been lost in video history are the open reel tapes from the sixties and early seventies. The history of these media informs the principles for the care and preservation of digital art works being developed collaboratively by museums such as the Guggenheim, Tate Modern and the Whitney, who already have substantial film and video holdings.

- 1: Douglas Bagnall, *12,800,000 Views of the South Island and Taranaki*, 1998, website screenshots.
- 2: Sean Kerr, *Brice Daranged*, 2004, computer, monitor, cardboard, software, installation at Michael Lett, Auckland, courtesy of Michael Lett and the Museum of New Zealand Te Papa Tongarewa.
- 3: Mladen Bizumic, *Aipotu: Psychic Landscapes*, 2004, DVD, monitors, paint, collection of the Museum of New Zealand Te Papa Tongarewa.



fig. 1



fig. 2



fig. 3

7. The online gallery for *W3* is still accessible, archived on former gallerist Warren Olds' website <http://www.warrenolds.com/honeymoonsuite/1998/W3/index.htm>. Likewise both Sean Kerr and Douglas Bagnall present, promote and archive their work on their personal websites see <http://seankerr.net/> and Bagnall's <http://halo.gen.nz/>
8. Gary Schwartz, "Digital Imagery and User-defined Art," *Art Bulletin*, LXXIX, no.2 (June 1997): 207.
9. The projects were Artspace—Michael Stevenson and Robert Hutchinson; Galerie Dessford Vogel—Sulcus and Yellow; Teststrip—Spatial State; and the Physics Room—Keri Whaitiri and Mike Dunn.
10. <http://www.dannybutt.net/codec.org.nz/>

Richard Rhinehart of the University of California Berkeley and the Pacific Film Archive, has led the development of the 'Media Art Notation System'—a documentation tool for writing metadata for art works.¹¹

One of the first multi-institutional initiatives in preservation of new media works was the Variable Media project. According to John Ippolito, one of the originators of the project, "the variable media approach asks creators to play the central role in deciding how their work should evolve over time, with archivists and technicians offering choices rather than prescribing them."¹² The project seeks to tackle historical media as well as the new and digital, incorporating the non-traditional materials and processes used in contemporary art practice. Its interests begin with early twentieth century media art and include work utilising, for example, nitrate film, videotape, and ASCII. The Variable Media project was one of the first initiatives to address technological obsolescence in art from an institutional perspective. Ippolito characterised the situation:

*It is going to take more than manila folders and telecine machines to preserve anything more of our cultural moment than the lifeless carcasses of forsaken mediums. We need artists—their information, their support, and above all their creativity—to outwit oblivion and obsolescence.*¹³

The Variable Media project demonstrates how the existence of older forms of new media and installation art have led beyond purely archival practices, where it is believed that a film, video or sound recording is preserved simply by duplicating it. Artworks employing non-traditional materials and technology complicate the issue of obsolescence. These works, often ephemeral or assembled of perishable materials, cannot simply be stored or photographically recorded, but often need to be re-made for exhibition. Take, for example, Jim Allen's *New Zealand Environment No. 5* (1969) part of the collection of the Govett- Brewster Art Gallery. The work is a large installation including neon, steel and hessian, and containing fresh wood chips and greasy wool. Part of the content and effect of this work relies on the olfactory qualities of these perishable components.

Archives and libraries work by standardising procedures and grouping objects by type for categorising and documenting. However, these systems have been developed for needs which are not always applicable to contemporary art. Strategies for preserving artworks need to consider the conceptual and relational aspects of individual works and the intent of the artist. Digital material is no exception. Art works have unique spatial layouts, functionality and site specificity. This makes preserving them different from artefacts such as business documents which, once digitalised, can be standardised and cared for as groups. It is worth noting that digitisation is not necessarily the same as digital preservation, which must technically achieve successive high-quality migration over the longest term. Digitisation is the process of converting analogue or physical objects into a digital form, for example, scanning a photograph or transferring an old sound or video tape to a digital format. Digital preservation is concerned with the management of digital information over a long period of time. This could involve migrating data to other software formats. Therefore the initial data needs to have qualities and features that allow for these changes.

Individual galleries and museums need to develop policies, documentation tools and digital storage to suit the material they are collecting. But the reality is

that even the most well-resourced art institution in New Zealand cannot guarantee the long-term preservation of digital and new media art works. For digital art, the understanding of what happens when a museum or gallery acquires a work needs to adapt from that which is related to traditional art forms. Museums and galleries need to become one of a number of nodes in the distributed care of these works. This impacts on all stages of the institutional relationship to the art object, from acquisition onward. Perhaps (following the lead of the Variable Media project) rather than trying to purchase data as a sort of physically tangible asset, the notion could shift to the purchasing of rights—the right to stage or restage the artist's work. However, this also raises another issue pertinent to both artworks and cultural artefacts: that of the work's loss of historical specificity through the updating of characteristics signalling their place in time.

In much contemporary and nearly all digital art, each reinstallation is a reconstruction of the work. It is not unusual for artists to be consulted, or for works, especially sculpture and installation, to require extensive documentation. Can both the institution and the artist handle these reinterpretations of the work? Traditionally institutional purchase has meant that artists relinquish some involvement in the display and care of their work. Acquiring media artworks requires a commitment to increased dialogue and negotiation with artists over the display, care, and continued operation of each art work. The reality of component failure and technical obsolescence means increased and ongoing contact with artists prior, during, and after acquisition and installation.

Documentation that unravels format from data is critical to the effective archiving of digital art. This returns us to the earlier distinction between digital media as *tool* and digital media as *medium*. In many digital artworks the container media is often confused with the artwork. For example, a gallery or museum may make use of pre-existent condition report templates and describe the physical aspects of the container media (that is CD, DVD, hard drive) and ignore the artwork contained within the 'packaging'. One of the key tools that the Variable Media project advocates is the idea of an artists' questionnaire. On one level it is impossible to standardise the diversity of art into a questionnaire, however, at a basic level, such tools enable collection staff to understand the technical and aesthetic needs of different artworks. The answers the artist provides in the questionnaire may raise further questions; issues that neither the artist nor the institution could have envisaged as being a problem.

New media art asks us to reconsider the conventions of display that allow us to recognise art as art. It is easy to understand the difference between a painting and the canvas or frame, or wall even, but where are the boundaries of a new media work? Anticipating technical obsolescence is one way of understanding what the work is, as opposed to the work's method of delivery. Progressing technology has an impact on art works left (due to obsolescence) to be presented on bigger and faster hardware than they were initially intended for. For example, in Sean Kerr's *Bruce-Deranged* (2004), a cardboard box with two eye-holes sits over a monitor on the floor. The monitor shows two googly black and white cartoon eyes that peer nervously around the room, accompanied by a re-mastered version of Black Sabbath's song *Paranoid*. The only parts of *Bruce-Deranged* that the artist intends to be constant are the cardboard box

11. Richard Rhinehart, "Media Art Notation System: Documenting and Preserving Digital/Media Art," 2007. http://ahds.ac.uk/performingarts/pubs/summerschool07/rinehart_leonardo.pdf

12. Jon Ippolito, "Accommodating the Unpredictable: The Variable Media Questionnaire," *Permanence Through Change: The Variable Media Approach* (New York and Montreal: Solomon R. Guggenheim Museum and the Daniel Langlois Foundation, 2003), 47. <http://www.variablemedia.net/pdf/Ippolito.pdf>

13. Ippolito, "Accommodating the Unpredictable: The Variable Media Questionnaire," 47.

and the moving image and audio, and in this way it fits the mandate of the Variable Media project. The box and eye holes can be remade and the small monitor inside playing the moving image and audio can be replaced. However, will small monitors of this kind still be being manufactured in twenty to thirty years and beyond? Will players of the future be able to emulate the look and sound of the moving image and audio made in 2004? And if not what will it look like?

Media artworks also highlight organisational and technical differences between smaller galleries and museums. In New Zealand large museums and galleries are governed by health and safety regulations and the requirement that they comply with the Building Act. This means exhibits are expected to meet standards that would not necessarily be required for works exhibited in dealer or artist-run galleries. At present this is most apparent when artists use domestic appliances rather than high-quality components suitable for extended play (say, a six-month run in an art museum collection show). Often work is made for short-term exhibition using cheaper and more easily available equipment. The difference between this and the long-term preservation and repeated performance required in an institutional setting could lead to significant changes being made to the artwork. Mladen Bizumic's *Aipotu* (2004) is a response to the artist visiting abandoned whaling stations at Paterson Inlet on Stewart Island. The work is an installation consisting of four paintings, a photograph, and an audio visual work that plays on two budget brand monitors painted by the artist. Discussions about the inevitable need for these monitors to be replaced (and the painting of the replacements) will need to consider the look and feel of the original installation, the artist's intent, and to resolve how appropriate it is to upgrade from a budget brand to a more durable audio-visual solution. Does this upgrading change the artwork too much? Who will be responsible for painting the replacement monitors in the absence of the artist?

The inherent obsolescence of many digital works points to the assumptions underlying the practice of cultural preservation. It is possible to question the true permanence of any object, let alone those that are digital. Media art pushes the public to rethink their expectations of art and pushes museum and gallery professionals and artists to examine how they participate in the care, storage, display and interpretation of works. In New Zealand these discussions are in their infancy. The archiving of digital art is a fast-growing field that needs to incorporate a range of new strategies and solutions to address both the diversity of digital art works and the main threat to their long-term accessibility—benign neglect.¹⁴

14. Useful websites on documentation and archiving processes for digital and new media art:
<http://www.docam.ca/>
<http://www.imappreserve.org/>
<http://www.incca.org/>
<http://www.variablemedia.net/>
<http://www.eai.org/resourceguide/>

The Digital Artist in Residence Programme

Sean Cubitt and Bevin Yeatman

In 2000, 'criticism and creativity', became the framework for the Digital Arts Programme taught at Waikato University. Criticism is practical. It isn't about being negative, but communicating to other people—audiences, curators, policy makers, funders—the technical, economic, institutional and conceptual terrain that shapes media arts. It's about clarifying what artists are trying to do, and helping others make judgments about whether they succeed, and on what basis that judgement might be made. We thought of creativity as the mix of skills and innovative thinking capable of producing work able to speak from and to different communities, different points of view, different ways of seeing and being in the world. Hosting practicing digital artists seemed to be one way of enmeshing these guiding notions into our life as a department.

Key to the residencies was that there were no rules. We didn't demand that artworks got produced, or that essays got published. Our plan was to create a space and time without the usual pressures, where creative thinking and research could go on. We offered a small sum of money, an office and very significantly, access to the University library. But most of all we offered access to the University community.

In 2002, Stella Brennan became our first resident. At the time she was curating the show *Dirty Pixels*. This exhibition, examining the gaps between the ideals of digital perfection and control and the messy imprecisions of everyday life included her hand-stitched needlepoint of the desktop of her old Macintosh, *Tuesday, 3 July 2001, 10:38am* (2001 – 2002) and the video work *ZenDV* (2002). As an artist, curator and writer, Brennan touched all the areas we wanted to develop. A characteristic of her work is the use of familiar technologies and end-user software such as the iTunes visualiser and Microsoft clip art. Her final exhibition at Ramp gallery, *Theme For Great Cities*, incorporated video using second-hand Lego bricks, an igloo constructed of the boxes for our new edit suite computers and a cityscape of photocopied polystyrene packaging.

It was during this first residency that the idea for Aotearoa Digital Arts took shape. Brennan and Cubitt noted a lack of a space for digital artists to discuss work and swap information. Setting up a discussion list on the University server and pooling address books, we patched together a list of the people we knew were working in the field. ADA's history is now quite separate, but it was one of the great achievements of the residency program to set it up in its infant state.

Wellington artist Douglas Bagnall was the second resident. One of New Zealand's few software artists, Bagnall was working on his *Music Industry Simulator*. This work generates synthetic pop songs by robotic bands. Visitors to the *Simulator* website can listen to these compositions and vote the tunes up and down the charts. If one of these randomly recombined songs does well, it spawns imitators. If it is voted off the charts, it sinks without trace. The work explores the possibilities of algorithmic, computer-generated artforms and satirises both simulacral pop stars and the backroom deals cut by record executives that shape



fig. 2



fig. 3



fig. 1



fig. 4

much of the real music industry. As Douglas describes it:

Industry players who consistently do badly are likely to give up, while those who do well inspire a sea of imitators. Thus the system as a whole drifts gradually towards more successful musical terrain. All of the musicians involved are figments of a software program, each with its own mind and memory.¹

A residency by Annie Bradley followed. Bradley was working on a collaborative project with Jamie Kydd, creating a programme sending text describing human-ape interaction to the internet translator BabelFish. The programme shuttled the text back and forth between English and a number of different languages, its meaning becoming more garbled with each iteration. The artwork alludes to the old image of a roomful of monkeys eventually typing out the works of Shakespeare. Can sense really arise from randomness? Is chaos theory right when it suggests that order can emerge from turbulence? Bradley was working with what might well be considered poetry, especially in the period after the L=A=N=G=U=A=G=E poets and their postmodern cut-ups. The work examined human relations with technology, and human conceptions of animal behaviour, betraying overlaps and inconsistencies. Bradley comments:

...the first tool use [by primates] is thought to have forced language from our voice boxes in order to free up our hands. What is the nature of our connection to technology, do we mould it or does it, as habitat, mould us?...consider the effect of language, whose insidious capacity to speak the speaker has been charted definitively by both psychoanalysis and poststructuralism over the twentieth century.²

Residents over 2004 and 2005 were Marise Rarere, Raewyn Turner and Adam Hyde. Rarere, a local Māori artist at the beginning of her career, worked mainly in print and painting. She developed her work using the electronic tools we had available. Raewyn Turner comes from a background in performance art and has a career extending back to the days of Split Enz. One of the works she made during the residency was an elaborately animated intelligent tree developed with Colin Beardon, one of the founders of digital arts in Aotearoa, who was then heading a research team in computer science.

Adam Hyde has a history in the Waikato, having helped set up the first student radio and TV station while studying at Waikato University. He returned from the Netherlands with a wealth of international experience in streaming and networking, which he shared not only with the department, but the whole ADA network. While Digital Artist in Residence, Adam was working on re:mote Auckland, the world premiere of these one-day experimental festivals. With a keynote presentation by Japanese lecturer, artist and radio pioneer Tetsuo Kogawa, re:mote brought new media artists and theorists from London, Helsinki, Tokyo, Rotterdam and Sydney to an Auckland audience. Hyde's development of open and freely available online resources for networking and streaming, which he pursues as part of his art practice, is part of his innovative approach to what constitutes art today.

Resident Janine Randerson developed her work at the interface between art and science, building especially close relations with the University's Earth and Ocean Sciences department and their micro-meteorological field station, used for taking minute measurements of local conditions. She also was introduced to the

1: Stella Brennan, *Tuesday 3 July 2001 10:38am*, 2001-2002. 1:1 pixel to stitch embroidery of a Macintosh desktop.
 (top) Josephine Brennan working on the embroidery, (bottom) detail.
 2: Annie Bradley and Jamie Kydd, *Little Ape*, 2004, ASCII experiment from early in the residency.
 3: Annie Bradley and Jamie Kydd, *Ape Living*, r.m.03 exhibition flyer, 2005.
 4: Annie Bradley and Jamie Kydd, *3D Ape Head*, 2004, microphone, software. The head presided over the *Ape Living* installation at r.m.03, Auckland, replying in text to speech input via a microphone. Its 'responses' were actually just attempts to mirror what was said to it, but were distorted by a badly configured speech recognition algorithm to the extent they seemed novel. The head was fully malleable and could conort itself or shrink and disappear when bored. Animated in Maya and 'interactivated' using Flash.

1. Douglas Bagnall, "The Music Industry Simulator," 2002. <http://halo.gen.nz/pop/>
 2. Annie Bradley, "Ape Living," 2003. <http://window.auckland.ac.nz/archive/2004/04/onsite.php>

University's specialist scientific glass-blower, Steve Newcombe, and his collection of meteorological instruments. Newcombe had the expertise to reproduce the historical weather prediction instrument designed by Admiral Fitzroy (an early Governor of New Zealand and a pioneer of modern meteorology)—his crystal-based 'storm glass'. One of the wonderful by-products of the residencies was discovering these unexpected nooks of expertise and imagination.

The installation *Anemocinegraph*, which Randerson first exhibited at the University, consists of suspended perspex domes projected with slowly animated satellite imagery of weather systems in the Waikato region. Working with Landcare Research NZ, Randerson sourced observations from the NOAA-17 weather satellite. Her imagery also included ground-based observations of eddies in surface water and the atmosphere collected over the same period. The work's audio track is based on wind data recorded digitally by a contemporary instrument, the sonic anemometer. The soundtrack compressed data recorded over the period of Randerson's three-month residency. The original anemocinegraph was a nineteenth century device envisaged to graph wind movements, but no such instrument was ever actually produced.

Our final resident was Lisa Reihana, one of Aotearoa's most established digital artists, who came to Waikato to develop further elements of her *Digital Marae* project. One area of Reihana's research was *takatapui*—Māori who are gay, lesbian, bisexual or transgendered. Takatapui, however, has meaning and power these Western terms do not convey. Informed by the historical investigations of Dr Ngahua Te Awekotuku at Waikato's Centre for Māori and Pacific Development Research, Reihana completed a photographic shoot including two takatapui figures: Victor Biddle (Ngai Tuhoe) portrayed in a dandy role; and Ramon Te Wake (Nga Puhī) as a 1930s diva.

Over the course of this project we learnt several things about residencies: that it's important to welcome the artist properly, and that artists in residence need to have their space, but also need to share common areas and be near the heart of the community, in our case a tiny area where our two sofas squeezed together round the kettle and the fridge. We realised that it's important to schedule visitors so that there are people around, staff and students to nurture the residency and to benefit from it. Terribly obvious in retrospect, but things we had to learn and which future hosts should always bear in mind. The Waikato Digital Artist in Residence program was a wonderful experience for us, even when it worked least well. It showed us that our commitment to criticism and creativity could extend beyond the classroom, encouraging traffic between every area of the university's work and the wider community of artists and their audiences. It made us feel risky and experimental, but it also made us aware of our commitments to the Waikato and to the country. We hope it made a difference to the artists. It certainly did to us.

5: Raewyn Turner and Colin Beardon, *World Tree*, 2005, live computer-generated animation. *World Tree*, a standalone application written in REALbasic, is about the contemporary notion of 'information'. We hang on to words, hoarding masses of digital and printed material we will never read, in the belief that somehow, through retaining it, we can extract its meaning. *World Tree* plays with this phenomenon, presenting glimpses of texts that disintegrate before our eyes. The fragments drift like poorly remembered facts or stories. Knowledge is promised, but always eludes us. The juxtaposition of the sole-authored text forming the trunk and canopy of the tree with text from the wider universe, gathered from websites on topics including tissue culture, cell technologies and amateur astronomy (forming the flowers and petals) highlights tensions between our subjective sensations and a universe accessed through digital communication. *World Tree* knits together the disembodied information of visual language into a tree of life, a biological metaphor mapping the whole world.



fig. 5



fig. 6



fig. 7

6: Janine Randerson, *Anemocinegraph*, 2007, ten acrylic screens (300 – 500mm diameter), two digital video projections, surround sound, installation in 'The Trouble With the Weather', Sydney, UTS Gallery, 2007. Audio composition by Jason Johnston, satellite images courtesy Landcare Research NZ, satellite transmission signals courtesy Tim Natusch, ElectroTechnology, AUT University, sonified carbon emission data courtesy Dave Cambell, Earth and Ocean Sciences, University of Waikato.

7: Janine Randerson, *Remote Senses: Storms nearby*, 2007, six acrylic screens (300 – 1800mm diameter), two digital video projections, surround sound, installation in Geomatics and Economics: Three Stories, Shanghai, Third Shanghai Science and Art Exposition, 2007. Audio composition by Jason Johnston, satellite images courtesy Landcare Research NZ and the Chinese Meteorological Association, satellite transmission audio courtesy Tim Natusch, ElectroTechnology, AUT University, sonified carbon emission data courtesy Dave Cambell, Earth and Ocean Sciences, University of Waikato. These installations use satellite and terrestrial climate data, including carbon emission data and micro-meteorological observations, that are visualised and sonified into interconnecting forms.



Contemporary Māori Women's New Media Art Practice

Maree Mills (Ngati Tuwharetoa, Ngai Tahu)

Digital art in Aotearoa New Zealand has a strong indigenous voice. Māori have taken up digital technologies in the same manner that they historically embraced new materials like iron and steel to effectively replace stone tools. This intersection between *Te Ao Māori* (the Māori world) and art practices that use digital media suggests that the two worlds are complementary. Digital media has empowered an oral culture by actualising it into a visual one, now accessible to a global audience.

A number of Māori digital artists are at the forefront of contemporary arts practice in Aotearoa. These artists are regularly showcased on the now established Māori television channel.¹ The success of Māori broadcasting is evident. In 2008, Māori Television will host the first world conference on indigenous television and launch a second channel on New Zealand's digital free-to-view platform. While it must be acknowledged that Māori Television operates within a commercial media context, it could be asserted that its success originates from a commitment to *tikanga Māori* (Māori customs and values) guiding its organisational principles and underpinning its creation and selection of content.²

Concurrently, indigenous women academics have seen the value of indigenous epistemology and philosophy in re-thinking cultural and economic conditions and the impacts that globalisation has on the culture of indigenous peoples. In recognition that 'new old' ways of thinking are a way forward, Makere Stewart-Harawira suggests that the central task of her book *The New Imperial Order: Indigenous Responses to Globalisation* is to argue that "traditional indigenous knowledge forms have a profound contribution to make towards an ontology for a just global order."³ As Māori television has applied the principles of *tikanga Māori* to guide its operations, Stewart-Harawira suggests that global organisations could benefit greatly from doing the same. While this is seen by many to be a utopian proposition that does not acknowledge the inherent problems associated with the instrumentalisation of indigenous knowledge outside its context, it is often the desire of those communicating indigenous constructs with new media. In the Māori world knowledge manifests differently between tribes, between families, and between individuals. In a sense 'traditional knowledge' is a collection of individual knowledge and the differences are celebrated rather than contended. Sharing and the rearticulation of knowledge are required for the culture to remain alive. The old stories as well as new need to be told, and dialogue regarding their meaning and application in a contemporary world should be fostered. Much fear seems attached to this phenomenological, mobile and embodied aspect of Māori culture, but it is time for a Māori voice and a Māori knowing to be seen and heard. The way we experience being Māori, or our own experiences of what it means to be Māori, is valid and exciting territory for digital artists.

Māori women digital artists use moving image to communicate their ontologies and make comment on these connections between traditional knowledge and the contemporary world. Digital technology is employed by the

Previous pages: Lisa Reihana, *Dandy and Diva*, 2007, digital prints on aluminium, 1200 x 2000mm each.
 1: Lisa Reihana, *Native Portraits n.19897, 1998*, details, *Grant and Rachel*, *Maddy*, collection of the Museum of New Zealand Te Papa Tongarewa, photos Norman Heke (*Grant and Rachel*), and Lisa Reihana (*Maddy*).
 2: Lisa Reihana, *Native Portraits n.19897, Whānau*, 1998, eleven monitors, 30 minutes DVD, 21 minutes stereo sound, AMX computer programme, collection of the Museum of New Zealand Te Papa Tongarewa, photo: Norman Heke.



fig. 1



fig. 2

1. *Te Kete Aronui* is a Māori arts programme currently in its fourth season. It is produced by Kiwa Productions and screens weekly on Māori Television.
2. <http://corporate.maoritvtelevision.com/about.htm>
3. Makere Stewart-Harawira, *The New Imperial Order: Indigenous Responses to Globalisation* (London: Zed Books, 2005), 32.

artists discussed in this essay in order to communicate indigenous constructs, reclaim lost mythology and reinvigorate the telling of things Māori to a wider audience. In discussing contributions of Māori women to current digital art practices in Aotearoa, I use three Māori concepts: the *wharenuī*, our meeting house and its role; *taonga tuku iho*, treasures handed down; and *manawa whenua*, the connection to land. These concepts allow me to group the artists and to locate their work.

The Wharenuī: House keepers of a different kind.

The wharenuī is the big house for meeting on the *marae*. Its role as a focus for things Māori is manifest in a number of works by Lisa Reihana (Nga Puhi, Ngati Hine, Ngai Tu). Emerging from art school at the time video editing tools became more easily accessible to artists, she joined other Māori artists in the drive to have an indigenous voice heard without external mediation. The wharenuī often displays portraits of *tipuna* (ancestors). Reihana's *Native Portraits n.19897* (1998) commissioned for the opening of Te Papa Tongarewa Museum of New Zealand, located the still photograph in a physical time, confronting the viewer with an alternative reading of the image. In *Digital Marae* (2001) Reihana digitally represents mythological ancestor forms as life-sized photographic portraits that are then animated in the video *Let There Be Light*. The work generates virtual *poupou* (posts representing ancestors) for inside the wharenuī and the sense of a meeting place for Māori is kept mobile and alive within the gallery space. Reihana suggests that displacement from the homeland (experienced by many indigenous cultures) could be somehow softened by recalling it, re-creating and sharing it in a virtual manifestation. Similarly Reihana's video work references the Māori construct of non-linear time, where past, present and future are seen to co-exist in a continuum. Images of our ancestors remind us that they are ever present, and therefore not mere representations but icons embodied with their sacred *wairua* or spirit. *He Tautoko* (2007 – 8) is one of a series of works where Reihana uses new technologies to give a new history back to old *taonga* (treasures).⁴ *He Tautoko* means support—both in the sense of supporting a building, but also in the sense of supporting the people around you. *He Tautoko* (2007 – 2008) uses cultural objects from the University of Cambridge's Museum of Archaeology and Anthropology collection, contrasting these with Reihana's own imagery, creating a fusion of old and new representations of *taonga*. She rehabilitates objects that have been stripped of their cultural context and significance and now reside halfway across the world. Reihana has recently curated digital art exhibitions, in essence, inviting others into her *whare*.⁵ This is an act of *manākitanga* (meaning to holistically take care of) where her assured status is used to launch young emerging Māori and Pacific Island artists whose work also conceptually references an evolving culture.

Another keeper of the wharenuī is curator Dr Deidre Brown (Ngaī Tahu), senior lecturer at the Auckland University School of Architecture. In *Whare* (curated for SOFA Gallery, Christchurch, 2002) seven emerging Māori digital artists were given the physical architectural framing of the wharenuī.⁶ The structure supported four projection surfaces of digital *heke* (rafters) and *poupou* (structural side posts). Viewers could physically walk through the tent-like projection structure, casting their shadow on the work, becoming part of it.

4. Exhibited in *Pasifika Styles* (2007 – 8). The show, a fusion of old and new, occurred alongside the historic oceanic collection at Cambridge University's Museum of Archaeology and Anthropology.
5. Reihana curated *Restless* (2007), the opening exhibition of MIC Toi Rerehiko. The exhibition featured video installation by Brett Graham, Lonnie Hutchinson, Junior Ikitule & Dean Kirkwood, John Miller and Parekohai Whakamoe.
6. *Whare* (2002) at the SOFA Gallery Christchurch consisted of video works by seven contemporary Māori artists with Canterbury connections: Lonnie Hutchinson (Ngaī Tahu), Maree Mills (Ngati Tuwharetoa, Ngaī Tahu), Nathan Pohio (Kati Mamoe, Ngaī Tahu, Waitaha), Rachael Rakena (Ngaī Tahu), Darryn George (Ngapuhi), Eugene Hanson (Ngati Maniapoto) and Ngahiraka Mason (Tuhoe). *Whare* toured to Tandanya National Aboriginal Cultural Institute as part of the 2004 Adelaide Arts Festival. Dr Deidre Brown (Ngapui/Ngati Kahu) received the SCAPE Biennial's Innovation Award for her curatorial work with *Whare* in 2002 and *Ahako he Iti* in 2004.

Rachael Rakena's (Ngaī Tahu, Nga Puhi) piece for *Whare, Mihi Aroha* (2002) was a tribute to her mother, who had recently died. The work showed a woman floating underwater while the text of consoling email messages rained down the roof and sides of the structure. The blue of the computer screen mixed with the blue of the water created a space that was both natural and artificial.

Other artists have worked with this connection between the living house and the living culture. *Hohoko* (1999) by Keri Whitiri (Ngati Kahungunu, Ngaī Tahu) was an installation referencing Māori oral culture by using sound through headphones to convey the sense of the talking walls of the wharenuī.⁷ While the *pou*, or structural posts represent ancestors who hold the space between the earth and the *heke* (rafters that act as ribs of the house itself), the 'wall space' between offers another opportunity for story telling. Walls were made by lashing raupo reeds in horizontal fashion, and complex bindings of *harakeke* (flax) or *kiekie* fibre were designed to provide abstract forms that related to cosmology and mythology as well as the day to day. The now customary *tukutuku* panels were a step towards visualising oral culture while facilitating storytelling within the house. *Hohoko* occupied this space and retold the stories traditionally told through the walls.

Taonga tuku iho: Treasures handed down

Maureen Lander (Nga Puhi), for a long time a senior lecturer in the Māori Studies department at the University of Auckland, was one of the first Māori artists to complete a Doctorate of Fine Arts. Lander's work reframes traditional Māori material knowledge, our *taonga* or treasures, within a western sculptural aesthetic. Her work *String Games* (1998 – 2000) takes traditional patterns into a parallel digital world of coded language. The work invites viewers to play a contemporary version of the ancient Māori game where string is threaded between the fingers. The shapes made by the string recount ancient knowledge of how we came to be, making ordered pattern out of confusion. It also suggests the player's role in creation, in establishing a complex network that relies on comprehension of structural rules and on the necessity of its own undoing. Many creation theories suggest that an ending is required to bring about a new beginning. Often a shape achieved after several hand or finger movements results in an unravelling of the form itself, emulating this concept. Manifestations of this work have included an enclosed black-light environment dissected by fluorescent shafts of coloured line that change as the viewer moves. The viewer becomes the fingers as they twist the shapes and forms of the light.

Donna Campbell (Ngaī Tahu, Ngati Ruanui) is a weaver renowned for her material virtuosity with *harakeke*. Campbell has adopted new media in order to communicate more of the essence of what it means to weave. Historically there have always been connections between weaving and new technologies. The computer screen or television monitor produces images through interlacing lines. The horizontal weft and vertical warp lines are redrawn constantly by an electron beam, creating mobile images. One of the processes of de-interlacing these scan lines is called 'weave'. This references the turning of the two fields of odd and even lines into one progressive frame. Campbell's video work *Aho, a Conversation with the Whenua* (2005) is a triptych projection suggesting the sensuality of the weave, movement under and over, in and out, dark and light.

7. Exhibited in *Hiko: New Energies in Māori Art* (1999), co-curated by Jonathon Mane-Wheoki (Ngaī Tahu), now Director of Arts and Visual Culture at Museum of New Zealand Te Papa Tongarewa.

The woven surface is projected onto the literally woven body. The meditative experience of the practice is also captured in vertical stills, illuminated by Campbell in *Light Pou* (2007). These fluorescent light boxes demand the viewer stands to attention and considers the glowing woven image as a marker for traditions made new.

For Campbell digital materials open up the dialogue regarding the feminine (often associated with weaving) in Māori art to new audiences. Digital media celebrate material culture in an abstract way where the *mauri* (life force) of the *taonga* (knowledge and/or treasure) exists but is no longer bound by original narratives. Like many of the artists mentioned, Campbell felt liberated by the gift of technology (a laptop computer) from her workplace and directly attributes this access to electronic tools as the impetus to move her work on. She says: "The work is always shifting and evolving; the same as tikanga."⁸ Campbell joins other Māori artists who see Māori values and customs evolving over time and validated by continued practice. An understanding can be gleaned from the meaning of the word itself. *Tikanga* is simply that which is right or correct. An example of this evolution would be the protocols of urban marae represented by pan-tribal authorities, who might apply different tikanga from traditional marae rooted in tribal *whakapapa* (genealogy).

Manawa whenua: The heart land

Rachael Rakena (Ngai Tahu, Nga Puhī) is a new media artist who has always positioned her work in Te Ao Māori, often using overlays of digital and water imagery. In *Ahakoā he iti...* (2004) she anchored her connection to the *whenua* (land) through the use of digital projection on stone. In the installation, a collaboration with Keri Whaitiri, a large boulder was placed in front of the Christchurch cathedral with an image projected on its surface at night. The *mauri* (essence or life force) stone was illuminated by the image of a woman who at times seemed to precariously hang from the rock and at others to hold it up. She hovered like the knowledge, suggested in many Māori creation chants, that we once came from stone.

Rakena's liquid signature returns in *Aniwaniwa* (2006), her collaboration with sculptor Brett Graham (Ngati Koroki Kahukura).⁹ *Aniwaniwa* originally showed at Te Manawa Gallery in Palmerston North and was selected for the collateral events section of the 2007 Venice Biennale. *Aniwaniwa* refers to a homeland drowned by the damming of the Waikato River for hydro-electric power generation. Five large domed vessels hang suspended from the eleven metre-high roof of an ancient salt warehouse. Sculpted with a surface suggestive of both moving water and coral, these forms house video projections. While viewers lie back on rows of mattresses (as they might in a *wharenuī*) watching the footage, a global tide seems to rise around them. These submerged vessels communicate an analogy of cultural loss. By naming them *wakahuia* (traditionally carved treasure boxes), Rakena reminds us of the treasures once kept now washed away, or submerged and unobtainable.

In Natalie Robertson's video installation *Uncle Tasman: The Trembling Current That Scars The Earth* (2007) water is found steaming from the ground and crying over the earth. Robertson says video has given her the opportunity to visually express her oral culture.¹⁰ Over three large-screen projections, a

8. Donna Campbell, conversation with the author, 22 June 2007.
 9. Sean Cubitt, "The Memory Of Water," in *Aniwaniwa*, ed. Alice Hutchinson, 2007. <http://www.aniwaniwa.org/index.aspx?site=571&page=5439>
 10. Natalie Robertson, conversation with the author, 22 June 2007. See <http://www.natalierobertson.com/uncletasman/>



fig. 3



fig. 4

3: Maureen Lander, *String Games*, 1998, installation at the Museum of New Zealand Te Papa Tongarewa, photo: Haru Samehima.
 4: Donna Campbell, *Ahō, a conversation with the whenua*, 2005, triptych projection, Randolph St Gallery, Auckland.



fig. 5



fig. 6

tauparapara (chant) is heard from a local *kaumatua* (respected elder) who relates the story of the pollution and disappearance of Lake Rotoitipaku due to the water requirements of a pulp and paper mill. A Ngati Porou women's *haka* (fighting chant) is heard, calling for justice and invoking Ruaumoko, god of earthquakes. The three large projections reference the romance of Ngati Tuwharetoa ki Kawarau and Ngati Awa, telling the story of the love triangle of three mountains. Robertson makes the tragic cosmology poignant and fluid across time and space. The lake vanishes along with its stories. Finally, Robertson provides the viewer with a long tracking shot taken from her car; the shot defines the landscape and is accompanied by a moving verbal roll call of those who have passed on young, diseased by the effects of the mill. The projection confronts the viewer with the tears of Mount Tarawera—an image of its waterfall. A taste of sulphur and dioxin swells in the mouth when we realize that the thermal activity we see from the ground is inextricably mixed with emissions from the mill. It is not the New Zealand landscape we are used to celebrating and it leaves the viewer in little doubt that we have indeed begun to pay for the scarring of the land.

Robertson originally worked with still photography and continues to look down the lens at the *whenua* (land). Her earlier images of road signage explored this integration between personal connection with the land and Māori oral history. It has pointed her way home to Kawarau, where even maps conceal truth. In one image she captures the name of Lake Rotoitipaku, now placed next to another lake entirely. In *Uncle Tasman: The Trembling Current That Scars The Earth* Robertson presents an installation that communicates on many levels but ultimately leaves the viewer knowing that the desecration of *Papatuanuku* (our Earth Mother) as well as our ancestors who lie beneath her, will be recognised.

Mana Wahine: The essence of Māori women

The author, Maree Mills (Ngati Tuwharetoa, Ngai Tahu) became entranced with video the moment a genlock was invented allowing video signal to be smoothly mixed. I was most interested in the possibilities of using moving image for exploring visual metaphor instead of narrative or document. *Ara Hupana* (2007) communicates an alternative reading of the mythological bird woman from Te Arawa legend, *Kurungaituku*. This bird-woman occurred to me as a symbol for the *noa* status of woman. Rose Pere says *noa* is associated with freedom; freedom embodied in the image of the eagle.¹¹ This is an alternative to the commonly used yet inadequate explanation of *noa* as 'profane', the opposite to *tapu* (sacred or restricted). *Kurungaituku* is a supernatural being who can traverse the realm of earth-mother and sky-father. Her flight, her knowledge of the arts and her ability to commune with all other living creatures sets her apart. Rather than accept her death at the hands of *Hatupatu*, the male hero of the original story, I think of her as a phoenix figure. Raptors are solar symbols in every indigenous culture. My birdwoman is transformed rather than vanquished by fire and alluding to her power to transform the hero from boy to man. Rather than follow a linear narrative, *Ara Hupana* uses visual layering, expansive images of the bird woman's habitat and emotive surround sound from traditional Māori musical instruments to communicate the essence of *Kurungaituku*.

Kurungaituku is acknowledged on screen by a *karanga* (a welcome call from women) and sent off by the transformative element of fire, the setting and rising

11. Rangimarie Rose Pere, *Tē Wheke: A Celebration of Infinite Wisdom* (Gisborne: Ao Ako Global Learning, 1997), 56.

5: Rachel Rakena and Keri Whatiri, *Ahakea he hi...*, 2004, Cathedral Square, Christchurch, courtesy of SCAP, Art and Industry Biennale Trust.
6: Rachel Rakena and Brett Graham, *Ahiwaniwa*, 2006/7, 15 minutes, five-channel video loop with sound in suspended sculptural forms, with mattresses and pillows on the floor for viewers.



fig. 7



fig. 8



fig. 9

7. Natalie Robertson, *Uncle Tasman: The Trembling Current that Scars the Earth*, 2007, three screen video projection, 1:1:1 minutes, installation view, MTC Ton Reprehko, Auckland.
8. Maree Mills, *Ara Hupana*, 2007, still from 3-minute video.
9. Louise Potiki Bryant, *Whakaruruhau—he mihi ki Araiteuru*, 2003, performance with installation, stills from film by Louise Potiki Bryant in collaboration with Nigel Bunn, 15:50 minutes.

sun, suggesting the ancestress flies among us still. These potent images of female power have been lost in colonisation. The *atua wahine* (Māori goddesses) were obscured behind their male counterparts, marginalised to make way for the embrace of Christian religion and the dominion of one male God. I see my video work as a way to draw focus to the female within Māori belief systems, particularly the female *noa*. I argue that a restoration of balance is required in order to empower Māori women marginalised in the ethnocentric and patriarchal re-telling of their origins. In this way digital media can reinvigorate ethereal or esoteric knowledge with its sensual and non-linear qualities.

Another artist working with similar themes is Louise Potiki Bryant (Ngai Tahu) who integrates video projection, sound and light with dance and performance art. Traditional Māori *taonga* and esoteric wisdoms are revered and re-imagined through her choreography and performance. Potiki Bryant's formal metaphors for Māori beliefs and values translate imagery and symbolism, engaging audiences with the communication of Māori stories and Māori constructs. Potiki Bryant's *Whakaruruhau—he mihi ki Araiteuru* (2003) was an interdisciplinary performance and installation created during a residency at the Otago Polytechnic School of Art. This work referenced the burning and resurrection of Araiteuru Marae. *Whakaruruhau* suggests that fire is more than simple destruction, that tied into that tragic event, are other stories, histories, tensions. Potiki Bryant says:

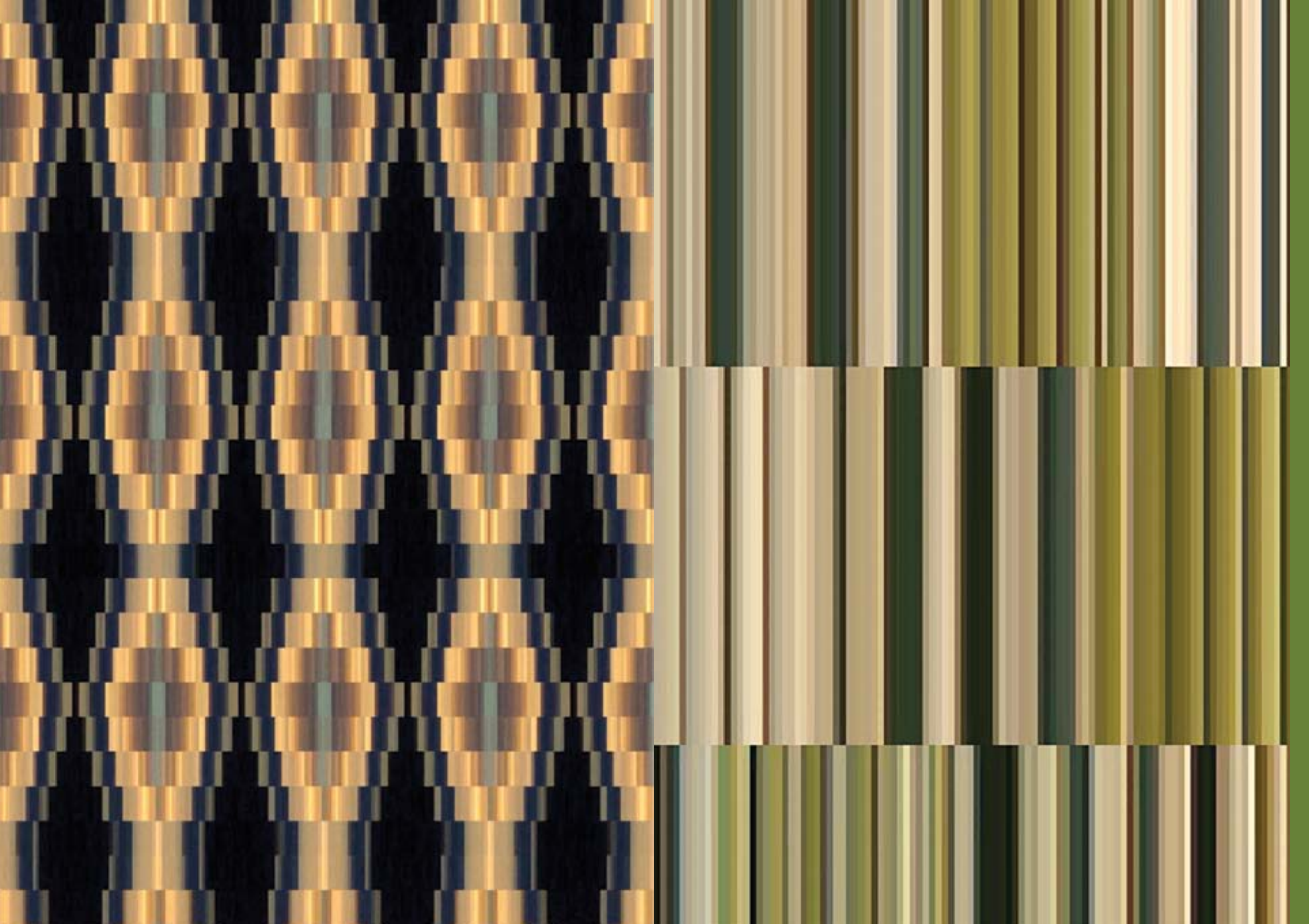
I felt like the fire took me back to an older time. In the part of the performance directly after the fire which I called 'Te Ao ki te Po' I felt a clearing was occurring in that creation was beginning again. I created one movement for each level of the night transforming into day. Starting again. Then I rebuilt the whare.¹²

The installation involved dual projection and the manipulation of an elasticated whare to visually demonstrate the re-building of the urban marae. Significant objects were also attached to the whare with elastic (such as a walking stick, a pair of black shoes, and 1960s style glasses). Potiki Bryant used narrative forms drawn from oral histories and as she performed, manipulated the structure, changing its shape throughout the performance. The work generated a sense of the rebirth of both the community and its house. Potiki Bryant made a short film based on her performance within the installation, a film included in the *Pasifika Styles* exhibition.

The concepts of the *wharenuī*, the collective home; *taonga tuku iho*, treasures that are handed down; and *manawa whenua*, the relationship with land, are three aspects of tikanga Māori evoked by these artists' work. These categorisations by no means exhaust possible readings and this invitational space of dialogue and layered meaning is one of the reasons digital media has become attractive to Māori artists. Digital media open up new opportunities for evolving and communicating Māori culture. Although often ephemeral in their expression, many of these works are physically experienced and located. Sharing a phenomenological approach to their subject, these women have broken new ground and continue to cultivate the land with digital media art that speaks of a Māori world-view. While centered in the Māori world, their works celebrate its continual transformation as its ancient epistemology is re-constructed and made relevant to a new generation.

Following pages: Lisa Reihana, *Kawhia & Kete #1*, 22, 20 and 83, 2007, inkjet on watercolour paper, 500mm x 750mm. "To ensure my work has resonance and meaning, I need to find a cultural approach to technology. I have recorded video around sacred places, in this instance, Kawhia Harbour, the important *taonga* of the Tainui people. These images are momentary fractions of video time, digital weavings from the video. Resampling the footage, I divide the 16:9 picture plane into a kaleidoscopic grid. At points this reconfigured video forms the *paifiki* or flounder pattern. Kawhia Harbour is an important fishing ground for Tainui, particularly for flounder. I liken this abstract language to the grid weavings of *tukutuku* panels found inside *wharenuī*." (Lisa Reihana)

12. Su Ballard and Rachel Rakena, "Whakaruruhau," in *Whakaruruhau: Louise Potiki Bryant* (Dunedin: School of Art, Otago Polytechnic, 2003), np.





Sampling Tradition: The Old in New Media

Janine Randerson

“What is *new* media art anyway?” a photographer recently asked me. This was a tricky question to answer because if there is ‘*new* media’ art, it suggests an ‘other’, in the cold, ‘old’ media category. The term ‘new media’ has become widely accepted to denote certain computer-based art forms, but what does it mean to be new? While new media art has lost its youth, it survives as a contested term in theoretical discourse. As an aesthetic category the term seems to have longevity, similar to *La Nouvelle Vague* describing French New Wave filmmakers of the 1950s and 60s. Perhaps ‘new media’ will remain similarly connected to our time. But as *New Zealand* ages as a nation state and the Māori name *Aotearoa* is more frequently heard in place of the Dutch maritime province, the rhetoric of newness faces questions of relevancy. The emergent media of ADA list discussions is simultaneously generative and regenerative and it is unnecessary to split it neatly into new and old. Makers of media art do not necessarily seek to invent new paradigms, although our lack of imbrication in traditional gallery structures leaves the digital terrain happily open for innovation. While *Aotearoa*’s media artists may grasp at shimmering future directions, just as often, we face the past. For example, Dr Maureen Lander (Nga Puhī, Ngāti Pakeha) suggests that the participation of Māori artists in the digital realm is not a radical break with customary modes, rather, she proposes that constant innovation is the ‘tradition’ that defines *Toi Māori* (Māori Arts).¹ Novel manipulation of materials by Māori practitioners is traceable throughout the period of colonisation. Similarly many of *Aotearoa*’s contemporary artists slip between old and new media. Lander’s audio work *Wingsong*, Rachel Rakena’s digital video installation *Rerehiko*, and *Mix that Scratch*—an eight-channel installation by Veronica Vaevae—reveal an active relationship with earlier modes of cultural practice. Sean Kerr’s online *Binney Project* invites a reappraisal of an icon of New Zealand painting. Nick Spratt’s *A whole lot less than what we started with, part II* transports the most tangible of old media—paper—into digital space and back again.

The suggestion that the ‘new’ in new media is not very useful has been a familiar refrain among media theorists, notably Jay David Bolter and Richard Grusin have argued that new media depends on its predecessors for context and significance.² Their term ‘remediation’ describes the process whereby new media refashions older media. The aforementioned projects ‘remediate’ in this sense by bringing into conversation practices such as painting and mobile media, video and handmade film, musical composition and installation. Bolter and Grusin argue that it is human to flock to ‘new things’ and every modern art medium has had its ‘new media’ stage (witness the current interest in locative media, while net.art is the most recent victim of changing fashion).³ More recently Wendy Hui Kyong Chun has reassessed Bolter and Grusin’s position, suggesting that theorists “debunking the newness of new media” should acknowledge that the new itself is “an historical category linked to the rise of modernity.”⁴ The commercial history of new media should also be recognised; built-in obsolescence and entanglement in an endless cycle of upgrades helps sustain

the capitalist economy. Rather than reiterating that the ‘new’ in new media does not help explain it better, I propose that there are multiple modes in which the digital artwork engages with earlier media.

On entering Nick Spratt’s online artwork “*A whole lot less than what we started with, part II*” (2004 – 5) you immediately become immersed in the pale pink and grey of a ‘remediated’ office environment, circa 1983. Yet within the soothing pastels lies a fantasy of destruction of the virtual workspace. Neat piles of paper and pink post-it notes spell out the words “This page will self-destruct” in a robust font. Simply by entering the site you are contributing to a countdown that will eventually destroy the page itself. As a web-browsing consumer, you have a choice: to accelerate the destruction of the site by repeatedly entering, or to unselfishly leave the pile of words to await the next visitor. The banality of office file transfer is suddenly loaded with cathartic potential. In a power reversal, the user is allowed the programmer’s right to give the site life, or to take it away. Eventually a simulacrum of a piece of paper, drifting in a virtual breeze (the appropriated Windows file icon, corner turned up) will float off the pile of words, and rematerialise as a file on your desktop. You can certify your participation with all the efficiency of the information revolution: your contribution to the site’s erosion is rewarded with a paper object.

For the artists Nick Spratt and Sean Kerr, the online work often has a material counterpart in a gallery space. In “*A whole lot less than what we started with, part II*” Spratt’s paper gift underlines the fiction of the promised ‘paperless society’.⁵ Other parts of Spratt’s series include magazine page-works and sculptural installations of plywood text. In Sean Kerr’s work there are often assemblages of screens, speakers or sculptural objects on site. These projects remind us of the materiality of information. Networked art is assumed to be largely uncollectible, reviving a 1960s resistance to art’s commodification. Yet in these practices there is a deliberate strategy of creating objects that exist in physical space outside the CPU from the outset, rather than leaving by-products (like the photographs, contracts and other detritus of Conceptual Art) to be fetishised in future museums. In philosopher Bruno Latour’s studies of science and technology, he suggests that the object has agency, in contrast to the Modernist mode of separation of ‘things’ into a distinct ontological category, inert and instrumental. In a networked art installation the movement between the immaterial and the tangible, between physical objects and net spaces, across histories and time zones exceeds the hermetic space of the gallery. Latour argues that complex relationships between animate and inanimate entities and their environments have always existed in Western culture, but they have been suppressed from mainstream discourse in a process of ‘purification’. These entangled works resemble the open-ended imbroglios that Latour uses to counter the notion that ‘things’ are closed and mute. Correspondingly, Nick Spratt suggests that the *impurity* of the dialogue created by crossing media interests him.⁶

Veronica Vaevae’s work *Mix that Scratch* (1994/2004) brings extant cultural forms and contemporary popular culture together in a new constellation. She draws together Rarotongan bark cloth (*tapa*) patterns, direct film techniques and the turntable scratching of Pacific hip hop music. *Mix that Scratch* came into existence as a single channel film in 1994, and ten years later it was reworked as

1. Maureen Lander, in conversation with the author, 5 April 2007.
2. J. David Bolter and Richard Grusin, *Remediation: Understanding New Media* (Cambridge, MA and London: MIT Press, 1999).
3. Natalie Bookchin, “Grave Digging and Net Art: A Proposal for the Future,” in *Network Art: Practices and Positions*, ed. Tom Corby (London and New York: Routledge, 2006), 68.
4. Wendy Hui Kyong Chun and Thomas Keenan, *New Media Old Media: A History and Theory Reader* (New York: Routledge, 2006).

5. Nick Spratt’s project, *A whole lot less than what we started with, part II*, was winner of the net art category in the 2004 Vodafone Digital Art awards and was developed into <http://thispagewillselfdestruct.com>, a website project launched as part of *Lost & Found*, 2005. Physical parts of the installation were realised in an exhibition at Room 103, Auckland in 2004. See <http://www.nickspratt.com>. The installation, *A whole lot less than what we started with*, including Parts I, II and III of the series showed in 2005 at the Pop-In room at Artspace, Auckland. See <http://www.artspace.org.nz/exhibitions/projects/popinroom.asp>
6. Nick Spratt, email to author, 26 June 2007.

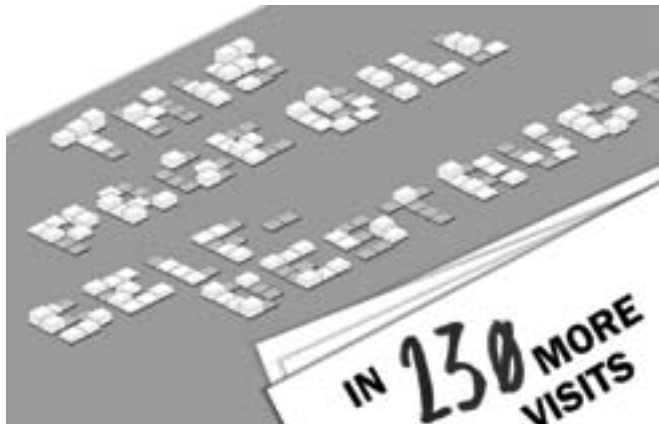


fig. 1

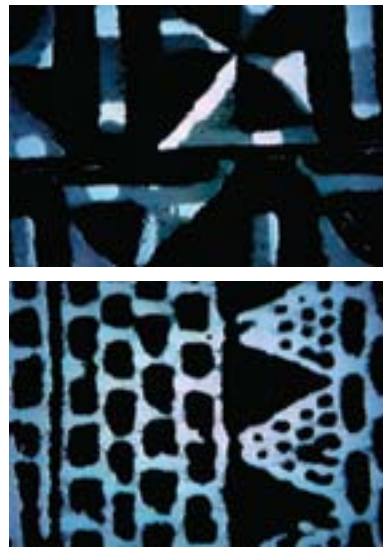


fig. 2



fig. 4



fig. 5



fig. 3

a column of eight screens for the Open Art Gallery in Frankfurt. Once digitised, media artworks have the potential for endless re-versioning. One could argue that there is no longer an original film *Mix that Scratch*, just a series of digital permutations. Latour might regard the digitisation process as an active mediator that can “transform, translate, distort and modify.”⁷ Vaevae samples geometric patterns derived from tapa patterns and Cook Islands hand-woven purses, combining them with the technique of working directly on individual film frames, then digitising the results. Rather than the stable, fixed cultural practice that Pakeha anthropologists used to seek, tapa for clothing or ritual use has always been a medium in transition. Cook Islands makers adapted to new materials and imagery during the period of British colonisation. In the nineteenth century, the small floral patterns of English fabrics began to appear alongside the bold, geometric bark cloth designs. European writing was also integrated into Pacific tapa. Vaevae does not revive a discontinued cultural form, but continues a dialogue with an already dynamic media.

Mix That Scratch employs the reassuring materiality of the direct film techniques developed by artist Len Lye, an influential figure in experimental film-making and media practice in New Zealand. Lye was also one of the first Pakeha artists with an interest in Pacific motifs, an influence revealed most clearly in his black and white animation *Tusalava* (1929). *Mix that Scratch* is not made purely by hand however; the patterns have been photocopied and then adhered to the film strip itself. Vaevae’s film reveals the dust, scratches and fuzz of the not-so-new medium of xeroxing. Geert Lovink notes that old media such as SLR cameras, or in this case filmstrips and photocopy processes, evoke comfort, stability, warmth and nostalgia, whereas the characteristically shallow and texture-less computer screen representation produces alienation effects.⁸ This reassuring warmth is mimicked in software features such as the image editor Photoshop’s ‘Xerox’ filter and the ‘Dust and Scratches’ filter of video editing package Final Cut Pro. The sensuous play between analogue and digital in Vaevae’s work is extended to the ‘scratch’ of the soundtrack. DJ Fast Eddie scratches vinyl records in time to the dancing rhythms of the film frames. The subsequent computer programming of *Mix that Scratch* for an installation context presented the opportunity for cross-cultural dialogue between Vaevae and the German group ProKab, who sequenced the single channel loop for distribution over eight screens. The vertical screen configuration in Frankfurt included a binary arrangement of positive and negative versions of the original sequence. Vaevae has described this fusion of tapa patterns and digital technology as “my own tribal art.”⁹ The work pulses with the energy of a migrant culture in translation as Cook Island media is noisily ‘xeroxed’ in Aotearoa.

In the introduction to the Korean version of his influential *The Language of New Media* (2003), Lev Manovich uses the word ‘remix’ to describe the nature of new media. In electronic music the term remix describes the process where a musician electronically samples an existing song from another artist, making a new version from the same elements. Manovich frames the term ‘remix’ in several different ways in relation to media: the eclectic remix of ideas in post-modernism; the remix of national cultural traditions with a new ‘global international’ style; and finally, a remix specific to ‘new media’ as an entity. He positions the latter remix “between the interfaces of various cultural forms and

7. Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford and New York: Oxford University Press, 2005), 39.
8. Geert Lovink, *Uncanny Networks: Dialogues with the Virtual Intelligentsia* (Cambridge, MA: MIT Press, 2003), 7.
9. Veronica Vaevae, “Mix That Scratch,” in *The Greenhouse* exhibition catalogue, ed. Janine Randerson (Frankfurt: DIFA, 2004), 22.

1: Nick Spratt, *A whole lot less than what we started with, part II*, 2004-5, website, screenshot.
2: Veronica Vaevae, *Mix that Scratch*, 1994, 2 minutes, video stills, sound: DJ Fast Eddie.
3: Veronica Vaevae, *Mix that Scratch*, 2004, installation version in ‘The Greenhouse’, at The Open Art Gallery, Frankfurt, Germany.
4: Maureen Lander, *Glorified Scales*, 2001, multi-media installation, detail, Auckland Museum, photo: Tim Mackrell.
5: Sean Kerr, *The Binney Project*, 2002, interactive software, screens, courtesy of Michael Left Gallery and the Museum of New Zealand Te Papa Tongarewa.

the new software techniques—in short, the remix between culture and computers.”¹⁰ The artist Rachael Rakena (Ngai Tahu, Nga Puhi, Ngati Pakeha) remixes culture, computers and ‘consciousness’ in the project *Rerehiko*. The title is a play on the Māori word for computer, *rorohiko*, which she translates as ‘electric brain’¹¹ and *rere* which implies a transitional state such as ‘escape’, ‘flight’ or ‘flow’. The 2004 version of this work was exhibited as a floor projection, appearing as a circular pool. The audio in *Rerehiko* is a remix of several media: the *waiata* of soprano Deborah Wai Kapohe, traditional Māori instruments such as the *koauau* recorded by Richard Nunns and a voice-over dialogue read from email transcripts. Members of Rakena’s *kapa haka* group are videoed performing underwater. Layers of text, sampled from the email archives of the Kai Tahu Whanau kapa haka group become a textual *tāniko* or *kaitaka*, cloaking and enveloping the performers. The bodies in the water are dematerialised, located somewhere between the overlapping layers of email text and the multiple strata of sound.

Rakena coined a further term, ‘*Toi Rerehiko*’, making an explicit connection to earlier Māori arts such as *Toi Whakairo* and *Toi Raranga*.¹² In Rakena’s words this term,

...centres, claims and names digital space within a Māori paradigm... Digital space [i]s a new realm of the cosmos[...] like the ocean our tupuna crossed. It is specifically non-land-based. It is a fluid medium through which movement, both travel and floating occurs. This space allows for relationships across terrains where the issue of identity lies not so much in geography but in the development of communities in fluid spaces that are both resonant with mythologies, whakapapa and belonging, and responsive to contemporary technologies. And, indeed, produced by them.¹³

This image of the Internet as a watery realm is particularly relevant to the islands of Aotearoa but also a commonplace in international net discourse, present in analogies of surfing, streaming, navigation or information flow. In the 1970s British Media critic Raymond Williams suggested that in telecommunications, neural processes of human thought and the flow of information as electric current have become interchangeable. In ‘cyber’ discourse, the term ‘liqueescence’, was coined by the Critical Art Ensemble to describe artworks that exist in “sites of resistance [that] rest in an ambiguous zone without borders.”¹⁴ The bodies in *Rerehiko* appear, at first, to be in electronic limbo, an abstraction of netspace. The kapa haka performers move seductively slowly, without gravity or spatio-temporal orientation. The absence of the solid ground, or ties of *whenua*, may be read as the rootlessness resulting from Māori land dispossession. Or, the rapturous bodily freedom could suggest a utopian vision of ‘cyberspace’ that dissolves difference, but the voice-over of a heated email debate and the distinct sound of the koauau land us directly back in Aotearoa. In Rakena’s work, the Internet cannot be separated from the politics of representation and community issues, in this case, of Kai Tahu Whanau identity. The email transcripts concern who, according to their tribal affiliations, should (or should not) be included in the whanau performance group. *Rerehiko* signals that the Internet is a place to negotiate and resolve specific local problems through dialogue, countering the outmoded notion that the internet erases differences of race, class and gender.

10. Lev Manovich, “Introduction to the Korean Edition,” *The Language of New Media* (Cambridge, MA: MIT Press, 2003).

11. Rachel Rakena, “Rerehiko,” in *The Greenhouse* exhibition catalogue, ed Janine Randerson (Frankfurt: DIFA, 2004), 18.

12. The name “Toi Rerehiko” has been given by Rakena to Auckland’s MIC (now the Media and Interdisciplinary Centre).

13. Rakena, “Toi Rerehiko,” unpublished MFA dissertation, School of Art, Otago Polytechnic, Dunedin, 2003.

14. Timothy A. Jackson, “Towards a New Media Aesthetic,” in *Reading Digital Culture*, ed. David Trend (Malden, MA and Oxford: Blackwell Publishers, 2001), 350.

Maureen Lander’s audio work *Wingsong* (2004) is a work of transubstantiation rather than a remix. The sound piece fuses the recorded calls of the kokako, an endangered native bird, and string instruments simulating bird song, with samples from the composition *A Chaos of Delight* by Eve De Castro Robinson. The listener can trigger fragile samples of sound by crossing movement sensors. *Wingsong* (2004) was first developed as an element of a larger installation *Glorified Scales* (2001) at the Auckland Museum. The piece presents a witty dialogue between the simulated and authentic, the animal world represented by the kokako call and the human world represented by string instruments. Participants compose the work on site by triggering the sound. By remaining on the sensor the whole soundtrack can be heard, while moving on and off the beam causes different sections of the sound composition to flicker hesitantly. The user’s manipulation of the movement triggers gives some degree of physical control over the invisible workings of the software. The ancient birdcall has the ethereal quality of an uncanny spectral presence. Lander writes in her doctoral essay *Manu as Medium* that in Māoritanga the bird (*manu*) acts as the intermediary between the *ira tangata* (mortal state) and the *ira atua* (immortal state).¹⁵ The digital birdcall as an intermediary reflects media theorist Jeffrey Sconce’s proposal in his book *Haunted Media* that the ‘live’ quality of interactive digital media suggests the animate or even sentient, and evokes early modern connections between emergent technologies such as the telephone and phonograph, devices which were in part proposed to enable communication with the spirit realm.¹⁶ The invisible interaction with the electronic birdcall appears to become a medium for communicating with the departed, with possibilities for dialogue between the living and the dead.

In his controversial book *The Space Between: Pakeha Use of Māori Motifs* (1994) New Zealand art historian Francis Pound draws on Jacques Derrida’s notion that a translation is not necessarily indebted to the original cultural form it reuses, but rather, that the original may be indebted to its coming translation. In *Wingsong* the original or ‘real’ call of the kokako is translated into digital form via electronic recording technology and is imitated by analogue instruments. There is a particularly strong demand in the voice of an endangered animal. In Pound’s words the original form insists: “recognise me: feed upon me: be re-made by me and re-make me, be influenced by me: *make me survive*.”¹⁷ This is a reversal of the idea that the new translation (or digital remix in our case) has a parasitic dependence on the original art form or sound. But in digital culture does the distinction between original and ‘update’ really matter? The Māori phrase “*Apiti hono tatai hono*” or, “Join together side by side”—Māori with Pakeha, the living with the dead, the original and the translation, old and new—may be used to disrupt construction of either/or binaries.¹⁸

Sean Kerr’s *Binney Project* (2002) reanimates painter Don Binney’s iconic New Zealand painting *Pacific Frigate Bird I* (1968) in an interactive work for seven computer screens. The birds can be manipulated on-screen by text messages, or, in its current network version, via keyboard. The *Binney Project* was commissioned by Ian Wedde for Te Papa Tongarewa Museum of New Zealand. It is an early example of an interactive artwork using mobile phones, in which an auratic painting and software as art practice meet head-on. Kerr was attracted

15. Maureen Lander, “Manu as Medium,” In *Glorified Scales*, edited by B. Wood and Maureen Lander (Auckland: Maureen Lander, 2000), np.

16. Jeffrey Sconce, *Haunted Media: Electronic Presence from Telegraphy to Television* (Durham, NC: Duke University, 2000), 8.

17. Francis Pound, *Te Ao Hou, The Space Between: Pakeha Use of Māori Motifs in Modernist New Zealand Art* (Auckland: Workshop Press, 1994), 165.

18. Nina Pelling from Maia, the Māori Development Unit at Unitec, Auckland, introduced this phrase to me.

to Binney's work by the "flash-like," hard-edged two dimensionality of *Pacific Frigate Bird I*.¹⁹ In Pound's terms, the painting 'demanded' to be 're-made'. In the 1960s Binney himself was experimenting with acrylic paint, a new material in New Zealand art, in order to render his paintings smooth and depthless. In both Binney's painting and Kerr's animated version space is flattened, outlines are sharpened and the surface is emphasised. In Kerr's self-described 'multi-user' painting you can unlock the frigate bird from its frozen moment.²⁰ Viewers are invited to participate in the painting, creating a narrative from a singular episode. When the frigate bird is activated (by pressing a letter on the keyboard or, initially, by mobile phone message) you can trigger a distorted squawk from the bird, an erratic circling, or a seaward plunge from the Windows-blue sky of the screen. Kerr points to the limitations of the software by comically revelling in the restricted colour range, flatness and linearity of the Flash environment. While the work may be read as an homage to Binney, rather than a cool détournement, Kerr challenges the painting's fixed canonical location by shifting it into the participatory arena of mobile media.

Sean Kerr re-versions a painting and Nick Spratt responds to an earlier media of mass communication. Maureen Lander weaves tangible fibre and intangible sound across cultures, and Rachel Rakena and Veronica Vaevae remix the living genealogies of their communities. These strategies resonate with media theorist Erkki Huhtamo's suggestion that, "the gaze of the media artist, earlier directed primarily towards the future, has now been supplanted, or rather supported, by another one which faces the past."²¹ Huhtamo is a proponent of 'media archaeology' in which overlooked or obsolete media forms are recovered to shed light on contemporary media practices. Media archaeologists study the disappearance and reappearance of media as they pass in and out of history. The cyclical movement of material across time zones and geographies has suggestive parallels with the Māori concept of 'thinking spirally'. Poet Robert Sullivan describes spiral thought as integral to Pacific culture. In spiral time there is a seamless shifting between past, present and future in a communal narration.²² Curator Jonathan Mane-Wheoki explains that the word for 'the past' in Te Reo Māori is *mua*, which may be understood as "the way we face". The past always moves ahead of us, for guidance, while *muri*, the word for 'the future', he translates as "the left behind" or the unknowable.²³ The past is always there to be re-evaluated or re-made in the contemporary world. However, spiral time, like the painted *kowhaiwhai* pattern, does not simply repeat itself; the spiral recurs with a subtle difference, signaling the possibility of regeneration.²⁴ While media archaeology and Pacific spiral temporality spring from very different places, they both retrieve suppressed histories for their relevance to the present moment. For Huhtamo, an alternative historiography of media art may be deployed against the capitalist drive towards the next technological iteration. In the Māori context, the sacred temporal co-existence of the ancestors counters linear narratives of progress and the erasure of Aotearoa's turbulent past. Whether we name the process remediation, remix, translation, homage, appropriation, archaeology, or spiral temporality, our 'new' media is utterly enmeshed with the old.

19. Diana Espinosa, "Sean Kerr Soars through the Digital Art Experience," *ReadMe: New Media; Net Culture: Now*, 2002. <http://journalism.nyu.edu/pubzone/ReadMe/past/3.0/mega3.html>
20. Espinosa, "Sean Kerr Soars through the Digital Art Experience."
21. Erkki Huhtamo, "Resurrecting the Technological Past: An Introduction to the Archaeology of Media Art," *InterCommunication* 14, 1995. http://www.ntticc.or.jp/pub/ic_mag/ico14/huhtamo/huhtamo_e.html
22. Robert Sullivan, "Keynote Address," paper presented at *Culture Incorporated: Bodies, Technologies, Habitats*, Cultural Studies Association of Australasia (CSAA) Annual Conference, University of Canterbury, Christchurch, 6 December 2003.
23. Jonathan Mane-Wheoki, "Opening Address," paper presented at *Present Pasts—Present Futures*, Art Association of Australia and New Zealand (AAANZ) Annual Conference, Waipapa, University of Auckland Marae, 1 December 2004.
24. Elizabeth Deloughrey, "The Spiral Temporality of Patricia Grace's 'Potiki,'" *Ariel* 30, no.1 (January 1999): 68.

Solar Circuit Aotearoa New Zealand

Trudy Lane and Ian Clothier

There was a moment when, after a year and a half of planning, the Solar Circuit Aotearoa New Zealand (SCANZ) residency began to form its own momentum. We sat in the Owae Marae *wharenuī* in Taranaki, quietly watching as one by one artists stood up and outlined their projects to local *kaumatua* (respected elders). As descriptions of artworks exploring breath, mountains, navigation and tides began to resonate around the sacred space of the house, a sense of alignment grew. Ideas regarded as within the realm of recent technological developments were revealed to have ancient counterparts in *Te Reo* (the Māori language)—such as *iarere*, meaning communication across vast distances. The significance of this introduction was reflected in the time *kaumatua* later spent with the artists, generously answering their questions. As organisers, we knew these proposed project concepts well—yet they were now housed within a local cultural context, a viewpoint from which to see digital art practice in general. A previously scattered group now shared a certain energy.

For many digital artists reaching to connect across distances to the like-minded, email forums such as mailing lists are crucial providers of sustenance. For those not living in Aotearoa New Zealand, the Aotearoa Digital Art Network (ADA) is a window into local practice in Aotearoa, and for those here, a means to connect and co-ordinate. It was through the ADA list that the organising partnership for SCANZ was formed, open calls for projects were made and a series of introductions to the artists were held.

SCANZ involves artists working at the intersection of art and technology—international artists and New Zealanders based both here and overseas. The inaugural residency, held in New Plymouth from 3 – 16 July 2006, carried strands of DNA from the Polar and Solar Circuit workshops. Polar Circuit arose out of discussions at the International Symposium on Electronic Art (ISEA) in 1996 which recognised that often the most valuable exchanges at such meetings occurred in less formal situations. A series of loose, three-to-eight week, low-budget, come-if-you-can gatherings under the midnight sun of northern Finland followed. These proved to be industrious environments for the development of new work. They also created a gathering point for artists located on the 'peripheries' of the far northern hemisphere. Solar Circuit is the southern hemisphere version, first held in Tasmania in 2001. Ian Clothier was among the artists attending, as were a number of others who would later attend SCANZ in New Plymouth.

Symposia and festivals encourage international artistic and curatorial crossover. Rewind twenty years and you would find Clothier strapped spread-eagled to a wheel and being trundled across Christchurch like some odd version of Da Vinci's Vitruvian man—part of Jacek Grzęlecki's work for the inaugural ANZart event of 1981. ANZart gathered artists from New Zealand, Australians including Steve Turpie and Mike Parr, and international artists such as Grzęlecki and Marina Abramović and Ulay. Running until 1985, ANZart was a grass-roots, low-fi project that gradually fell victim to bureaucratisation and a cooling of trans-Tasman art relations.¹

1. Pamela Zeplin, "Crossing Over: Raising the ghosts of Tasman-Pacific Art Exchange: ANZART-in-HOBART," *New Zealand Journal of Media Studies*, 9 no.1 1983. <http://www.nzetc.org/tm/scholarly/tei-Scho91JMS-t1-g1-t4.html>

The need for events specifically for artists working with new technology had been articulated on the newly-formed ADA list. Such events came to include the 2004 re:remote conference, which used technology such as video conferencing and live chat to create a communication space between local and distant practitioners; the 2005 ADA Symposium in Dunedin which hosted Melinda Rackham, director of the Australian Network for Art and Technology and Steve Dietz, curator of ISEA 2006; and the marae-based Cultural Futures symposium held in Auckland shortly afterwards, which focused on indigenous practitioners' use of new technology to articulate a sense of place. Each of these very different approaches influenced the planning for SCANZ, which as a period of focused project development seemed an appropriate next step toward a regular festival event for digital art in New Zealand.

As the residency began, thirty artists from all over New Zealand and the world began settling into the Western Institute of Technology accommodation and the communal studio for the residency. This space quickly became a hum of people, laptops, network cable, video, audio and electronic gear. The commonalities of working with developing technologies gave artists overlapping reference points and a sense of common purpose. An easy productivity was due at least in part to this feeling, succinctly described by Caroline McCaw when she said, "it's nice not having to translate yourself."

On any given day you would see people clustered around ethernet hubs and power strips. Nina Czegledy, concentrating intensely at her laptop, was communicating with her co-investigators into the Aurora Borealis. Stella Brennan was researching radiology during the Second World War, war stories mixed with accounts of local U-Boat sightings and bomber aircraft turned into medical scanners. Turning again you might have seen the huddled forms of Caroline McCaw with Helen Varley Jamieson and Vicki Smith of *Avatar Body Collision* playfully inventing new scenes in Second Life and *Avatar Body Collision's* custom-built UpStage software. Beyond the studio, hidden away in a windowless room, Becca Wood was wrapped up in a dancing duel. Two adjoining projections, one of Wood and one of her distant collaborator, created a shared dance in virtual space. Meanwhile, holed up in a tiny office, Adam Hyde collected video interviews for the third in the series of re:remote conferences, to be held at ISEA 2006 in San Jose a month later.

In an opposite corner sat the electronics department, with transistors, transformers, wiring and solder—the shared space of Ken Gregory and Diana Burgoyne. Curious artists would often come sidling by, spurring frequent electronics and soldering bees. Burgoyne, a self-proclaimed 'electronic folk-artist' was creating an electronic Audio Quilt—each square containing a brief audio recording captured on microchip and triggered by light sensors. Gregory's project combined site specificity with electronics and kite building—technologies old and new. Through his research into traditional kite-flying celebrations at *Matariki* Māori new year and the navigational techniques of Captain Cook, Gregory's project attempted to evoke the spirit of the huia, a bird extinct since the start of the twentieth century. As it flies, Gregory's translucent night kite, embellished with glowing LEDs emits the recorded call of the lost huia. Sally McIntyre described it:

1: The Message, *The Enchantment*, 1981, directed by Jack Grzeliński, ANZart Christchurch, photo: Jonathan Smart.
 2: Becca Wood, *Foreign Correspondent*, 2006, networked performance with Kerry McMurdo, technical assistant Kelly Moynihan, photo: Trudy Lane.
 3: Ken Gregory, first trial of the night kite, 2006.



fig. 1



fig. 2



fig. 3

*Ken valiantly battles the kite in the high winds, and it begins to look as though he is interacting with an animate presence. ... I have a go and it is like trying to steer a Manta ray. The wind becomes something physical that I am interacting with, and the kite a gauge for its elemental force.*²

Though conscious of his newcomer status and the potential delicacy of the proposal, Gregory's ideas were a significant point of exchange with local kaumatua, curious to see 'the huia fly again metaphorically'. Visits by Dr Huirangi Waikerepuru, Tengaruru Wineera and his partner Te Urutahi Waikerepuru, brought sacred objects, allegorical readings and layered discussions to the working space. On one visit Wineera brought with him ancient and well-used *patu*, beautiful stone clubs with a will and story of their own. Artists Derek Holzer and Sara Kolster record and amplify sounds and images from a location, stitching together global journeys from the tiniest shards. In a literal reading of the surface of these taonga, Holzer recorded the physical resonance of the club's *pounamu* (jade) with a contact microphone. As Andrea Polli wrote, "It felt very much like a hole in our technological/scientific approach to the environment was starting to be filled by ancient knowledge."³

Many artists were hunters and gatherers of materials—of image, audio, stories and objects. In an absurdly literal yet poetic meditation on the interconnectedness of individual action, the Out-of-Sync pair of Norie Neumark and Maria Miranda went out each day with a large microphone—'collecting breath' amongst the New Plymouth public (and on occasion their pets). Breaths were simultaneously gathered from around the world on their *Talking about the Weather* project blog. Also out among people in New Plymouth was Xiu Li Young, gathering information about the early settlement of Taranaki. Part of her ongoing investigation into stories of the global Chinese diaspora, she sought out descendants of Chinese New Zealander Chew Chong, early entrepreneur and founder of one of New Zealand's first dairy factories.

Wolfgang Staehle had come planning to continue his series of webcam-based paintings—continuous twenty-four hour static shots of landscapes—with a view of Mount Taranaki. Just as he had talked about the series itself being a meditation on the value of quiet observation, carried out in contrast to the furious speed of the modern lifestyle, so he found himself forced to stay beyond the residency period to capture the needed continuous twenty-four hour shot, as the mountain had remained cloaked in cloud. Steve Durie and Bruce Gardner of the C5 collective also made an attempt on mist-shrouded Mount Taranaki, trying to plot its form using GPS, but they too were held back by the vagaries of weather.

In a sobering finale to the artists' self-introductions, Staehle's presentation finished with a projection of a work from the same series—a twenty-four-hour shot of New York's World Trade Center that happened to coincide with the morning of 9/11. As the footage of the evening before the towers were felled was replayed in real-time, there was as Helen Varley Jamieson noted "a sense of place shifting and time distorting as we worked into the night."⁴

Through the capture and transformation of data, artists enable us to hear the levels of fury within a hurricane, see rising temperatures, listen to colours, transplant mountains and hear the click-click-click of a spinning pulsar. Andrea Polli's sonification of complex and difficult to comprehend systems such as

2. Sally McIntyre, *The Observatory*, [blog] 2006. <http://www.scanz.net.nz/theobservatory/?m=200607>
3. Polli, *andrapolli's weblog*, [blog] 2006. <http://www.danchan.com/weblog/andrapolli/2006/7>
4. Helen Varley Jamieson, *Trip the Light Fantastic*, [blog] 2006. http://bodycollision.blogspot.com/2006_07_01_archive.html

oceans and hurricanes allows a different mode of perceiving these vast natural spaces and events. Polli's residency work, *T2* revealed oceanic activity through wind speed and tidal data from the Taranaki region, information which was used to generate an installation of real-time video and data sonification.

Raewyn Turner explored a physical response to place. Researching her *Perfumes for Fear* project led her to the stench and buried toxic stories of 2,4,5-T manufacture and dioxin contamination at the Ivan Watkins Dow Chemical plant at Paritutu, on New Plymouth's coast. Turner collected a palette of 400 greens from Mount Taranaki and around Paritutu. These colours from the lush but contaminated landscape were then turned into fragrances by her collaborator, commercial perfumer Louise Crouch, who synaesthetically connects colours with her catalogued perfumery materials.

Turner's production of fragrance from her green palette investigates the potential of smell as a source of cross-sensory information, revealing emotional and physical states and details of the environment. A collection of sticks and stones from the local area forms the model for the perfume's container, emulating ancient practices of healing by 'playing' found objects mimicking the shapes of internal body organs (a practice reflected in New Zealand musician Richard Nunns' work with traditional Māori instruments).

As Turner describes it:

*The project investigates the relationship between the environment and people's fear of the uncontrollable and the unknown, playing with the idea that we can influence vast forces such as weather and chance by our animistic fragrant objects. The odours and their containers are fix-it tools intended for manifesting fortifying thoughts of love and healing in an irrational communicable form.*⁵

For the evening of artists' presentations, Turner presented a collaboration with Diana Burgoyne, taping light sensors directly to her laptop screen and 'playing' her collected palette of greens, each of which produced a distinct audio tone.

The largest collaborative effort of the residency was Alex Monteith's video installation *Composition for farmer, three dogs and 120 sheep for four-channel video installation* (2007). Out in the crisp air and iconic green of a local farm, Lloyd Bishop, a champion New Zealand dog triallist expertly choreographed two dogs and 120 sheep across the viewfinders of Monteith's four simultaneously recording video cameras. The work plays with the notion of site specificity, tweaking an archetype of agrarian New Zealand, a nation of 40 million sheep and 4 million people. The once-primetime television staple of sheepdog trialling, where farmers and their dogs compete to usher an unruly mob of sheep through a course and into a pen in record time, becomes in Monteith's video installation a pattern of animal and human bodies. There is nostalgia for an imagined rustic innocence, contradicted by the muddy specificity and the fantastic pointlessness of this choreography. Formally, the work draws a relationship between the rigid framing of the camera lens and the pegged arenas the sheep move between.

The residency's final weekend culminated in an exhibition at New Plymouth's Govett-Brewster Art Gallery featuring work by Norie Neumark and Maria Miranda, Alex Monteith, Derek Holzer and Sara Kolster, Wolfgang Staehle and Andrea Polli. Residents presented the results of their research in a public

5. Raewyn Turner, "Perfumes for Fear," artist's statement, 9 July 2007.

evening. At the following day's ADA symposium artists led workshops, including Diana Burgoyne's 'Electronics for the Intimidated' which invited the learners to play the banana—an exercise in organic electronics.

Connections begun or nurtured at SCANZ continue to develop. From the residency's unstructured investigations come a number of projects, exhibitions and events. There is *Space-Sense*, the New Zealand-Canadian collaboration being organised by Ian Clothier and Nina Czegledy, Stella Brennan's premiere of her video *South Pacific* in July 2007, and Out-of-Sync's exhibition *The Trouble with the Weather* (2007) curated by Norie Neumark and Maria Miranda (with Jacqueline Bosscher) which includes work by New Zealand artist Janine Randerson. Many digital traces of the time also remain in blogs, videos and sound recordings. SCANZ's intention—to nurture intercultural, local, national and international relationships—continues, and the residency will reconvene in New Plymouth in January 2009.

- 4: SCANZ participants at work in Na, the residency media lab, WITT, New Plymouth, photo: Sara Kolster.
- 5: Andreea Polli, 12, 2006, data feed, webcams, software, composite image.
"12 explores real time ocean activity using wave and wind data from Port Taranaki, webcams from the West Coast of the US and East Coast of New Zealand, and a live global ocean conservation news feed from oceanconserv.org. Wave and wind data is translated into sound and animation. The webcams show a synchronous time lapse animation of recent coastal activity, updated with new images every 30 minutes while a scrolling rss feed presents breaking news. 12 aims to increase awareness and appreciation of the beauty, power and importance of the ocean in a warming world." (Andreea Polli)
- 6: Alex Monteith shooting *Composition for jammer, three dogs and 120 sheep for four-channel video installation*, Taranaki, 2006.



fig. 4



fig. 5



fig. 6

Following pages: Alex Monteith, *Composition for jammer, three dogs and 120 sheep for four-channel video installation*, 2006, 18 minutes, sound, installation view, Auckland Art Gallery Toi o Tamaki, photo: Stefan Puruskar.



Why You Should Learn to Love Free Documentation

Adam Hyde

Free software has developed outside and alongside of the more restrictive licenses and copyrights of the proprietary software environment.¹ Free software can be used by anyone for any purpose: users can study the source code, adapt it to their needs, and whether or not they modify it, they can redistribute both the software and its source code. This co-operative model has meant that free software has had a high rate of uptake in the cultural sector—artists and activists have been amongst its active promoters. Its appeal is strong amongst those who recognise the productive political and social ambiguity of the word ‘free’. A number of artists also make a living through teaching and workshops centered on free technologies they use in their practice. Exhibitions, symposiums and festivals have brought these issues into the public arena, while cultural and digital theorists have reinforced the need to develop and use both free software and free hardware. This support has often risen to the point of hyperbole, and for many years every digital art event seemed to be ‘open’ this or ‘free’ that.

However, despite these efforts, it seems that the uptake of free software is very slow. Although most of the internet runs on free software (60% of web servers run Apache and 90% of Domain Name Servers run BIND), if we look at operating systems the share is somewhere under 2%.² Free software, as opposed to free operating systems, does a little better, with the current estimate for usage of the Firefox browser across all platforms coming in at something between 20 – 30%.³ Still, this is very small. The user uptake of Firefox is an impressive achievement, but why haven’t other fine tools such as the image editing software Gimp or the audio editing software Audacity taken similar ‘market’ share? Why, given that we all know how good free software is, that a wide variety is available, and that it is free as in gratis as well as libre, (or, Free Libre Open Source Software—FLOSS) is the uptake so low?

The free software foundation think the answer is quite simple: “The biggest deficiency in free operating systems is not in the software—it is the lack of good free manuals.”⁴

Many years of teaching free tools (mostly for streaming media) have led me to the same conclusion. It is not that there is no documentation. Often you can find something on a developer’s site, or in a bookstore, or perhaps in the comments on a forum, a mailing list, or maybe in a wiki somewhere. This seems to satisfy most geeks. Many ‘advanced’ users tell me this is enough. Google is their index, and they know how to use it to find solutions. The thinking is that when it comes to solving a problem in software you aren’t the first to encounter it and that someone somewhere has written down a solution. This is often true. If it isn’t true then either you solve the problem yourself (by hitting your head against the wall until it works), or you find the appropriate IRC channel and quiz the developers. Even better... you’re using open source, right!? READ THE SOURCE CODE!

1. The free software definition outlined by the Free Software foundation, founded by Richard Stallman in 1984 emphasises that free software “is a matter of liberty, not price,” and explains that “to understand the concept, you should think of ‘free’ as in ‘free speech,’ not as in ‘free beer.’” <http://www.fsf.org/licensing/essays/free-sw.html>. The term ‘FLOSS’ (Free, Libre, Open Source Software) emphasises both free as in speech and free as in beer.
2. <http://marketshare.hitslink.com/report.aspx?qprid=2>
3. http://www.w3schools.com/browsers/browsers_stats.asp
4. <http://www.gnu.org/philosophy/free-doc.html>

Well, I don’t know about you but perhaps my brain isn’t big enough or I maybe don’t have enough time, or maybe, just maybe, I feel that I should not have to be a programmer to work out how to use a particular piece of software. Perhaps this threshold is a little too high and might be deterring users.

Free software should be well documented. You should be easily able to find out what a particular software does, what it doesn’t do, how it fits into the software universe, what the interface looks like, how to install it, how to set up the most basic configuration and how to use its main functions. These things should be well explained and kept in a place that is easy to find. The easier it is to access well written documentation for a given software, the larger the potential user base.

I have often heard that it is simply not the case that there is a lack of documentation. ‘There is a manual for X!’ (replace ‘X’ with your favorite free software). ‘What do you mean? X has a great manual!’ Well, I admire the effort put into the documentation of some free software. Unfortunately however, the documentation is seldom adequate. The most common flaws include:

- that assumptions about the user’s knowledge are set too high
- the documentation has bad navigation
- it contains unexplained jargon
- there is no visual component
- the documentation is proprietary or ‘closed’ material
- the documentation’s design is unreadable
- operational steps are missing or unexplained
- the documentation is out of date
- the documentation is not easily re-usable
- the documentation is not easily modifiable

These mistakes are very common, and the situation is so bad it amounts to a crisis in the world of free software. I have made my own efforts to address this situation but I thought it is about time I wrote about some of the basic issues in order to encourage others to consider the importance of free documentation and to encourage you to contribute to free documentation projects.

First of all I want to say something briefly about why documentation should be free, and then to look at some parameters for identifying good documentation.

Free documentation for free software

I sometimes feel this is too obvious a point to make. Making documentation ideologically aligned with the software it documents seems to me to be a natural conclusion. Practically, however, there are a few hiccups with this idea. Free software has developed a methodology and economy that free documentation lacks. The traditional method of making money in the manual business is to write a manual and sell it. To protect your interests you use a standard ‘closed’ copyright notice. This is the publishing model. Outside of this circle of proprietary content you do the best you can voluntarily and put your work online wherever you can.

The free software sector has much better resources. Free software projects have established working models and a number of content and management tools including development and distribution sites like Savannah and SourceForge. The financial model is much clearer too. Most obviously, if you need to make money working on a free software project you hone your skills and find a company that will pay you for your work.

Free documentation is lacking all these components—there is no standard technical tool set, there are very few ‘communities’ of free documentation writers and less chance of being able to pay the rent if authors choose to write full time. Finding our way to build these elements is critical to the evolution of a healthy free documentation sector, and, I would argue, to achieving the widespread adoption of free software. It is imperative that we find and develop these models and tools, as closed documentation for free software contains an ideological paradox.

Less ideologically and more practically speaking, free documentation presents a better kind of documentation than closed documentation. Ease of modification is a strength that proprietary documentation cannot match. Free documentation can be updated at the same time as the software is updated and improved through distributed problem solving (à la ‘many eyes make bugs shallow’); it can be translated into your own language or re-contextualised to better suit individual or organisational needs.⁵ Free documentation in these terms alone is a better argument than closed documentation and, if done well, can be a tremendous asset to the uptake of free software.

So, now I would like to talk a little about some essential qualities good free documentation should have:

Free documentation should be easy to access and easy to improve

It makes sense that if the intention is that something can be improved that it should be able to be easily improved. Many free documentation projects inherit their technology strategy from free software development methods. These projects store their content in a CVS (Concurrent Versioning System) which means that you need to be pretty technically competent to be able to access the source material and contribute to it.⁶

What this system overlooks is the fact that writers are not programmers. Writers have a different tool set (usually based on word processors), and do not have a familiarity with the typical programmers tool set. To expect a free documentation writer to access content via CVS or similar tools is to make the same mistake as assuming the audience for your documentation knows more than they do: setting the threshold for contributions so high means that many people that could contribute won’t contribute.

There is no need to trap content in CVS. All we are dealing with is text and images and there are plenty of tools that are easier to use. I recommend a wiki with WYSIWG (What You See Is What You Get) editing—these look and work like word processors except they are available anywhere you can get online via your browser. I personally don’t recommend using mark-up languages as even wiki mark-up is harder to use than WYSIWYG editors and is a barrier to contributions.

5. The so-called “Linus’s Law” is described by Eric S. Raymond. Eric S. Raymond, *The Cathedral and the Bazaar*, [online book] (Sebastopol, California: O’Reilly Media, 1999). <http://www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/>

6. For example <http://www.nongnu.org/cvs>

Free documentation should be well structured

Many projects are now setting up unstructured wikis for their developers and users as a base for writing documentation. At the moment, mediawiki is often used, although which specific platform gets used tends to depend on the winds of software fashion. These resources can be extremely good, however, I believe unstructured wiki content, with contextual navigation systems, is a poor substitute for well-structured content with a clear top-level index. Unstructured content is a good secondary documentation strategy and certainly useful for documenting the nooks and crannies of sometimes archaic interface issues or strange hardware-specific conflicts, however, it doesn’t replace content that is designed to document the software thoroughly with a clear and structured flow.

Tell it as it is

I have found that documentation written by developers can make the simple mistake of writing how the software should work and not how it does work. Writing free documentation should not be done from memory or done by those who cannot see the problems. Telling the user what is wrong with the software, what does not work and what could be improved is absolutely necessary. It is not bad-mouthing a free software to point out a quirk that should not be a quirk. It is far worse for potential users of that software if the user reads documentation that is inaccurate or glosses over these issues.

Make it look good

Documentation should be attractive to read. Over the years, free software developers have discovered that in order to interface with humans, software must look nice and allow the eye to easily engage with it. The same is true for documentation. Black text with blue links on a white background are not enticing. Embrace a layout that enhances readability but make sure it also looks good.

Quality

Now we come to the bugbear. Quality. What is good quality documentation? Some benchmarks include:

- no spelling mistakes
- set a style guide and stick to it
- make sure no steps are glossed over
- make sure the documentation is accurate

However, beyond the purely procedural there is the subjective issue of quality. There is no solid rule, the best you can do is to get people to read the content and tell you if it makes sense. If you belong to a community of contributors then look to peer reviews.

FLOSS Manuals and the pursuit of funky docs

It is easy enough to point out what is wrong with something and harp on about how it should be. It’s another issue to actually do something about it. In order to address this, I founded a not-for-profit foundation called FLOSS Manuals. We are a community of free documentation writers committed to writing excellent

documentation about free software. Anyone can join FLOSS Manuals and anyone can edit the material we publish. All content is licensed under a free license (the GPL (GNU General Public Licence)).

When we started (we officially launched in October 2007) there were, and still are, no good publication platforms for collaborative authoring. Some may say that there are too many CMS (Content Management Systems) already and surely, SURELY, there must be a CMS to meet our needs?

Well, no. The closer you get to collaborative publishing systems the further you stray from the functionality of most Content Management Systems. So we have hacked our way into the wonderful TWiki and developed our own set of plug-ins. TWiki has proven to be a very good platform for online publication. It has all the structured content features and user administration that makes it a good shell for authoring collaborative content. What was missing, and what is missing from other CMSs is good copyright and credit tracking, easy ways to build indexes, and a nifty way to remix content. We have remedied that now with our own custom plug-ins (available through the TWiki repository).⁷

Remixing

So, the word 'remix' may have caught your eye and you may have fleetingly thought 'remixing manuals?'. It might not seem intuitive at first glance but there are a lot of very good reasons why manuals are excellent material for remixing. I don't mean remix in the William S. Burroughs sense of cut-up—we do cherish linearity in the world of free documentation. I mean remix as in re-combining multiple chapters from multiple disparate manuals to form one document. Doing this enables the user to create manuals specific to their needs whether they be, for instance, learning by themselves, teaching classes or running inhouse training programmes.

The FLOSS Manuals remix feature (<http://www.flossmanuals.net/remix>) enables the remixing of content into indexed PDF and downloadable HTML with your own look and feel provided by Cascading Style Sheets. Now we have also added a Remix Application Programme Interface. This means that you can remix manuals and include them in your website by cutting and pasting a few lines of HTML. No longer is messy FTP necessary. This part of FLOSS Manuals is new and in test form, but so far it works very well. Combining remixing with print-on-demand is an obvious next step. It can be done now, as print-on-demand services use PDFs as their source material, but the trick is in getting it to look nice on paper.

Print-on-demand

In addition to the free online manuals FLOSS Manuals material is also turned into books via a print-on-demand service. The books look very nice, having been tweaked for print production, and they are available at cost price (we don't put any mark-up on books so they cost what the print-on-demand company charge to produce the book and send to the buyer). This is pretty exciting and I hope that we will soon see FLOSS Manuals on the bookshelves of retailers. Bookshops are, after all, a very important promotional venue for free software.

As I talk to people, I find that the physicality of books is the best way to get across the idea of what the FLOSS Manuals project is doing. Talking about a

7. There are still some things we need, in fact it's quite a long list, but piece by piece we are turning TWiki into a publication engine. Currently we are working on translation workflow features in plugin form. <http://twiki.org/>

website is one thing, but handing over a book sparks understanding and gets people excited. So books are an excellent promotional medium for FLOSS Manuals as much as for the free software itself (it is a symbiotic relationship after all).

Quality control

Lastly, a word on quality. These manuals aim to be better than any available documentation. (Sometimes this is not hard, as there is no available documentation!) When working with an open system maintaining this level of quality raises some interesting issues. Anyone can contribute to FLOSS Manuals—it is completely open. You need to register, but this is not a method for gating contributions, but so we can abide by the license requirements of the GPL to credit authorship.

Spam is an obvious issue with an open system, as is the possibility of malicious content. Incorrect or malicious information in Wikipedia might lead you to quote the wrong King of Scotland or may misinform you about the origins of potatoes, but incorrect information in documentation might lead you to wipe-out your operating system. So we have separated the 'backend'—where you can write manuals—from the 'frontend'—where you can read manuals.

Manuals in the 'Write' section are in constant development.⁸ However, the same manual linked from the front page will be in the 'stable' form, ready for use. This is managed by some existing TWiki tools we twisted together to form a simple one-step publishing system. It works like this—every manual has a Maintainer. A Maintainer is a person—a volunteer—who keeps an eye on that particular manual. Edits and updates are added to the Write section by anyone wishing to contribute. When the Maintainer thinks the manual is in good shape and an update is appropriate they push the 'publish' button and all the material is copied to the 'frontend' version of the manual. This way the reader gets stable reliable documentation and writers can continue working on documents without the reader being confronted by half-finished content. It's a simple and effective system.

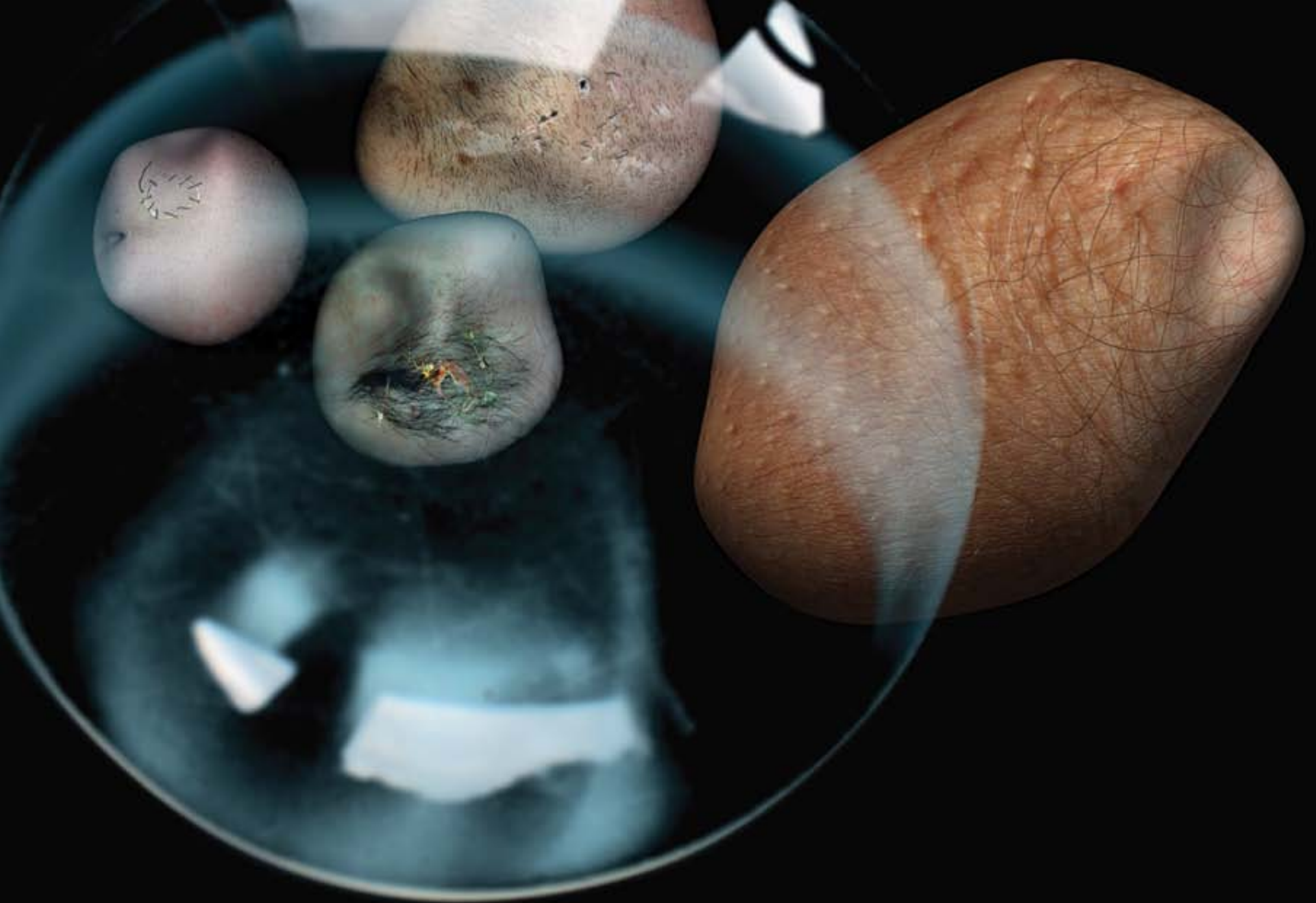
How you can help

Good free documentation is a necessary component of good free software. If you can't program, or don't want to, but you love free software then help make free documentation! We have a growing number of very talented contributors and Maintainers and good manuals available online, but we need more. Contributing is pretty easy. If you would like to be a part of helping create good manuals then register with the project and read our manual on FLOSS Manuals.⁹

Anyone can contribute: you can spell check documents, tidy up layout, test or review material, design icons, write, remix or improve material. Contribute in any way that you can and not only will you be helping to make the documentation better, you will be assisting in the development and spread of free culture and free software.

8. <http://www.flossmanuals.net/write>

9. <http://www.flossmanuals.net/register>



Interdisciplinary Moments: A History in Glimpses

Andrew Clifford

Digital art has a legacy interweaving the histories of visual art, media and screen culture, music, dance, theatre and science. Gathered here are a series of fragments that either recall an interdisciplinary spirit, or have clearly glimpsed it on the horizon.

Technological developments have shifted modes of practice. New media can require the artist, if that is what they call themselves, to look beyond their own artform into other fields; to act more like a director, corralling content and collaborators—including writers, designers, musicians, scientists, programmers and photographers—towards the final production. There are moments too where it would be tempting to generalise about the role of fabled kiwi ingenuity in projects requiring unconventional combinations of expertise and resulting in unusual collaborations. When support might not have been present within an artist's chosen practice but could be found in surprising new locations, new resources and expertise developed, along with new frameworks from which to think about cultural production, collaboration and authorship. This shift has often also meant moving beyond the usual modes and venues of presentation to create new spaces for new kinds of experiences.

The Happiness Acid

From film to sculpture to photography and batik, Len Lye's multi-stranded career looms large across any discussion of interdisciplinary art in New Zealand. Born in 1901, as a child Lye was fascinated by the mechanical motion of the lighthouse he lived in.¹ By the age of twenty he was deeply interested in tribal art and already considering ways to compose motion in the way "musicians compose sound."² On moving to Australia in 1922 he began experimenting with kinetic sculptures and scratching directly onto film. Fascinated by Aboriginal and Polynesian objects, he decided to focus entirely on "black art" rather than "Western style draftsmanship."³ After a brief return to New Zealand, he spent two years in Western Samoa and Australia, arriving in London in 1926. He completed his first film, *Tusalava*, in 1929. Hand-painted frame by frame, *Tusalava* is a greyscale animation of primordial, cellular forms, the result of both Lye's interest in tribal artforms and his incessant doodling, a habit he saw as being able to free the hand from conscious impulses and connect with the 'old brain'—subconscious memories of primal instincts and images.⁴

Lacking funding to pursue his projects, Lye had realised that by scratching, painting and printing directly onto individual film frames, he could do away with the need for a camera. He recognised the potential for a technique that would seem too jittery and unpredictable for traditional animators but could produce colours much more intense than those realised through conventional processing. Much of Lye's film output during the thirties was in the form of advertising for the General Post Office, tagged with exhortations to send letters by 2pm or use the right postcode. Although fitting the commercial imperatives of short advertisements shown in cinemas, these snappy vignettes, cut to music,

- 1: Len Lye, *Tusalava*, 1929, 10 minutes, 35mm film, 16 frames a second, b&w, silent, courtesy the Len Lye Foundation, Govert-Brewster Art Gallery, New Plymouth.
- 2: Len Lye, *A Colour Box*, 1935, 4 minutes, 35mm film, Dufaycolour, sound, courtesy the Len Lye Foundation, British Post Office, Govert-Brewster Art Gallery and the New Zealand Film Archive.
- 3: Len Lye, *Trade Tattoo*, 1937, 5 minutes, 35mm, Technicolor, sound, courtesy the Len Lye Foundation, Govert-Brewster Art Gallery.
- 4: TV Dinner: *Hommage to EAT (Food for Thought)*, a performance at the New York grand Street Y.M.X.W.H.A at the end of the 1967 Contemporary Voices in the Arts tour. At the table behind Lye are (left to right) David Vaughn, Robert Creedy and John Cage. On the far side of the table are (left to right) Stan VanDerBeek (standing), Jack Tworckov, Billy Kliver and Merce Cunningham and behind Lye with microphone is John B. Hightower, photo: Adelaide de Menil.



fig. 1

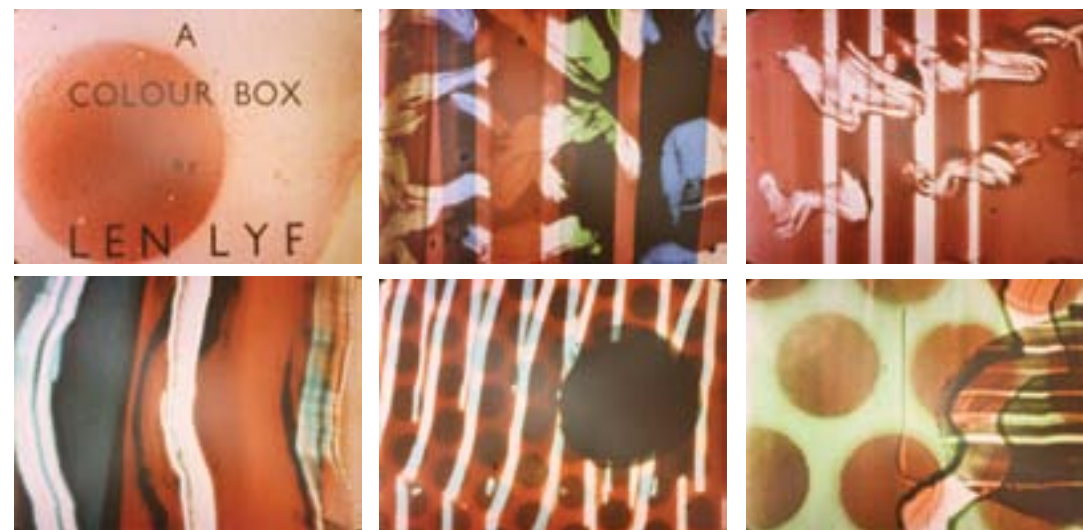


fig. 2



fig. 3

fig. 4

1. Roger Horrocks, *Len Lye: A Biography* (Auckland: Auckland University Press, 2001), 13.
2. Wystan Curnow and Roger Horrocks, "Introduction," *Figures of Motion* (Auckland: Auckland University Press, 1984), xi.
3. Curnow and Horrocks, "Introduction," xii.
4. Curnow and Horrocks, "Introduction," xiii.

gave him an opportunity to experiment with combinations of image and sound; much like later practitioners, who would cut their film-making teeth making promotional videos for bands.

Lye was also experimenting with photograms, directly exposing objects onto the light-sensitive surface of photographic paper without a camera.⁵ In the late 1940s, having moved from London to New York, he produced photogram portraits of his friends, including painters Joan Miró and Georgia O’Keeffe, architect Le Corbusier and poet W. H. Auden. He had his first exhibition of kinetic sculptures at the Museum of Modern Art in New York in 1961; a one-night showcase featuring ten models of his motorised steel constructions that crashed, flipped and wobbled their way through choreographed sequences accompanied by recordings including that of music by Pierre Boulez and African drumming.⁶ These dancing machines provided more tangible ways of composing motion, articulating energy through the steel’s ephemeral harmonic forms. Lye also showed at the Howard Wise Gallery, which was presenting high-tech work by such artists as Nam June Paik, Group Zero, Pol Bury and Billy Apple, but by 1967 Lye stopped developing new pieces, preferring to focus on theory and plans for enormous works that exceeded the material technologies of the time.⁷ His writing ranged from poetry, prose and word-games to auto-biographical anecdotes and sense-based reminiscences; from manifestos and essays to theories of art, television, film, genetics, and anything else that sparked his active brain.⁸

It was around this time that Lye participated in a lecture tour of New York State campuses with an eclectic group of six others, including composer John Cage, poet Robert Creeley, choreographer Merce Cunningham and electronics engineer Billy Kluver, who was then the organiser of EAT (Experiments in Art and Technology, Inc.). These kindred spirits, who already knew each other in New York, by day lectured in classrooms, by night combined to present chaotic, multi-sensory happenings.⁹

A New Vocabulary

In the late 1950s, Frederick Page, then Professor of Music at Victoria University College in Wellington and a keen follower of new developments in Europe, played a recording of Karlheinz Stockhausen’s landmark 1956 electronic composition *Gesang der Jünglinge* to New Zealand’s pre-eminent composer, Douglas Lilburn.¹⁰ Lilburn was already a nationally celebrated senior composer with two symphonies under his belt and a third nearly finished. He described the new electronic medium as a “zombie on the horizon,” worrying it would condemn him to “musical inconsequence” if he could not keep up with new developments.¹¹

1961 was a pivotal year for Lilburn, who not only completed his third symphony but also produced his first tape composition: incidental music to accompany Allen Curnow’s play *The Axe*. Lilburn was no stranger to working collaboratively in order to step outside the boundaries of conventional musical presentation. New Zealand writers continued to play a key role in Lilburn’s electronic works. His 1965 treatment of Alistair Campbell’s poem *The Return* was his first major electronic work and featured experiments such as wrapping cellophane around the tape drives. As early as 1949 he was involved in an expedition to Mt Aspiring with poet James K. Baxter, photographer Brian Brake and artist John Drawbridge.¹² Led by Brake, with support from the National Film

5: Douglas Lilburn in the Electronic Music Studio at Victoria University, Wellington, 1969, Dominion Post Collection, Alexander Turnbull Library, ref. EP/1969/3689/18.
6: Detail, Electronic Music Studio at Victoria University.



fig. 5



fig. 6

5. Horrocks, *Len Lye: A Biography*, 236 – 237.
6. Horrocks, *Len Lye: A Biography*, 288 – 289.
7. Horrocks, *Len Lye: A Biography*, 287.
8. One lecture Lye delivered was titled “The Absolute Truth of the Happiness Acid”, referring to nucleic acids (DNA), see Horrocks, *Len Lye: A Biography*, 340.
9. Horrocks, *Len Lye: A Biography*, 321 – 323.
10. Chris Bourke, “Douglas Lilburn: An Interview,” *Music in New Zealand* 31, (Summer 1995/1996): 35.
11. Philip Norman, *Douglas Lilburn: His Life and Music* (Christchurch: Canterbury University Press, 2006), 199.
12. Gregory O’Brien, “High Country Weather,” *New Zealand Listener*, vol. 203, no. 3447, 3 June (2006): 35.

Unit, they attempted to create a collaborative multi-media documentary, but bad weather postponed filming after only a few days and the project was later abandoned after the death of one of the actors.

Electronic music held several advantages for Lilburn: it made him less reliant on performers, allowing him a freedom from unsympathetic musicians who might not appreciate a work's more challenging aspects, and it expanded the palette he was able to call upon, introducing new aural textures and environmental sounds, which he considered far more appropriate for evoking the local landscape and indigenous themes than classical instruments with their European associations.¹³

In 1963, Lilburn, by then Associate Professor of Music at Victoria, took a short sabbatical. The trip mostly focussed on visiting electronic studios: in Toronto he met Boyd Neel and Myron Schaeffer, in New York he visited the Columbia-Princeton studios, in London he visited the BBC Radiophonic Workshop as well as Workshop founder Daphne Oram's own studio, and he experienced Stockhausen's teaching in Darmstadt. After spending an additional three months at the University of Toronto, where he studied with Schaeffer and produced a number of studio sketches, he returned home. He then quickly set to work securing surplus and abandoned equipment from the New Zealand Broadcasting Corporation (NZBC) and the Victoria University Physics Department. With the help of enthusiastic NZBC Technical Officer Wallace Ryrrie, he set himself up in a vacant basement at Victoria with borrowed gear and a can-do attitude to establish what has been described as "the most advanced electronic music studio in the southern hemisphere, outclassing anything in both Australia and Britain."¹⁴ A later upgrade was overseen by staff of the Department of Scientific and Industrial Research, with added know-how provided by the Victoria Computer Centre.¹⁵ This facility became a site of pilgrimage for a new generation of composers, including Jack Body, John Cousins, John Rimmer and Phil Dadson, many of whom then went overseas to learn more, returning to set up their own studios in other parts of the country.¹⁶

Television goes live at agricultural showcase

The Auckland Agricultural & Pastoral Association's shows, held since 1843, have predominantly been known as a display of agrarian prowess, featuring wood-chopping competitions and livestock exhibits, but they have also been an important showcase for New Zealand industry.

Although New Zealand television broadcasting officially began in black and white in June 1960, there had been experimental broadcasts throughout the 1950s. The New Zealand Broadcasting Service ran closed-circuit demonstrations in 1951 and Canterbury University College licensed their own self-built transmitter in 1952, but without many receivers in homes, audience was limited. Some of the first moving image transmissions to reach a substantial audience took place at the Royal Wellington Show and the Auckland A&P Easter Show in 1954, seen by an estimated 275,000 people. In the absence of a government commitment to the new medium, demonstrations and experimental broadcasts were also undertaken by private individuals and companies, including Pye and the Bell Radio-Television Corporation, both motivated by the desire to sell TV sets. Programming included quiz shows, sports simulcasts, medical operations,

13. Bourke, "Douglas Lilburn: An Interview," 35.

14. Tom Rodwell, "Space Waltz," *New Zealand Listener*, vol. 196, no. 3368, 27 November (2004): 44 – 45.

15. Douglas Lilburn, "EMS/VUW: A Personal Note," in *Douglas Lilburn Complete Electro-Acoustic Works*, ed. Wayne Laird and Jack Body (Auckland: Atoll, 2004).

16. Jack Body, interview with the author, 5 October 2001.

political addresses and 'educational' material from oil companies and airlines.¹⁷

Television promised to distribute and democratise culture, bringing images, entertainment and information from around the world into the homes of anyone who could afford a set. Although television came to be uniformly installed in living rooms, isolating the passive viewers arranged around this oracular presence,¹⁸ these early A&P Show demonstrations seem to anticipate a more interactive future for the medium, conflating community events into a strange mix of live, pre-recorded and simulcast components.

The NZBC previewed its permanent colour television service at the 1973 Show. As well as setting up a 200-seater theatre for viewers, colour monitors were placed at strategic points around the expo pavilion. The 1973 guide also carried a full-page ad for a "Colour Television Exhibition and Electronic Sound Display" to be held at the Mandalay in Newmarket, sponsored by The Television Electronic Service Association (TESA) and involving a roll-call of early consumer electronics companies (Philips, Murphy Colour Television (Fisher & Paykel), Majestic, AWA, Shaft, Pye, Sanyo, Bell Radio—TV, Orion and Sonophone), all eager to sell the virtues of television to the public and open visual portals to the nation's living rooms. Although A&P Shows were considered a means for townies to keep in touch with their rural heritage, there is little doubt that, for a period, they became a commercial forum for parading the biggest brands with the flashiest, newest technologies.

Building the Brand

Another seemingly incongruous feature of the A&P shows was the art competitions. Better known for such handicrafts as wood-carving and lace-making, participants were also able to demonstrate draughtsmanship in pencil, watercolour, and oils, and at least as early as 1910 the Auckland Winter Show was staging a photography exhibition.¹⁹ A young Barrie Bates took a number of prizes in the 1958 Easter show, including first prize for poster and catalogue design, book jacket design, pencil still-life, pen or wash study and dinner plate design.²⁰

Bates left New Zealand for London in 1959, eventually changing his name to Billy Apple. Studying design at the Royal College of Art, Bates challenged the institution by working more like an art director than an artist, sub-contracting his production to staff in the sculpture foundry, ceramics school, fashion school, typography and photography departments; a "hands off and head on" approach still integral to his practice.²¹ Billy Apple recalls the RCA also had a film school but that they didn't actually have any movie cameras yet. Nevertheless, Bates' early works photographically documenting performers shaving, bathing, shampooing, and drinking were envisaged as storyboards for potential film pieces.²²

His final student work was also his last as Barrie Bates: a re-branding exercise with the artist bleaching his hair, eyebrows and eyelashes blonde, titled *Billy Apple Bleaching with Lady Clairol Instant Cream Whip, November 1962*. In addition to photographic documentation, later pieces were recorded on film, including the 1970 *Manhattan Street Glass Accumulation*, broadcast on the American Broadcasting Corporation's 6pm TV news. Other glass pieces were recorded on audio tape in collaboration with New Zealand-born composer Annea Lockwood.²³ Works recording everyday activities such as window cleaning, floor washing, nose blowing and bowel movements challenged the division

17. Robert Boyd-Bell, *New Zealand Television: The First 25 Years* (Auckland: Reed Methuen, 1985), 61 – 71.

18. Laurence Simmons, "Television Then," in *Television in New Zealand: Programming the Nation*, ed. Roger Horrocks (Melbourne: Oxford University Press, 2004), 44 – 73.

19. Agricultural, Pastoral & Industrial Shows Board, *Winter Exhibition Show Guide* (Auckland: The Auckland A&P Association, 1910), 93.

20. Agricultural, Pastoral & Industrial Shows Board, *NZ 1958 Easter Show Catalogue and Programme* (Auckland: The Auckland A&P Association, 1958), 101 – 105.

21. Billy Apple, interview with the author, 9 October 2005.

22. Billy Apple, conversation with the author, 7 September 2007.

23. Douglas Maxwell ed., *From Barrie Bates to Billy Apple* (London: Serpentine Gallery, 1974), 54 – 55.

24. Paul Stitelman, "From Barrie Bates to Billy Apple: An Overview," in *From Barrie Bates to Billy Apple*, ed. Douglas Maxwell (London: Serpentine Gallery, 1974), 1 – 3.

25. The Poster for this event stated that "Billy Apple presents" 'A' (for Apple), a film produced by Cammell [sic] Hudson Associates Limited, 'The Apple', produced by TV Cartoons Limited, and 'Billy's Apple and Friends', produced by Appthorp/ Craddock.

between art and life, artist and audience—the distinction being the artist (the brand) who transforms these activities into something else.²⁴

On 29 October 1963, just prior to leaving London for New York, Billy Apple staged a one-night event, *Motion Picture Meets the Apple*, at the Institute of Contemporary Arts. The focus was the screening of his first complete moving-image work, *Billy's Apple and Friends*. The New Zealand Apple & Pear board provided boxes of apples, Bulmers provided two types of cider, and the 16mm film *Billy's Apple and Friends* was shown with two others²⁵ in a continuous television-style programme of screenings, interspersed with found apple-related footage including television commercials, horticultural documentaries and dentists endorsing apples. The resulting show-reel was a kind of typological, keyword-driven zeitgeist-montage now easily recreated with the results screen of an Internet image search.²⁶

In New York, Billy Apple made headlines with his pioneering use of new technologies, a preoccupation perhaps attributable to his early ambition to be an engineer and an aversion to turpentine.²⁷ His first New York solo show was *Apples to Xerox*, which used the toning capabilities of this new process to create a silkscreen-like result on fabric that was then stretched like a painting. A year later, in 1966, a Ford Foundation Fellowship took him to Idaho, where he was hosted by scientist Robert Nertney, second-in-charge at the nearby Atomic Energy Commission research facility. Nertney produced works for Billy Apple on the facility's photocopier and related his experience of attending a UFO crash site, thus inspiring Billy Apple's 1967 *U.F.O. (Unidentified Fluorescent Objects)* show. Nertney later contributed the foreword to the catalogue of a Billy Apple neon exhibition at the Pepsi Cola Gallery, New York, a show which put Billy Apple on the front page of the New York Times. Many other artists in New York were also working with emerging technologies at this time, including Nam June Paik and Robert Rauschenberg who was collaborating with Bell Telephone Labs. Over the next few years there was a string of group shows across the USA and Europe focussing on electric art and including Billy Apple's neons.²⁸

In 1969, Apple established his own gallery, 161 West 23rd Street, one of New York's first non-commercial, artist-run galleries.²⁹ From here he was able to experiment more freely, bringing an increasingly conceptual approach to his use of space. In a 1970 exhibition he bounced a laser light between pillars and walls to delineate new surfaces while later shows involved more quotidian carpet removal, vacuuming and window cleaning. In February 1972 he staged what he describes as a 'mental retrospective', counting, cataloguing and often destroying the works he had accumulated at his gallery, but not displaying any. A few months later he created the video and audio tape work *Alpha State* at the Montefiore Hospital and Medical Centre, where he recorded himself transmitting Alpha Waves from electrodes attached to his head.³⁰

In what could be considered a return to those early A&P show beginnings, Billy Apple is now working with horticultural researchers, apple growers and Saatchi & Saatchi to produce and market his own distinct breed of apple.³¹ Throughout his career he has been quick to experiment with new technologies, but only as a means to an end. Much like in the world of advertising where he once worked, it has always been a case of finding the most effective tool—be it drawing, photography, laser or ozone generator—to convey an idea.

7. Billy Apple with Neon Floor #1, Apple, 161 West 23rd Street, New York, November 20 – December 7, 1969. Argon, neon and mercury gas discharge tubes.
8. Billy Apple, *Ozone #2: Low Room Temperature*, Apple, February 21 – 22, 1970. Three ozone generators with slide projection of previous installation *Ozone #1: High Room Temperature*, October 25 – 26, 1969. The ozone produced in the closed, heated or chilled space made objects appear blurred, an effect combined with a distinctive air quality described by Apple as being like the aftermath of an electric storm.
9. Billy Apple, *U.F.O.s (Unidentified Fluorescent Objects)*, Howard Wise Gallery, New York, November 11 – December 2, 1967. Argon, neon and mercury gas discharge tubes.
10. Billy Apple, *Laser Beam Wall*, Apple, February 7 – 8, 1970. Helium-neon laser and front surface projection mirrors. Produced in association with Dr Stanley Shapiro, physicist at General Telephone and Electronics and, in 1969, co-inventor of the supercontinuum generated broadband white light laser.

26. Billy Apple, conversation with the author, 25 September 2007.
27. Robert Pincus-Witten, "A Times Square of the Mind," *Time*, 18 March (1966). <http://www.time.com/time/magazine/article/0,9171,941980-2,00.html>
28. Billy Apple, conversation with the author, 3 December 2007.
29. Although originally named for its address, the gallery became known as Apple in order to appease the protocols of some publications' free exhibition listings. Billy Apple, conversation with the author, 7 September, 2007.
30. Maxwell ed., *From Barrie Bates to Billy Apple*, 46.
31. Christina Barton, "Billy Apple," in *Speculation*, ed. Brian Butler (Auckland: Venice Project, 2007), 196.



fig. 7



fig. 8



fig. 9



fig. 10

Rewiring the gallery

As art moved away from self-contained, singular pieces in the 1970s (a movement known in New Zealand as post-object art) technology helped it reconstruct its role in the gallery—or escape the gallery altogether. Rather than presenting static works, artists would set up interactive environments, stage performances, or present recordings of events that took place elsewhere. As well as providing documentation, these devices allowed artists or participants to have experiences detached from the physical performance, such as the disembodied voice of a walkie talkie.³² Duration also became a significant factor, evidenced by artists staging dawn-to-dusk endurance events or fleeting activities that could only be seen after the fact through documentation.

Concerned with processes rather than products, and situations rather than aesthetics, artists sought to engage with lived experience where anything could be the raw material of art, and viewers actively participated in the creation of meaning.³³ Underlying the work of this era is a sense of democratisation, opening up the potential of everyday objects to replace precious art materials, closing the gap between the artist (as creator of the work) and the audience. Post-object art extended the range of production and presentation, rupturing the division between what happened in the everyday and what occurred within the gallery. In the case of David Mealing's 1975 *Jumble Sale: A Market Place*, the artist opened the ground floor of the Auckland Art Gallery to stallholders, repurposing the open spaces of the gallery for a more informal and unsublimated exchange of value. Significantly, the work's success as a social sculpture relied upon the public's sincere support and engagement with the project as more than viewers.³⁴

Co-edited by critic Wystan Curnow and teacher-artist Jim Allen, the 1976 book *New Art* is a good start for considering this period—in large part because it captures and fixes the practices of artists whose work is otherwise difficult to access, mostly due to its contingent, ephemeral nature.³⁵ It begins with a dedication to Len Lye. Projects featured include Kieran Lyons' *Superimpression*, which wired participants up for sensory tests using tape loops and closed-circuit television broadcasts on behalf of the anonymous corporate entity E-Z-GRO; Leon Narbey's neon light environments; Bruce Barber's Whatipu Beach and Mt Eden Crater group performances using walkie-talkies, megaphones, portapack video and audio recorders and Maree Horner's *Chair* which electrified an armchair using a battery and electric fence unit. Many works documented in *New Art* took place as performances at the Auckland City Art Gallery, part of a programme of contemporary artists' projects. This was fostered by Allen's ally, gallery exhibitions officer John Maynard, giving radical art by emerging artists (mostly Allen's students) major institutional endorsement. Other key artists of the time not featured in *New Art* include Andrew Drummond, who conducted solitary rituals in remote sites, Pauline Rhodes, who would make fleeting interventions in the landscape, and Di Ffrench, who would freely shift between performance, sculpture and photography.

Allen's own contribution to *New Art* was his group performance *Contact*, staged at the Auckland City Art Gallery as part of the 1974 exhibition *Four Men in a Boat*. *Contact* comprised three parts: *Computer Dance*, *Parangole Capes* and *Body Articulation/Imprint*. Set in an intentionally disorientating environment of flashing lights and cobweb-like hanging strings, *Computer Dance* required eight

11: Billy Apple, *Alpha State: A Video and Audio Tape Work*, Montefiore Hospital and Medical Centre, Bronx, New York, May 18, 1972. "Session began at 4:16pm and ended at 5:01pm. It was conducted by psychologist Dr Gene Smith. I lay motionless on a bed. Electrodes attached to my head transmitted Alpha Waves. The Alpha State is between beta (consciousness) and theta (light sleep). It is a condition of receptivity and acceptance without conscious effort. To achieve it and stay in it one must not seek it. Production of Alpha waves was signified by a buzzer sounding." (Billy Apple, 1972)

32. Tony Green, "New New Zealand 'New Art,'" in *Intervention: Post Object and Performance Art in New Zealand in 1970 and Beyond*, ed. Robert McDougall Art Gallery (Christchurch: Robert McDougall Art Gallery and Annex, 2000), 61–63.
33. Christina Barton, "Framing the Real: Postmodern Discourses in Recent New Zealand Art," in *Headlands: Thinking Through New Zealand Art*, ed. Mary Barr (Sydney: Museum of Contemporary Art, 1992), 173–175.
34. Bruce Barber, "The Gift in Littoral Art Practice," in *Intervention: Post Object and Performance Art in New Zealand in 1970 and Beyond*, ed. Robert McDougall Art Gallery (Christchurch: Robert McDougall Art Gallery and Annex, 2000), 51.
35. Wystan Curnow and Jim Allen, *New Art: Some Recent New Zealand Sculpture and Post-Object Art* (Auckland: Heinemann Educational Books, 1976); see also Green, "New New Zealand 'New Art,'" 59.

fig. 11 (left)





fig. 12

(four male, four female) scantily-clad, blindfolded participants to connect their respective infra-red emitter and receiver units by painstakingly lining up the beams. Contact was confirmed by a shrill tone from a chest-mounted speaker.³⁶

For those in the North Island, Jim Allen's sculpture department at the Elam School of Fine Arts was the locus of much of this activity. Allen—who helped establish an international context for the school, bringing visiting artists in to teach—himself began gathering international experience and contacts while studying at the Royal College of Art (1949 – 1952). On returning, he worked for the Education Department before becoming head of sculpture at Elam. This experience, especially working with children in provincial communities, led to a distinct approach to both his teaching style and his art-making—establishing open, social situations for interactive and critical dialogue, rather than asserting specific skills.³⁷ The establishment of a serious library at Elam, with a focus on periodicals, also helped students keep up-to-date with overseas developments.³⁸

Of particular interest to Allen was the field of cybernetics, defined in Jasia Reichardt's seminal exhibition *Cybernetic Serendipity* (1968, ICA London) as "systems of communication and control in complex electronic devices like computers, which have very definite similarities with the processes of communication and control in the human nervous system."³⁹ Allen encountered this show in London during a sabbatical that took him to Europe, Mexico, and the United States. In London he also experienced the work of kinetic and conceptual artists, especially South Americans Lygia Clark and Hélio Oiticica.⁴⁰ This influence can be seen in Allen's *Parangole Capes* performance, echoing Oiticica's expansion of pictorial space by enveloping the viewer within the work, its title borrowed from Oiticica.⁴¹ While in the States, Allen met Len Lye and Billy Apple, who had both had little contact with New Zealand at that time.⁴² During this formative trip Allen also had first-hand encounters of riots and student protests in France, England and the USA. In retrospect, it seems clear that Allen's experience of this turbulent political milieu connected with the radical new art he found. For Allen, as well as making connections between science and art, *Cybernetic Serendipity* sparked an interest in psychological and social processes that would have a lasting effect on his work.

World-wide Networks

At 6pm Greenwich Mean Time on 23 September 1971, people in fifteen different locations around the world simultaneously participated in Phil Dadson's *Earthworks* composition. The performers, mostly unknown to Dadson or each other, were mailed audio tape, film and instructions to document the weather, the conditions of the immediate earth and air, sounds of the environment, information about the tidal, solar and lunar cycle, the local time and a description of the location. This international, ten minute performance was planned to coincide with the equinox—spring in the southern and autumn in the northern hemisphere, a time when the sun is directly above the Earth's equator and day and night are of equal length in most places.

Unlike contemporary equivalents, such as global internet chat or webcam hook-ups, at the time of *Earthworks*, Dadson did not know if anyone was participating beyond the group he had assembled in New Zealand. Dadson's local team used the central North Island's volcanic plateau as a site to observe and

36. Jim Allen, "Contact," in *New Art: Some Recent New Zealand Sculpture and Post-Object Art*, ed. Wystan Curnow and Jim Allen (Auckland: Heinemann Educational Books, 1976), unpaginated.

37. Christina Barton, "In and Out of Sight/Site: Jim Allen and the World Picture," paper presented at *Crossing Horizons: Context and Community in the South*, the South Project conference, Santiago gathering, 3 October 2006. http://www.southproject.org/Santiago/Biographies/Barton_paper.htm

38. Wystan Curnow and Robert Leonard, "Contact: Jim Allen Talks to Wystan Curnow and Robert Leonard," *Art New Zealand* 95 (Winter 2000): 49.

39. Green, "New New Zealand 'New Art,'" 61 – 63. See Jasia Reichardt, "Cybernetic Serendipity" [exhibition statement] (London: Institute of Contemporary Art, 1968), reproduced at: <http://www.medienkunstnetz.de/exhibitions/serendipity/>

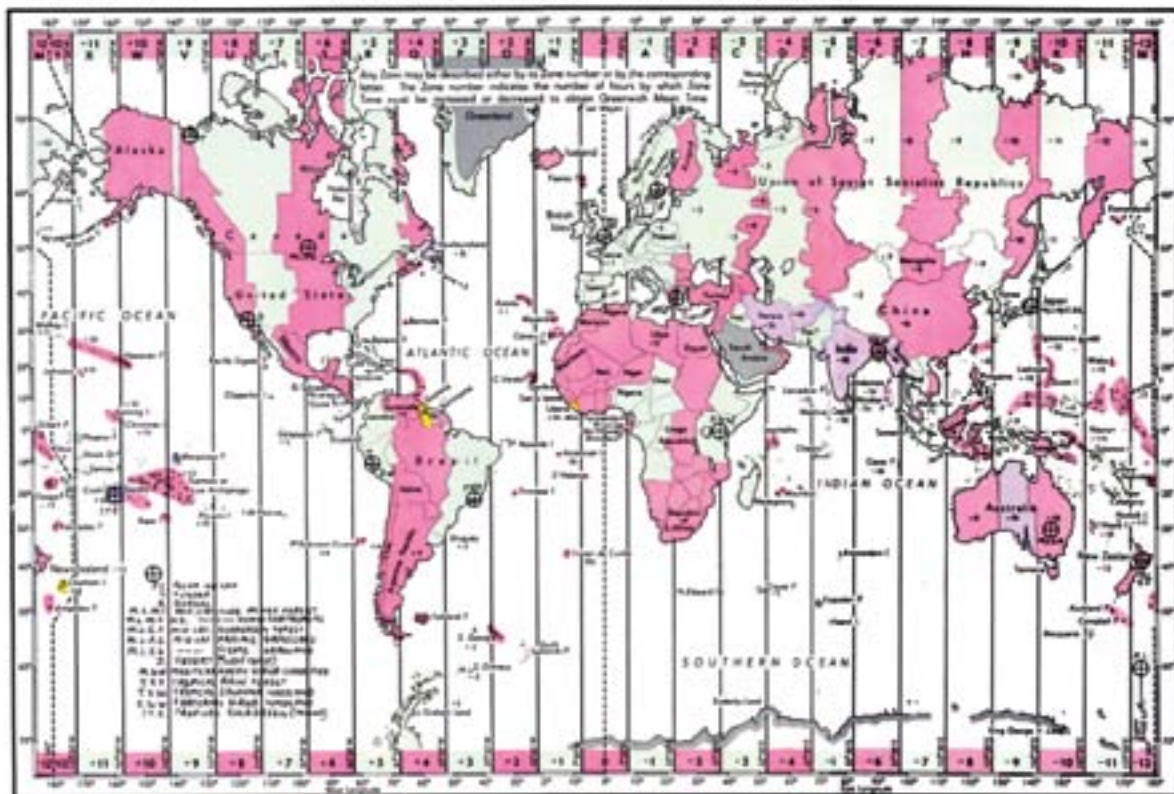
40. Curnow and Leonard, "Contact: Jim Allen Talks to Wystan Curnow and Robert Leonard," 51.

41. Barton, "In and Out of Sight/Site: Jim Allen and the World Picture."

42. Curnow and Leonard, "Contact: Jim Allen talks to Wystan Curnow and Robert Leonard," 50 – 51.

TIME ZONE CHART

This chart shows the Zone Times kept at sea and the time normally kept on land.



13: Phil Dadson, *Earthworks: A simultaneous global linkup in real time*, 23/24th September 1971. Time zone chart indicating location of the participants instructed to make synchronised ten-minute audio tape recordings and a series of photographs. Photos: Brian Porter, Antarctica, 6am, 23 September; Jim Baltaxe, Rarotonga, 7.30am 23 September; Ken Friedman, San Diego, USA; 10am, 23 September.

Interdisciplinary Moments: A History in Glimpses

record New Zealand's place in the "universal ebb and flow."⁴³ Of the fifteen countries invited, completed documentation later arrived from Australia, Sweden, England, San Diego, Rarotonga and Antarctica (Canada was left out because their instructions arrived two days too late). As well as being an observation of planetary rhythms, *Earthworks* is intended as an exploration of media, designed to capture results characteristic of the different tools and materials available.⁴⁴

Earthworks adopts the performative and postal strategies typical of Fluxus activities, whilst also evoking Nam June Paik's exploration of broadcast media.⁴⁵ Dadson was familiar with Paik, having seen him perform in London in the late 1960s. While in London, Dadson had established an association with composer Cornelius Cardew through an experimental music course Cardew was teaching at Morley College, which attracted not only musicians but also visual artists and theatre people. This brought a conceptual edge to the course, further influenced by Cardew's Fluxus colleagues who would often participate, favouring a playful, task-based approach to performing that didn't emphasise instruments or ability. The Morley cohort became the foundation for Cardew's Scratch Orchestra, which, on his return, led to Dadson establishing a New Zealand Scratch Orchestra back in Auckland.⁴⁶

Performance only became a major strand in contemporary art last century but, conversely, it is only in the last century—since the invention of recordable media and programmable instruments—that performance has ceased to be an intrinsic part of music. Bearing in mind these trajectories, it is probably no coincidence that artists such as Phil Dadson and John Cousins established careers with equal footprints in the worlds of music and art at a time when those paths crossed. Both took encouragement from Lilburn's electronic work and both executed performance works in outdoor environments, but Cousins' practice has become increasingly studio-based whereas Dadson continues to explore environments through improvisation.

Although primarily known and trained as a composer, Cousins' work has been as much about actions, ideas and images as it is sound. Like Dadson, time plays a key role in Cousins' pieces, particularly in regard to bodily endurance. Installation works like the *Sunwalk* series (1989) and *Reciprocal Transverses* (1988) document his experience of the turning of the earth through shadow, stride and breath, using slides, video and recorded sound.⁴⁷

Cousins is interested in the sound of things, of humans and their experience of and relationship with the natural world. Recording technology has allowed access to a range of sounds previously inaccessible to composers and performers of traditionally notated music. In works like *Harp at Arthurs Pass* (1991) he sets up devices (in this case tripod-suspended bowls of water that visually and sonically amplify the passing of the sun and air-currents) to evoke and extend our perception.⁴⁸ In works like *Membrane* (1984) and *Bowed Peace* (1986), this extension is more literal, extrapolating and supplementing the functions of the body through apparatus that could be considered a cyborg hybrid of human and machine.⁴⁹ For *Bowed Peace*, Cousins is stretched over a sling, with the sound of his heart amplified. Raising his body through a system of pulleys, he can bring himself to a position where he can read from a text, although the exertion of doing this makes the reading difficult for more than just short extracts.

43. Dadson, "Earthworks," in *New Art: Some Recent New Zealand Sculpture and Post-Object Art*, ed. Wistan Curnow and Jim Allen (Auckland: Heinemann Educational Books, 1976), unpaginated.

44. Phil Dadson, conversation with the author, 31 July 2007.

45. This furthers Paik's vision, stated in his 1973 *Global Groove* video, of a future global society where any TV station on earth is accessible and where there is no division between art, life and technology. Anne Kirker, "Nam June Paik—Whimsical Encounters Without End," in *APT 2002: Asia-Pacific Triennial of Contemporary Art*, ed. Lynne Seear (Brisbane: Queensland Art Gallery, 2002), 78–81.

46. At Elam, Dadson worked with Jim Allen in the sculpture department to create an *Intermedia* option at the school, a time-based discipline exploring the connection between image, sound and performance, which eventually became a subject in its own right and the source of many media events. Phil Dadson, interview with the author, 19 October 2003, originally recorded for Radio New Zealand.

47. Pat Unger, "Christchurch," *Art New Zealand* 51 (Winter 1989), 47.

48. Jonathan Bywater, "Natural Choices: The Art of John Cousins," *Music in New Zealand* 29 (Winter 1995), 14–19.

49. Donna Haraway, "A Cyborg Manifesto," in *Simians, Cyborgs, Women: The Reinvention of Nature* (New York: Routledge, 1991), 149–181.

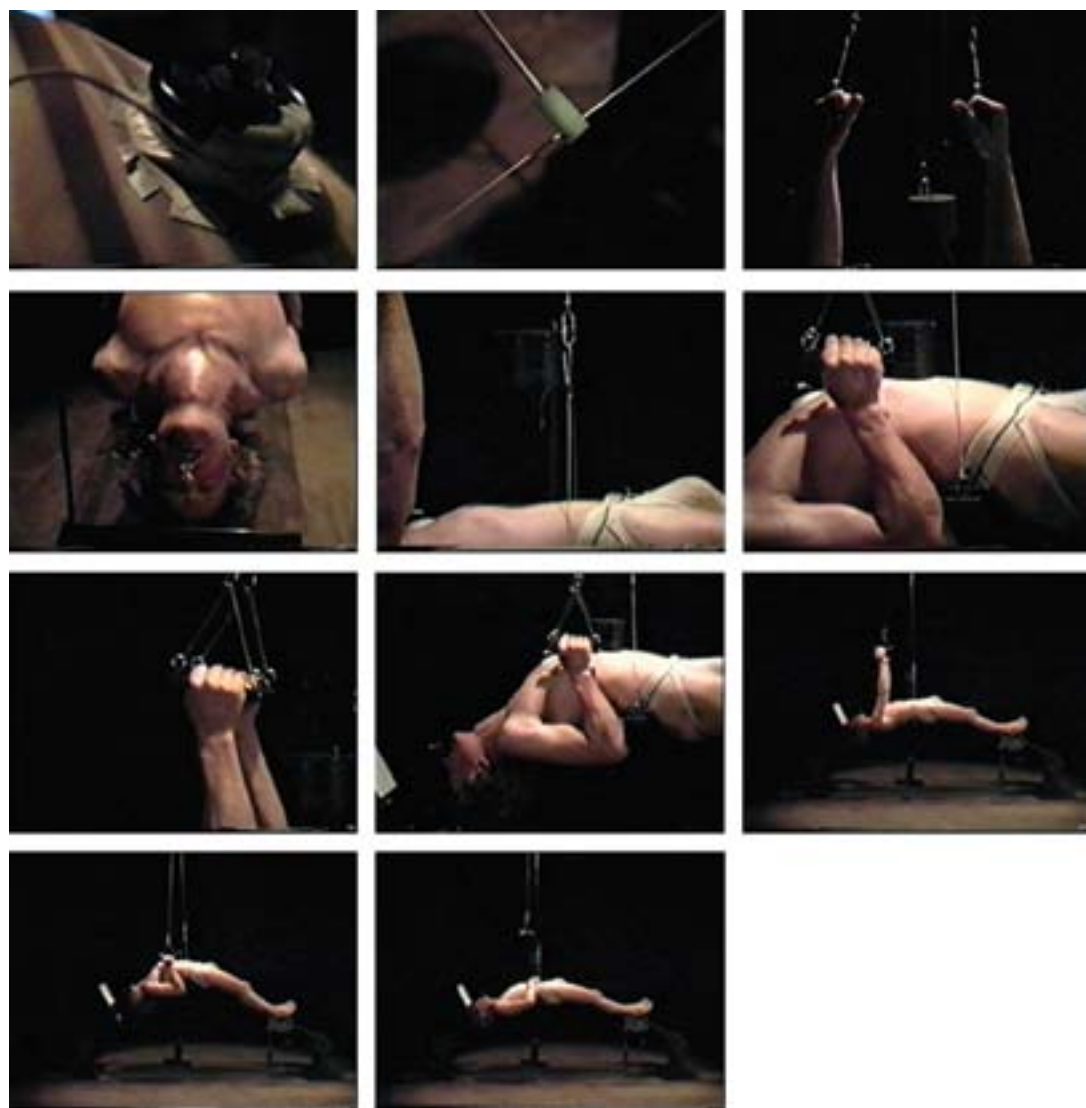


fig. 14

Interdisciplinary Moments: A History in Glimpses

Membrane uses the urinary cycle to create chiming, aleatoric percussion music, again using an organic, hydraulic machine that he is harnessed to as the central processing unit, consuming, processing and outputting biological data.

Good Vibrations / Tellurian Love

Whether psychedelia is invoked to describe a musical genre, trippy light shows or the fashions of the late 1960s and early 70s, a druggy, non-conformist counter-culture, combined with growing political unrest permeated the arts. This was a period of expanded possibilities and cross-pollination where rock bands were taking inspiration from the structures of jazz and classical music (and vice-versa), happenings involved poetry, theatre and performance art, and artists produced experimental light shows and stage sets. In Europe in the 1970s, environmental and expanded cinema artist Jeffrey Shaw worked on rock shows for Pink Floyd and Genesis, while in New Zealand Raewyn Turner was doing lighting design for Split Enz. Electric instrumentation was evolving, providing new sound palettes for mind-expanding music, and cybernetic, kinetic and electric-art survey shows proliferated.

As the exploratory musical tendencies of psychedelia evolved into more technically-focussed progressive rock in the northern hemisphere, most New Zealand 'prog' took the form of extended Hendrix-influenced heavy blues jams, rather than the complex, extended structures typified by the likes of Yes, Frank Zappa or King Crimson. One notable exception is Alastair Riddell's *Space Waltz*, a group melding the progressive tendencies of Yes, the glam rock of Roxy Music and the effeminate stage theatre of David Bowie. Riddell, who was studying art history at the University of Auckland and was closely associated with the scene at Elam, shocked conservative critics with his glittering, long-haired androgyny. In the 1960s he had been observing developments from the likes of Stockhausen and experimenting with tape loops, and sound textures, experiments which never saw public performance or release but brought an edge to his later work. His early 1970s group Orb, with drummer Paul Crowther and keyboard player Eddie Rayner (who used one of country's first synthesisers, hand-made by Crowther) evolved into the band *Space Waltz*.⁵⁰ In contrast to the ubiquitous blue denim of the day, on stage *Space Waltz* wore custom suits made by Riddell from curtains, anticipating the now-famous look of Split Enz (who eventually poached Rayner for their own group, along with Mike and Geoff Chunn, Wally Wilkinson and Crowther, who had all previously played with Riddell). *Space Waltz* songs featured lyrics based on science fiction stories by Riddell about an imaginary planet named Telluria, populated by droids and genetically engineered, androgynous clones.⁵¹

Although their first release, 1974 single *Out on the Street*, was New Zealand's first indigenous number one in many years, the band barely outlasted the release of their 1975 self-titled album, which remains one of New Zealand's only serious concept albums of the era. Whereas albums were once collections of songs recorded in a day or two, they became a platform for elaborate compositions reliant on a studio-based layering of sounds that could take weeks or months and had a distinct existence, separate from a group's live routine. Supporting this development was the evolution of recording technology and an increasing use of the studio to shape production, rather than as a simple tool to capture the sound of a live band. In recording the *Space Waltz* album, Riddell wrestled with

50. Alastair Riddell, interview with the author, 9 May 2002, originally recorded for Radio New Zealand.

51. Alastair Riddell, interview with the author, 9 May 2002, originally recorded for Radio New Zealand.



fig. 15



fig. 16



fig. 17



fig. 18

an old system that saw the record company appoint a producer to deliver the product they wanted. Whereas traditionally musicians were essentially treated as contractors with their input expected to end with the performing of their songs, Riddell was from a new generation of artists with his own vision of what he wanted to achieve in production and presentation. The Space Waltz album is more than a collection of songs, it is concept, image and theatre; operatic in its delivery. After barely ten days, the record company brought the project to an early conclusion, which seemed generous by New Zealand standards, but paltry compared to what was taking place overseas or is commonplace now. Nevertheless, Riddell managed to release one of the smartest albums New Zealand had yet seen. Made from more than just sound; it is a *gesamtkunstwerk*, a total work of art.

Entertainment to go

In the 1970s, beyond the pub-based entertainment circuit and dealer galleries, festivals promised to become a new context for the gathering of the free-thinking, alternative-lifestyle set. In the popular music world this would usually mean de-camping to the country, where a temporary city would be built, accommodating the transient community for the duration of the long-form entertainment event. One of the first in New Zealand was Redwood (1970), which presented both the Bee Gees and a string quartet. However, very quickly beer culture became the main feature and hard rock was all that could satisfy the rioting, liquor-soaked audience. The next significant effort was The Great Ngaruawahia Music Festival in 1973, which similarly fell short of utopian ideals and was a disillusioning experience for the likes of Blerta who, as a combined theatre-dance-film-music group, should have been a fit for such an idyllic, rural venture. Commercial demands and crowd mentality took charge, prompting Blerta to pack their own travelling festival into a bus and hit the road.⁵²

Although a little late, with punk nihilism having already superseded flower power, the Nambassa Music, Crafts and Alternative Festival of 1978 was organised “by hippies for hippies.”⁵³ Main-stage entertainment for the second Nambassa festival in 1979 ranged from local country singer John Hore to Split Enz via the Little River Band and The Plague, including Sarah Fort (later of Fetus Productions) and Richard von Sturmer parodying hippy nudity in full body paint.⁵⁴ A workshop programme offered sessions on topics from solar heating to the I Ching.⁵⁵ Nambassa even had its own ‘cosmic architect’, Rob Meurant, who erected a 70-foot wide, 12-sided rainbow mandala, ‘Nambala’, to unify the spiritual area.⁵⁶ Nambassa ’79 was so successful that it attracted competition of a much more commercial nature in the form of the Sweetwaters festival, which quickly made Nambassa redundant.⁵⁷

Despite more conventional performance contexts, arts festivals are long-form events creating communities of interest. Most arts festivals then, and today, have multiple simultaneous stages or venues that splinter the gaze. For example, Wellington’s Sonic Circus began in 1974, organised by composer Jack Body. The first Circus took place simultaneously in eight venues over six hours, featuring works by the likes of John Cousins, Jenny McLeod and Douglas Lilburn.⁵⁸ Phil Dadson’s performance group From Scratch also made their first public appearance.⁵⁹ The second Circus in 1975 added theatre groups, including Red Mole.

52. David Eggleton, *Ready to Fly: The Story of New Zealand Rock Music* (Nelson: Craig Potton Publishing, 2003), 53.
 53. John Dix, *Stranded in Paradise: New Zealand Rock’n Roll 1955 – 1988* (Palmerston North and Wellington: Paradise Productions, 1988), 253.
 54. Colin Broadley and Judith Jones, *Nambassa: A New Direction* (Wellington: A.H. & A.W. Reed, 1979), 120.
 55. Nambassa Trust, *The Nambassa Sun* 1, no.6 (1979), 11 – 15.
 56. Broadley and Jones, *Nambassa: A New Direction*, 54.
 57. Dix, *Stranded in Paradise*, 253.
 58. Rachel Barrowman, *Victoria University of Wellington 1899 – 1999: A History* (Wellington: Victoria University Press, 1999), 308.
 59. Wystan Curnow, “Writing and the Post Object,” in *Action Replay: Post-script*, edited by Stella Brennan, Robert Leonard and Hanna Scott (Auckland: Artspace; New Plymouth: Govett-Brewster Gallery, c2002), 42.

15: Cover of first Space Waltz album, 1974.
 16: Dick Frizzell, *Dragon and Space Waltz concert poster*, 1975.
 17: Nambassa main stage 1979, image correction: Peter Terry.
 18: The Plague performing main stage, Nambassa, 1979, photo: Gerard Couper.

Sonic Circus continued until 1987.⁶⁰ These were new spaces for art and new experiences for audiences.

After playing Soundwatching in Tokyo with From Scratch, Dadson was inspired to start a festival of his own.⁶¹ Instigated with guitarist Ivan Zagni, and initially held largely at Artspace, Auckland's Sound/Watch festival began in 1989. Performers included John Cousins, Drone, and John Lyall's People Who Hit Things, and the show included an exhibition of photo documentation of the annual Solar Plexus events held at winter Solstice in Maungawhau crater. The 1992 festival was larger, more international and more interdisciplinary, including video, lectures, installation and dance, with participants including Jim Allen, Jack Body, John Daly-Peoples, Adrian Hall, Sean Kerr, Chris Knox and Julainne Sumich.⁶² Sound/Watch morphed into SoundCulture, touring the Pacific Rim, from Sydney (1991), to Tokyo (1993), San Francisco (1996) and Auckland (1999). Events and exhibitions spread throughout the city and included John Lyall's cyber-opera, *Requiem for Electronic Moa*, featuring tent-pitching, bacon frying, the live construction of a waterfall, and generative music from computers and kinetic sculptures.

At the same time, the popular music scene was becoming more electronic and experimental. Of particular note were industrial group Fetus Productions and later, Tinnitus, centred on Michael Hodgson and Angus McNaughton. Pioneers in what became known as VJ culture, from early on Tinnitus incorporated video as a key part of their performances, often staged as elaborate party nights that came to be known as *Rotate Your State*. The first public *Rotate Your State* took place in 1992 at the Gluepot in Ponsonby where, as Hodgson recalls, they would re-configure the venue, creating an environment with a café, a bar with artists' works for sale and a performance area.⁶³ Video projections were used as backdrops or integrated into performances; TVs were liberally spread around and also built into a large video wall near the entrance.⁶⁴ Performers included Compulsory Joy, Godstar and Tinnitus; video interludes were provided by artists including Lisa Reihana, Stuart Page, Kirsty Cameron and Hodgson.⁶⁵ At the end of the nineties Hodgson established *Soliton*, a series of events with a similar structure, but working within the then-ascendant nightclub culture.

Running in parallel to *Rotate Your State* and *Soliton*, in 1990 Dadson's Intermedia department established *Interdigitate*. *Interdigitate's* main attraction was a 36-screen video wall, which could be triggered in conjunction with live performances. To interdigitate means to interweave, and it is this performative interlocking of media that was the focus, much like the live video performances Hodgson was organising.

As an evolution of the light-shows essential to dance culture, from the mirror balls of the ball room, to psychedelia and later disco, multi-media would play a major role in visual content and atmospherics of the emerging rave scene and, eventually, to outdoor festivals entirely focussed on electronic music such as The Gathering and Splore. Technology (from generators and electric guitars to video synthesisers and data projectors) has been a key part of creating these total environments, new social spaces and new modes of presentation and reception.

Cultural Industrialisation

Fetus Productions offer us a final glimpse of an approach that encompasses

19: John Lyall, *Requiem for Electronic Moa*, opera, soundculture 99, photo: Laura Sunderland.
 20: *Soliton* curated and produced by Michael Hodgson and Lara Bowen; images clockwise from top left: *On Growth and Form*, by Lattice (Chris Chetland, Bruce Ferguson, Andrew Manning/ Kog Transmissions); *Goblin: behind Me is Black*, Lovely Midget and Seductor Productions; *Lovely Midget performing live film soundtrack on lathe-cut records*; *Strips*, performance by Becca Wood, Kelly Morynhan, Ben Harris, Anja Pachkam and Tasha Alpe; *Machine Code*, live cinema performance by Unit 23; *Mood Unit* (Angus McNaughton).
 21: Sean Kerr and James McCarthy, *Turning Blue*, 1995, 36-monitor video work and performance at Interdigitate.



fig. 19

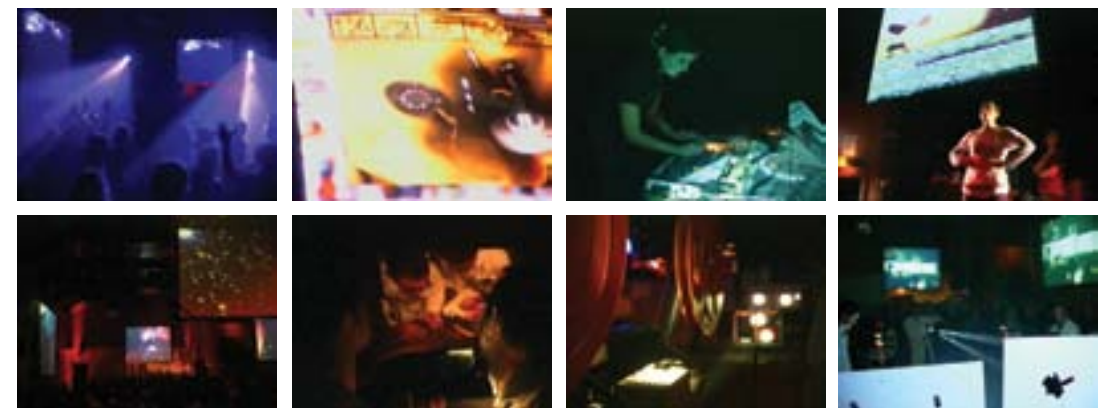


fig. 20

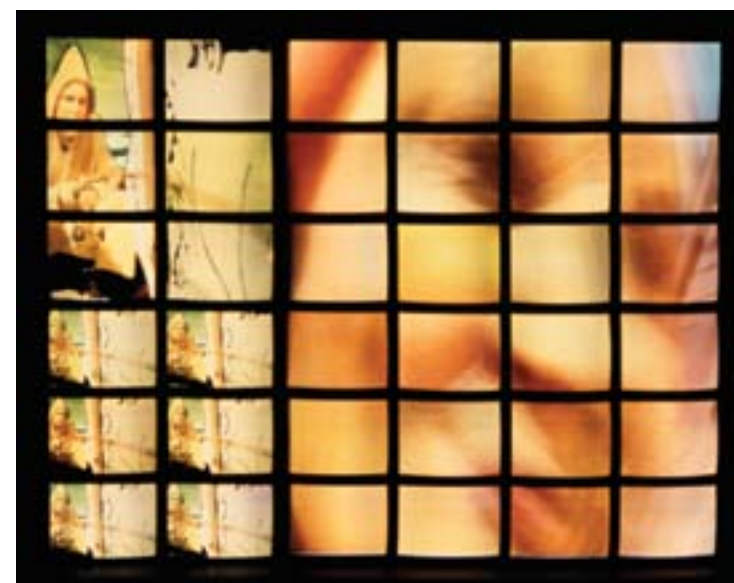


fig. 21

60. The finale included more than 60 performances, including from the New Zealand Symphony Orchestra, in twelve venues providing a ten-hour continuous and simultaneous marathon of events.
 61. Mark Amery, "Art in your Ear," *Stamp* 33 (July 1992): 14 – 15.
 62. A third and final Sound/Watch festival took place in 1994.
 63. Mike Hodgson, conversation with the author, September 27, 2007.
 64. Jo Schmidt, "A View from a Different Perspective," *Stamp* 32, June (1992): 40.
 65. Advertisement, *Stamp* 32, June (1992): 2.

media including sound and experimental film.⁶⁶ Although later in their career Fetus Productions was primarily driven by Jed Town, to start with there was input from Sarah Fort, Mike Brookfield and James Pinker. For a period, Fetus operated as a dispersed entity with members in different parts of the world still using their brand to work remotely, producing events, manifestos and albums. They created videos, screenprints and merchandise, and staged exhibitions and multi-media concerts. Evolving out of post-punk group The Features, the first official Fetus event took place in 1980: an exhibition featuring fluorescent screenprints of medical deformities by Brookfield (who was studying at Elam), accompanied by the sounds of waterfalls, crying babies and scraping metal. This collage was designed to produce sensory shock, intended as a slap across the face of a sleepy nation living under the illusion of tranquillity.

Fetus acted like magpies, hijacking medical footage and photos. They processed these along with found sounds, superimposing and shifting content from tape to samplers and between Super-8, 16mm and VHS. Their gritty realism borrowed equally from futurist noise manifestos and William S. Burroughs' dissection of language and media. Rather than the illusion of perfection offered by TV stars and soft-focus magazine spreads, Fetus wanted to show humanity for what it was—fleshy machines made from brightly-coloured internal organs.

The arrival of the Sony Walkman allowed them to point a microphone at the world around them, gathering sounds in the same way they collected images, processing them like a sonic screenprint to emphasise grain and hiss. Pioneers of electronic music in the local rock scene, they were quick to start using samplers, sequencers and synthesisers. Concerts integrating music with moving images was also key and Fetus found like minds in the fledgling industrial music scene of Sydney, characterised by bleak mechanical rhythms and a dystopian futurist aesthetic, with bands such as SPK and Severed Heads all using film projection as part of their hi-tech man-machine performances. These methodologies would later be adopted in New Zealand by the likes of the Skeptics, Tinnitus and Headless Chickens, who saw the relentless electro-mechanical rhythms of the industrial music scene plant the seeds of much local contemporary dance culture.

For a period, electronic music existed live as a group presentation of drum machines, samplers, sequencers and synthesisers, as well as more conventional instruments, all being triggered by human performers. In light of the increasing pervasiveness of laptops and turntables as the dominant culture of electronic music, it is tempting to see this moment, including events like Interdigitate and Rotate Your State, as a resistance to musical performance disappearing entirely into the black box of new technology.

From Lilburn's work with poets and playwrights to Dadson's global link-ups to Fetus Productions' collisions of image, sound and design, what becomes apparent in this pre-history of digital art is the impossibility of separating media, of unpicking sound from image from performance. Anticipating art's shift into the new spaces created by technology, these episodes demonstrate new expressions for new contexts, from the possibilities of film and electronic music, to the increased scope offered by long-playing records and portable recording devices. Intertwining aural and visual, much of the practice detailed through these fragments is collective. These works recall an interdisciplinary and collaborative spirit that is more than the sum of its parts.

22: Fetus Productions, posters 1981-89, various artists including Jed Town, Sarah Fort, Mike Brookfield, Tone Corriage and David Mitchell.



fig. 22

66. Roger Horrocks, "Fetus: Moving Images," in *Fetus Reproductions: Fetus Productions 1981 - 2002*, ed. Stella Brennan and Hanna Scott (Auckland: Artspace, 2002), 10.



A Minor Cinema: Moving Images on the Internet

Eu Jin Chua

Does the short digital movie streamed over the Internet constitute a form or genre? Do such streaming Internet movies have a particular sensibility? The film theorist Vivian Sobchack thinks so. In an essay titled *Nostalgia for a Digital Object*, she points out that streaming movies obey neither the logic of digital culture (broadly speaking) nor the logic of conventional cinema.¹ Instead, they constitute a unique form of their own. Whereas the aesthetic of the digital is all sleek logic and clarity and sterility (consider the fact that the governing metaphor of computer operating systems is that of the well-organised office with everything hierarchically slotted away into files and folders), streaming movies tend to be, on the contrary, ragged and fragmented, dishevelled, disorderly. This is partly for technical reasons—because of the simple and pragmatic fact that the artists and amateurs who make such streaming movies are aware of the technical constraints and so make their works accordingly. In the tiny size of the image, in the jerkiness resulting from bandwidth bottlenecks, and in the fuzziness arising from the necessary lossy compression, streaming movies refuse any sense of totalising sleekness or predictable structure. Unlike the expansive, outward-looking mode of address of “big-screen, live action movies,” streaming internet movies “draw us down and into their own discrete, enclosed and nested poetic worlds: worlds re-collected and re-remembered; worlds more miniature, intensive, layered, and vertically deep than those constructed through the extensive, horizontal scope and horizontal vision of cinema.”² The ethos here is that of psychological interiority rather than public address, contingency rather than determinacy, associational reverie rather than hierarchical logic, distilled intensity rather than expansiveness.

For obvious reasons, the form of streaming Internet movies resembles that of short rather than feature-length films. But Sobchack also compares streaming movies to precious artefacts of material culture that similarly call for responses having to do with pensive contemplation or nostalgic longing: miniatures, reliquaries, cabinets of curiosities, Joseph Cornell boxes. Sobchack uses an Internet artwork by Lev Manovich, *Little Movies* (1994 – 1997), as a prime example, but I also think of another series of works by the artist Shirin Kouladjie as paradigmatic, even if these latter works are not in fact streaming movies at all. Rather, Kouladjie’s movies are animated GIFs, short found-footage clips that appear in small pop-up windows, often overlaid with scrolling text and radio buttons and set to music.³ Mickey Mouse dances to a jaunty Eastern European pop song. The silent movie star Louise Brooks arches her neck and laughs. A swimming baby does a stately underwater waltz. And so on. In their salvaging of ignoble and neglected fragments: forgotten films, home movies, old music, family photographs; in their predilection for the twee and the kitsch; in their associational collagism and sense of collector’s mania; and in their dusty archival impulses hinting at what Sobchack calls “a sea of memories shifting below the surface, [...] an effluvial database,” Kouladjie’s animations echo with the “bits

1. Vivian Sobchack, “Nostalgia for a Digital Object: Regrets on the Quickening of Quicktime,” *Millennium Film Journal* 34 (1999). <http://www.mfj-online.org/journalPages/MFJ34/VivianSobchack.html>

2. Sobchack, “Nostalgia for a Digital Object.”

3. Shirin Kouladjie, <http://www.photomontage.com>

and traces of an individual yet collective past: personal memories, narratives, histories that were, from the first, commodified and mass-mediated.” The experience of passing time appears as the act of selecting fragments, flotsam and jetsam, out of the turbulent ‘database’ of personal and collective history. Memories emerge from the effluvial murk of the past in the form of a Proustian or Bachelardian reverie—or as cute little pop-up windows.⁴

Sobchack’s article was written in 1999. I mention this because, by the fast-paced standards of contemporary technological time, that is a long age ago. Now that we are firmly in the era of YouTube and video podcasts and Web 2.0, her argument seems somewhat quaint and outdated (not least because she uses the proprietary brand name ‘Quicktime’ to denote the streaming Internet movie, as if this was the only format available for setting images into motion over the web). But she is in fact quite conscious of impending obsolescence. For the article takes the form of a kind of lament or elegy for a soon-to-be archaic form, whose defining characteristics are too often perceived as mere technical shortcomings to be swept away in the rush of progress. Forget puny screen sizes, twitchy playback, and indecipherable images—let’s have high resolution and widescreen! The Quicktime movie is an endangered species; it will “eventually and seamlessly ‘stream’ into ‘live-action.’” Hence Sobchack’s regrets about the “quickening of Quicktime.”⁵ Indeed, that we can now watch world events unfold on tiny YouTube screens or download high-definition movie trailers and feature-length video podcasts suggests that this has already happened, that the Quicktime movie as memory box was already passing into history when Sobchack wrote her paean to it.

At the same time, I think the characteristics that Sobchack discerns in the short streaming Internet movie remains as an underground tendency—a “minor cinema.” One sign of this is the unpolished amateurism (I use the term in the least pejorative sense) that dominates YouTube as much as the more professional stuff grabbed off TV or a DVD. Amateur re-edits (or even the very act of selection of short fleeting moments to be posted online that would otherwise have been missed in the flow of a television broadcast or in the progress of a film) suggest that a new cinephilia is made possible by digital technologies.⁶ They suggest indeed that the minor tendency survives in practices of reception if not production. By analogy, think of Cornell’s *Rose Hobart* of 1936 as an early mash-up by a cinephilic fanboy—appropriately enough, this formerly hard-to-see film is now available for viewing on YouTube. In fact, with the advent of cellphones and digital still cameras that record movies onto memory cards with limited space, these minor characteristics are now apparent even from the point of production, secreted, as it were, within increasingly dominant and totalising forms of technology. The emergence of these ‘convergent’ recording devices is usually interpreted in totalising ways—as the potential recording of *everything all the time*—but isn’t it also possible to think of these technological phenomena in less sweeping terms? It may be true that everything is now being recorded, but it is being recorded in fuzzy and fragmented form, which complicates the issue and suggests that an exclusive focus on the totalising aspects of this technology is itself totalising.

4. Sobchack, “Nostalgia for a Digital Object.” Sobchack alludes to Gaston Bachelard’s *Poetics of Space*.

5. Sobchack, “Nostalgia for a Digital Object.”

6. On cinephilia, see Paul Willemen, “Through a Glass Darkly—Cinephilia Reconsidered,” in *Looks and Frictions: Essays in Cultural Studies and Film Theory* (London: British Film Institute, 1994), 223 – 57; Christian Keathley, *Cinephilia and History, or the Wind in the Trees* (Bloomington: Indiana University Press, 2006); and Marijke de Valck and Malte Hagener, *Cinephilia: Movies, Love and Memory* (Amsterdam: Amsterdam University Press, 2005).

Consider as well moving image-based Internet art, not least of all recent work from New Zealand. Fuyuko Akiyoshi's films come to mind as further evidence of the survival of this "memory box" tendency, as does Gabriel White's *Aucklandis*.⁷ Though both these series of films were originally meant to be shown conventionally, on cinema or television screens, their relaying over the Internet seems like the perfect marriage of aesthetic disposition to transmission medium. In Akiyoshi's *IX Sketches* (2003) a woman writes "empty every night" on a postcard and mails it by sticking it into the shrubbery. A boy named Nick orders a meal in an Auckland food court and drinks slowly from a paper cup. The subtitles that appear on screen—"nothing really happens... only after it's happened"—are explicit articulations of the artist's interest in the recording of minor, transitory incidents, incidents with the potential to distil a life, a desire, an effluvial database of lingering memory, filmic traces of lost time which make good the always-missed encounter with the present. The in-between moments, the "foreplay of life," become visible as life itself.⁸ Meanwhile, in *Aucklandis* (2006), a series of short films about life in the city of Auckland as it is imagined as a kind of alternate universe, White films himself, for example, brushing his teeth while providing running commentary through a mouthful of toothpaste (he brushes with Natural brand toothpaste to make himself speak more naturally). Or films himself reading an invisible book, the turning of whose pages he mimes. He crosses a pedestrian bridge while watching to see whether his shadow cast on the motorway below gets run over by the cars. He shows us garbage bags on the street and informs us that the so-labelled "green bags" and blue recycling bins are for sorting coloured items, so that the city council can build us an all-green world or an all-blue world. This may be comedy, but it is of a disorienting sort. The deadpan commentary, with its alternate-universe logic, is a complement to the way in which these scenes, when viewed on a tiny blurry screen, are shrunk and compressed, but also re-charged, concentrated, intensified, perhaps in the manner of surrealist *depaysement* or formalist estrangement. There is, as with Sobchack's analogy between Quicktime movies and baroque *Wunderkammern*, a sense of filmic fragments containing and unfurling a whole world, each short movie evoking a kind of interior, psychological continent—call it *Aucklandis*—which may have sunk beneath the waves but which occasionally re-surfaces in the form of these droll traces.

My point, and perhaps Sobchack's, is not simply the essentialist-formalist one that streaming Internet movies have unique and exclusive properties of their own. Rather it is that the particular limitations and constraints of having to transmit over the Internet are conducive to a certain kind of already-extant disposition. This disposition is not even exclusively filmic or solely digital. In fact, one analogue here might be with Michael Benedikt's attempt to distinguish in architectural practice a minor "interiorist" sensibility from a dominant "exteriorist" one. The former is Benedikt's term for what we might elsewhere call immanentism—a sense of embedded continuity with the world, of mutual interrelation, the belief that life or existence can only be that which materially inheres within the present world rather than anything apart from it. Exteriorism, on the other hand, is the competing idealistic worldview that things are divided

7. Fuyuko Akiyoshi, *IX Sketches*, 2003. <http://www.emptyevernight.net/play.html>

8. Fuyuko Akiyoshi, "Statement" [artist's statement], 2003. <http://www.emptyevernight.net/statement.html>

and autonomous, with some elements always transcendently standing outside others. The difference, Benedikt says, in a wonderfully quirky image of the exteriorist-interiorist distinction, is "how one feels about [an] onion":

*What is an onion, formally? A tiny seed embedded in a series of cupping shells, or a series of near-spheres each covering the one inside? It makes no logical difference whether one starts from the inside and moves out, or starts from the outside and moves in, but it makes a great deal of difference to how one feels about the onion—or rather, how it would feel to make or be an onion. The exteriorist wants to paint each Russian doll on the outside; the interiorist wants to line each enclosing doll's inner, concave surface.*⁹

How one feels about the onion is not merely a trivial distinction, Benedikt goes on to point out, for these two orientations can take on political value. It becomes an issue of whether one wants to take up the exteriorist, transcendent 'view from everywhere and nowhere', which is also the view of imperialist mastery, coded masculine, in which one observes, from above and from the outside, a world consisting of mutually autonomous beings whom one can dominate (or be dominated by)—or whether one wants to take seriously the fact that one's view is always corporeal, materially coded, embedded in mutually-constituted relationships with other beings and objects (that is, immanent in concrete practices of life), and hence always partial and necessarily limited. Benedikt namechecks the architect Rem Koolhaas but also Plato, Newton, and Bohr as members of the dominant exteriorist 'party,' versus Aristotle, Leibniz, and Einstein as constituting the minor interiorist sensibility. I could also add Descartes versus Spinoza to this exteriorist versus interiorist axis—remembering, however, like good Spinozists, that no one is ever solely one thing or the other, never solely exteriorist or interiorist, except in their effects, practices and concrete powers.

I also see another analogue for this minor, interiorist disposition in Eve Sedgwick's account of what she calls "reparative practices"—ways of responding to the world's oppressions that don't involve paranoia or cynicism or knee-jerk suspiciousness, but that rather choose to defuse the world's hostility by taking its initially inimical, fragmented resources and refashioning these into new wholes.¹⁰ Reparative practices are minor, local acts of art and thought that suggest that effective critique may be possible without a sense of paranoid and antagonistic—or if you like, exterioristic—negativity. Reparative practices are temporary and local rather than totalising or encompassing; they are enfolding and assimilative rather than merely antagonistic; they are responsive rather than reactionary (keeping in mind—and without exempting myself—that the left can be as reactionary as the right). The primary example here is the camp aesthetic, for, as Sedgwick points out, "campy" objects aren't simply subversive (which is the way that they are usually interpreted via the tools of negative critique)—they are also the products of an intensity of affect and feeling, even love, directed towards neglected or hostile materials which are therein reconfigured and refurbished. In a sense, "camp" has become a misnomer given that the word has taken on connotations of ironic humour without sincerity, whereas these objects are anything but ironic or insincere or cynical. Sedgwick's concept of the "reparative impulse" has, I think, a great deal of explanatory force for the kind of

9. Michael Benedikt, "Environmental Stoicism and Place Machismo: A Polemic," *Harvard Design Magazine* (Winter/Spring 2002): 3.

10. Eve Kosofsky Sedgwick, *Touching Feeling: Affect, Pedagogy, Performativity* (Durham, NC.: Duke University Press, 2003), 150.

digital moving images in which I am interested here (it explains the almost-kitschy, almost-campy elements of my filmic examples above), and indeed her description of reparative practices might well serve as a kind of checklist of characteristics of a “minor cinema”—these practices, she says, involve:

...startling, juicy displays of excess erudition... passionate, often hilarious antiquarianism, the prodigal production of alternative historiographies; ...‘over-attachment to fragmentary, marginal, waste or leftover products; ... rich, highly interruptive affective variety; ...irrepressible fascination with ventriloquistic experimentation; ...disorienting juxtapositions of present with past, and popular with high culture... surplus beauty, surplus stylistic investment, unexplained upwellings of threat, contempt, and longing...¹¹

As with Benedikt’s “interiorist” sensibility, Sedgwick’s “reparative impulse” is immanent, embedded—this is a sensibility which, in its most concrete forms of practice, doesn’t want to survey the world from a lofty or transcendent perch, but rather wants to enfold into itself the impure but nonetheless worthy resources of the everyday in order to create new lenses through which that same world may then be re-perceived, however locally and temporarily.

Against a dominant cinema of transcendentalising values, then, a minor cinema has a “sense of *immanence*, immersion [in the phenomenal world], and embeddedness in a form of life,” with a sense of “corporeal intimacy” and affective imbrication.¹² Against Andre Bazin’s “myth of total cinema” (the idealistic desire for an all-encompassing cinematic image that reproduces reality completely—think IMAX), there is to be discerned another potential tradition of the moving image in which the fragmentary and the diminutive are acceptable because they gesture outwards—rather than solipsistically inwards in the manner of the autonomous art object—at the material practices and scenes of everyday life beyond which, they imply, there is nothing.¹³ The frequent found-footage impulses of such moving images also suggest that the ‘major’ and ‘minor’ tendencies need not be mutually exclusive, but that moments of immanence may be discovered within even the most boisterous Hollywood film, via reparative techniques of fragmentation, collage, decontextualisation, re-projection and re-scoring (as with *Rose Hobart*), or, as in the case of the streaming web movie, digitisation and re-transmission over the Internet. In this latter case, digital technology, rather than being coldly abstractive or reifying (as we usually think of it), is an effective agent of dehierarchisation and destratification. The technology may, in one sense, cripple the moving image by making it jerky and small and snowy and truncated, but it thereby produces *another* kind of cinema, a cinema that accrues “phenomenological and aesthetic value as an effect of these necessities and constraints.”¹⁴ Here, digitisation enables by partially disabling.

Could New Zealand become a fertile ground for creative or aesthetic production in this minor or “interiorist” vein? Perhaps it already is. For Aotearoa is separated from the art-world centres by a wide geographical (and psycho-geographical) gulf, across which any totalising or metropolitan tendencies have to seek passage. Think about how New Zealand has always received the metropolitan canon across vast distances, the result of which may indeed be the overvalorisation of ‘masterworks,’ but also their creative misinterpretation and

11. Sedgwick, *Touching Feeling: Affect, Pedagogy, Performativity*, 150.
12. Malcolm Turvey, “Jean Epstein’s Cinema of Immanence: The Rehabilitation of the Corporeal Eye,” *October* 83 (1998): 35.
13. Andre Bazin, “The Myth of Total Cinema,” in *What is Cinema? Vol 1.* (Berkeley: University of California Press, 2005). Two objections might be made here. Firstly, that immaterial or intangible objects such as digital moving images consisting of nothing more than data streams can’t be agents of an immanentist conception of the world. Can one ‘embed in a form of life’ something not physically real? But immaterial objects can serve quite easily as agents for a materialist or immanentist conception of the world, as long as one doesn’t imagine that the virtuality of these objects is a ticket to transcendence. To do so would be to head down that much-trodden track of hyping digital technology as something that will save us all from our bodies and our messy lives as material creatures because once we download our brains onto our hard drives, we will never need to eat, sleep, have sex, or go to the bathroom ever again. Indeed, the idea that human existence or human being can be divided into an essence of digital or genetic code on the one hand, and throwaway corporeality on the other, precisely exemplifies the exteriorist, Cartesian sensibility in which some things are conceived of as divided from, and on a higher plane to, others. Yes, digital objects are virtual. But like any other artform, digital objects are the result of material practices and physical actions and they have concrete effects. In that sense they are not virtual but actual objects like any others, and it is a fiction to imagine otherwise. One might even speculate that the reason digital technology so often inspires idealistic thinking—exemplified, for instance, by the ‘Californian Ideology’ of futurists such as Jaron Lanier during the heady days of the 1990s—is that the technology’s non-physicality or virtuality is too easily misconceived as occupying a higher plane. Virtuality ends up being conflated with classically

productive misappropriation. That is, the ‘masterworks,’ by the time they are transmitted here, are perforce smaller, fuzzier, more fragmented, less anchored to structured contexts and hierarchies, dampened, re-ordered—thus allowing minor, alternate tendencies to surface and spin-off. Or perhaps the dominating tendencies of the canon become so over-determined that they shrink and diminish and intensify to the point where, between the covers of books or magazines or downloaded from the Internet—indirect rather than direct sources—they can be cut-out and collaged and put away into boxes, files, and folders (orderly to the point of disorderliness), where they accrue new, immanent life. I don’t want to over-stress this point, for there is here the very real danger of turning marginalisation and peripheralisation into fetishised virtues, but perhaps there is something productive to be made out of the fact that Aotearoa has always had, may always have, bandwidth problems.

transcendent categories such as mind or reason or spirit. The second potential objection to my argument is a more difficult one: in many streaming movies, especially Internet artworks, there is the threat of solipsistic aestheticism, as might be expected in films that emphasise psychological interiority, intimacy, and the domain of the private. Here, the line between a solipsism and immanence is very thin. I am well aware of this, and don’t have a convincing reply except to say that, though solipsism and immanentism may be proximate, they are not identical.

14. Sobchack, “Nostalgia for a Digital Object.”

Old Noise, New Sounds: Sonic Explorations in Gallery Spaces¹

Su Ballard

People hated the sound (of [our] early films) and this encouraged [us] to challenge assumptions about technical perfection.
et al., 1991.²

It was left to Leon Narbey ... to set New Zealand art off to the kind of start the 'seventies should have. His light and sound environment Real Time, commissioned for the opening of the new Govett-Brewster Art Gallery, floated, swung, boomed, rang and flashed its way into a major event ... Real Time was in every sense an environment. ... Nothing on the scale of Real Time has been attempted here before. For that alone it must rate as a major achievement, but beyond that the environment does involve the participant. It needs people and it does involve them. ... Perhaps Leon Narbey's Real Time ... might be the lines along which the cultural battles of the next decade are to be fought.
Hamish Keith, 1970.³

Leon Narbey's electronic sound and light installation *Real Time* opened New Plymouth's Govett-Brewster Art Gallery in February 1970. It was a noisy exhibition. Fluorescent and neon lights constructed flickering visual spaces, swathes of black polythene disguised all internal architecture, and recording microphones and movement triggers transferred sounds from one space to another. It was simultaneously disorientating and exhilarating. *Real Time* was a major installation in a minor location. Outside the centres of an already peripheral country, *Real Time* raised the possibility of networked electronic installation transgressing the mainstreams of both "gallery art and media art."⁴ It did this by using feedback and the relations of signal to noise to bring sound and image together in an interactive environment.

In the early twenty-first century, it is worth reflecting on Hamish Keith's invocation of cultural battles. Did Keith imagine that battle lines would demarcate old and new art? Or, was it that *Real Time* shifted previous delineations between sound and image? In *Real Time* sound and image emerged from unfamiliar materials that transformed the space and time of the gallery. As Narbey's use of electronic materials brought viewer experience to the fore, technologies within the gallery questioned the usual status of the viewer. *Real Time* heralded the emergence of complex relationships between informatic materials, sound, the viewer, and the spatial-temporal construct of an art gallery. The viewer was immersed in patterns of signal and noise, in clashing, clanging, flickering spaces.

In gallery environments it can simply be the sound of artworks that suggests a cultural battle. *Real Time* forced participants to listen in a space designed for viewing and as a result threatened long-established aesthetic modes. In the eighteenth century Gotthold Lessing argued for the separation of art into the distinct media disciplines of painting, music, poetry, sculpture and architecture. Once identified, these disciplines were expected to stick to what they did best, and not

Previous pages: Leon Narbey, *A Film of Real Time: A light sound environment*, 1970, 16mm film, colour, sound, 12 minutes, courtesy of the Govett-Brewster Art Gallery, camera: Robert Hutchins.

overlap. Because of the pervasive influence of this division—promoted in the Modernist rhetoric of Clement Greenburg—we learnt to bring to the art gallery sets of filters or frames that mark the artwork out from its architectural environment. As Brian O'Doherty explains: "unshadowed, white, clean, artificial—the [gallery] space is devoted to the technology of esthetics."⁵ This technology of aesthetics meant that to be able to focus on the artwork, a viewer was trained in aural and visual filtering. The silent white cube of the gallery allowed paintings to be hung in straight lines, framed, and self-contained. Furthermore, the gallery presented a blank space that constructed a particularly obedient viewing body. Artworks were afforded a silent contemplation. Neither the work nor the viewers made any noise. Over the course of the twentieth century, this same white cube began to transform into a black box as film and video fought for the viewer's attention. Curators began to work with these aesthetic dissonances, both visual and aural. Today, the apparent need for parabolic speakers and segregated viewing boxes implies that we are simply less skilled at isolating the senses of sound than vision. Due to modern gallery architecture's codes of control and containment the moving image does as a whole behave—but its sound leaks.

An early work by Popular Productions (an arm of the artists' collective et al.) played on these expectations, even as they were realised in the screening spaces of film. Echoing Nam June Paik's *Zen for Film* (1964), Popular Productions screened minimal text over white leader accompanied by the sounds of a woman laughing. The repetitive looped sound of *Dora or Dora's Lunch or Dora Dora Dora* (1990) mixed with a lack of visual clues proved to be excruciating for many audiences. We could not see what was causing such mirth. Was the film laughing at its viewers? In *Dora*, and many other early works, Popular Productions worked with the politics of image reproduction; questioning audiences' own desires as they found themselves before the screen. Films were made by combining VHS with televisual refilming, and reformatting early 16mm and 8mm footage; everything was seen as iterable and malleable. In *You Require Filmic Pleasure* (1987) Popular Productions imitated the hand scratching of a Len Lye film; except that the work was presented on VHS and lacked Lye's strict choreography. The viewer was left in a visually and sonically degraded zone where sound and image both frayed at the edges, leaving spaces for noise to creep in.⁶

It is the sound made by these artworks that continues to undo the disciplines of the gallery. Although Modernist media demarcations and disciplinary distinctions are now questionable, artworks in galleries are generally understood to be seen and not heard. They should be visual signal and definitely not aural noise. It is in these engagements with sound that digital materials have challenged the gallery. In 2004, this discomfort reached a high point with et al.'s *rapture* at the City Gallery, Wellington. The work produced intermittent high volume noise deemed inappropriate for a gallery environment. *rapture* generated significant public discussion on appropriate behaviours by both artworks and their creators.

This was, however, not a *new* challenge. Sound had always been present in gallery spaces. In 1902 Eric Satie admonished his audience to pay no attention to his *Musique D'Ameublement* or *Furniture Music*. Satie's concern was to:

...introduce music that satisfies the 'useful' needs ... Musique D'Ameublement generates vibrations; it has no other purpose; it performs the same role as light, warmth—and comfort in every form.⁷

1. This paper was supported by a research grant from Otago Polytechnic Dunedin.
2. Roger Horrocks, "Popular Productions," in *Pleasures and Dangers: Artists of the 90s*, ed. Trish Clark and Wylan Curnow (Auckland: Longman Paul, 1991), 159.
3. Hamish Keith, "Hamish Keith Reviews Current Exhibitions," *Arts and Community* 6, no.3 (March 1970), np.
4. See Diedrich Diederichsen, "Media Art Undone Panel," *Transmediale.07 Conference*, Akademie der Kunst, Berlin, 2007. http://www.mikro.in-berlin.de/wiki/tiki-index.php?page_ref_id=3

5. Brian O'Doherty, *Inside the White Cube: The Ideology of the Gallery Space* (Berkeley: University of California Press, 1999), 15.
6. See Horrocks "Popular Productions," 158–162.
7. Quoted in Golo Follmer, "Audio Art," *Media Art Net*, ZKM, Karlsruhe, 2006. http://www.medienkunstnetz.de/themes/overview_of_media_art/audio/

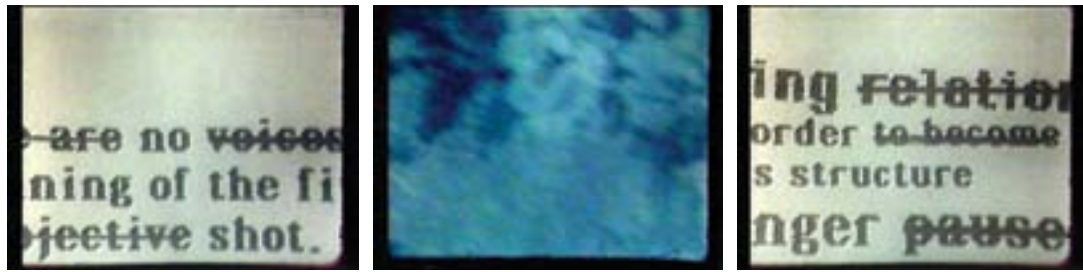


fig. 1



fig. 2

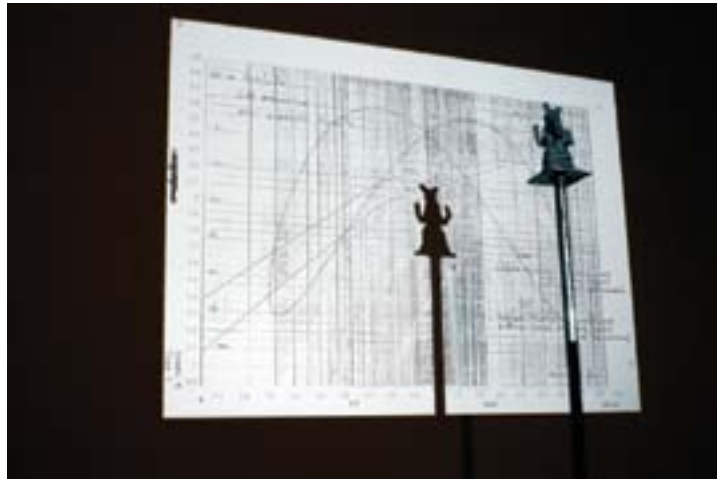


fig. 3



fig. 4

1: Popular Productions, *Dora's Lunch or Dora Dora*, 1990, 16mm film.
 2: et al., *rapture*, 2004, mixed-media installation, sound, City Gallery Wellington.
 3: et al., *rapture*, photo: Guy Robinson.
 4: et al., *maintenance of social solidarity—instance 5*, 2006, network-based multi-media installation, SCAPF Biennial, Christchurch Art Gallery, photo: Dean Mackenzie.

Satie was troubled by the worthiness of sound. Sound should be heard, it should produce ambience, but NOT be listened to. In *Furniture Music* Satie created a precursor for Muzak. It was the Italian Futurist noise machines that would soon demand attention and present a direct challenge to the primary visual experience of the gallery. In his 1913 text *The Art of Noises* Luigi Russolo declared the distinction between signal and noise to be untenable. Russolo, argued that the “machines, not simply their music, are the musical discourse.”⁸ For Russolo, inspired by affective experiences of noise in battle, it was noise that marked the arrival of the sound machine into visual gallery spaces. In retrospect, and somewhat ironically (given the Fascist context within which he was operating) Russolo introduced a consideration of the body and its relation to both sound and time.

The modern gallery had been designed as a timeless space, an eternal present within which the artworks could float independent of context. However, in the twentieth century, the body of the viewer became mobilised. For Michael Fried the full horror of this shift was realised in the theatricality of Minimalism: art that relied on the presence of the viewer to give it meaning. This acknowledgement of the viewer’s body moving through space challenged what could occur within the gallery. Time and space were no longer static but in motion.

The issue was not only being raised within the cross-over spaces of galleries, but within the mainstreams of Western music. Resonance, tone, timbre, frequency, vibration, amplification, and modulation are the material of sound, combinations of which become subsequently classified into music or noise. Within musical discourse sound was traditionally defined as what was heard and understood or deemed meaningful: it was signal.⁹ This meant that ‘noise’ was not seen as a discrete signal nor even marked a disturbance to signal but was understood to be signal’s opposite—indiscrete and non-periodic. In 1929 composer Henry Cowell began to question this distinction and defined noise as something embedded within sound.¹⁰ Speaking in 1937, John Cage introduced noise back into the realm of sound, famously declaring that:

*Wherever we are what we hear is mostly noise. When we ignore it, it disturbs us. When we listen to it we find it fascinating.*¹¹

Cage defined noise as incidental, unheard, chance elements. In suggesting that we could derive meaning and fascination from noise, Cage removed any oppositions between noise, sound and music.¹² In part due to Cage’s influence, it is this concept of noise that dominates contemporary media contexts where sound, noise and image are made to work together by artists who question and elaborate art in the age of the digital.

listening and looking

So, despite having celebrated Narbey’s installation thirty years earlier, the mainstream media in New Zealand reacted to et al.’s infiltration of sound into a public art space with horror and uncertainty. And it is here that the media distinctions between what is heard and what is seen became blurred. A little background is necessary.¹³ In 2004 et al. was awarded both the prestigious Walters Prize, and a role as New Zealand’s representative at the Venice Biennale. Controversy erupted when it was falsely reported that *rapture* would be travelling to Venice. The work was at the time on show at the City Gallery, Wellington, described as

8. Mary Russo and Daniel Warner, “Rough Music, Futurism, and Postpunk Industrial Noise Bands,” in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner (New York and London: Continuum, 2004), 51.
 9. Among others Henry Cowell and John Cage resisted a history where noise had been “essential to [music’s] existence, but impolite to mention.” Henry Cowell, “The Joys of Noise,” (1929) in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner (New York and London: Continuum, 2004), 22 – 24. See also John Cage, *Silence. Lectures and Writings by John Cage* (Hanover, NH: Wesleyan University Press, 1973); and John Cage, *A Year from Monday: New Lectures and Writings by John Cage* (London: Calder and Boyars, 1968).
 10. Cowell, “The Joys of Noise,” 22 – 24.
 11. John Cage, “The Future of Music: Credo,” in *Silence* (Hanover, NH: Wesleyan University Press, 1973), 3. Cage’s composition 4’ 33” (1952) required pianist David Tudor to sit before the piano and at precisely scored moments open and close the piano lid to signify three movements. The audience was made intimately aware of the sounds and noises of the auditorium. This work was later revisited by La Monte Young in his *Piano Piece for David Tudor No. 2* (1960). Young shifted the focus further toward silence by requiring Tudor to perform exactly the same opening and closing action as Cage’s piece, but without making a single sound. Young’s piece is complete when Tudor succeeds at performing the action. Although the audience may hear the same piece in these two works, they will see something altogether different. See Simon Shaw-Miller, *Visible Deeds of Music: Art and Music from Wagner to Cage* (New Haven and London: Yale University, 2002), 5 – 6.
 12. See essays by Christian Marclay, Yasunao Tone and David Toop in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner, (New York and London: Continuum, 2004).

“the donkey in the dunny” by powerful talkback media presenter Paul Holmes. Talkback radio, newspapers and television were taken over with discussion of the validity of the work, the reticence of the artists to even name themselves, and the fact that this work would represent New Zealand internationally. The controversy made it into parliament and ministerial enquiries were held.¹⁴ The issue was not necessarily over the imagery of the work, as New Zealand art audiences were familiar with the flat grey tones of et al.’s installations and previous works that had included delicate graphing of sonic movements, experimental film splicing, and ‘blonding’ of familiar objects. The problem was in part with the noises the installation emitted.

rapture (2004) is an installation of a old grey steel portable toilet shed, raised on the deck of a mobile gallery trolley. The shed (described by et al. as an Autonomous Purification Unit or A.P.U.) remained on the trolley to be wheeled into in the middle of a small square alcove, as if it was in the process of being installed. Projected on the back wall of the alcove is a graph charting some unexplained experiment, plotting what might be flows of energy. Propped in front of this, casting its shadow over the projection, is a small figurine, evoking some totem or pagan offering. Periodically the wood and steel construction erupts, emitting noises that shake its foundations. The sound is shocking, especially if a viewer is close by. Was this kind of sound appropriate to a gallery installation representing New Zealand internationally? Was it what ‘we’ wanted others to ‘see’ of ‘us’? It was not revealed in the media that the sounds emitting from the closed shed, causing it to shake so uncontrollably, were recordings made of French underground nuclear tests at Mururoa Atoll.

The question raised by the work is one of the meaning of noise. What does it mean to listen to such unbearable noise—the hidden sounds of an atomic rapture? In attempting to find meaning within these unexplained sounds and forms, the media generated a debate which sidestepped the work itself.

Sound (and in particular an aesthetics of noise introduced to the gallery) has the potential to transform what viewing might be. Is listening in galleries a process of supplementing the visual, or do sonic and visual media come together? Do we see with more than our eyes? Physicists will tell you that sound is vibration, movement and pressure. Sounds, like radio waves, move through and across objects and architectural spaces. Sound, unlike light, is dependant on matter, it penetrates our bodies more deeply than visible light can. In order to hear these sounds we continue to follow Edison’s lead and construct listening technologies.

r a d i o q u a l i a is a collaboration between diasporic New Zealanders Adam Hyde and Honor Harger. r a d i o q u a l i a have developed tools for the capture and transmission of radio that also disrupt material delineations of sound and wave:

*r a d i o q u a l i a think of large radio telescopes as radio receivers... Unlike normal transistor radios, these receivers are listening to signals being transmitted from planets and stars. Radio Astronomy connects broadcast radio—the transmission of audible information—and the science of radio astronomy—the observation and analysis of radiation from astrophysical objects.*¹⁵

The sound work *data_space_return* (2003) is an extract from r a d i o q u a l i a’s research into radio astronomy at the VIRAC Telescope in Latvia, and in essence

13. et al. is an artists’ collective. Over the past 20 years the collective have used numerous identities, some producing specific works. blanche readymade, for instance, did blonding works, coating objects in gluggy white paint. et al. encompasses all previous names within the collective (including merit gröting, marlene cubewell, lionel budd, l. budd, lillian budd, and p. mule). et al. suggests a positioning of artistic identity outside the cultural object he or she might create and critiques the notion of individual genius as the source of creative practice. These multiple, collective identities and the artists’ refusal to speak publicly has caused controversy in mainstream media. See also Jim Barr and Mary Barr, “L. budd et al.,” in *Toi Toi Toi: Three Generations of Artists from New Zealand*, ed. Rene Block (Kassel: Museum Fridericianum, 1999), 123.

14. This was misreporting, as the work for Venice was a new commission: *the fundamental practice*. See John Daly-Peoples, “Urban Myths and the et al. Legend,” *National Business Review* (20 August 2004), np; Anonymous, “Complaints under Section 8(1)(a) of the Broadcasting Act 1989,” *Broadcasting Standards Authority*, Wellington, 2004. <http://www.bsa.govt.nz/decisions/2004/2004-153.htm>. Jeremy Hansen, “et al. Field Story,” *Frontseat* [broadcast] Television New Zealand 4 July 2004. <http://frontseat.co.nz/exclusive/transcripts/transcript.php?id=9>

15. See r a d i o q u a l i a, “Broadcasting Sounds from Space,” 2004. <http://www.radio-astronomy.net/ars.htm>

is the result of holding a butterfly net up to distant radio waves. In outer space, noise is an all-pervasive signal; radio waves bounce between objects more distant than we can ever hear or see unaided. But these signals need to be gathered and energetically transformed in order to be heard. The sonification of the radio waves recorded in *data_space_return* makes listeners focus on what can be captured, and what we choose to capture, of the vast spaces and noises of the universe. When shown at The Physics Room, Christchurch, in 2003 the sounds of *data_space_return* were housed in a small white cubicle with headphones.¹⁶ Inside, viewers tuned into a pre-recorded transmission of lunar static that felt and sounded like Modern composer Edgard Varèse’s dream of “blocks of sound moving at different angles.”¹⁷ These collisions of sound masses were the result of r a d i o q u a l i a’s editing of satellite transmissions received through the radio astronomy dish. Focusing on the glitches, static and sound shadows of passing satellites and planets, r a d i o q u a l i a realised the noisy spaces of silence in-between communication. Nonetheless, despite its distant origins, the recording is immediately recognisable because, since the day in 1969 when Armstrong sent back his static message from the moon, we know the sound of silence in outer space.¹⁸ Neither empty nor void, the glitch and buzz is familiar. It maps both time and distance. The gallery listener to *data_space_return* relies entirely on the locative effects of sound as the noises echo from deep space. There is nothing to see.

glitch

The presentation of noise as a kind of mapping of technology is taken up by Stella Brennan’s *ZenDV* (2002), a tribute to and digital update of Nam June Paik’s iconic works *ZenTV* (1963 – 1975) and *Zen for Film* (1964 – 1965).

The first manifestation of *ZenTV* was part of the installation *Exposition of Music—Electronic Television* (1964). *ZenTV* was one of thirteen television experiments where Paik sought to “study the circuit, to try various ‘feedbacks’, to cut some places and feed the different waves there, to change the phase of waves.”¹⁹ The televisions were accompanied by four prepared pianos (one was further prepared when, at the exhibition opening, Joseph Beuys attacked it with an axe), and a variety of noise-making machines. Each television work was a different manipulation of the same three-hour nightly broadcast. The back of each set was open so that the audience could see what had been transformed inside. John Hanhardt describes these prepared televisions as Paik’s first “video sculptures” and many critics now herald it as the first video art exhibition.²⁰

In *ZenTV* a broadcast image has been compressed into one narrow line, appearing horizontally but viewed vertically (the TV is on its side). The line shrinks the screen’s image into one flickering strip of light on the surface of the monitor. In *Zen for Film* (1962 – 4) a 1000-foot film loop of clear leader is played through a projector.²¹ Scraping along the ground it slowly accumulates dust and scratches—material invasions of the film surface. Here the surface, rather than being compressed back into its medium is opened up to disturbances by other materialities.

What Brennan introduces to Paik’s series is the relationship of digital to analogue, and, like Paik, she makes us acutely aware of the specificities of the material through the particular noise the work contains within it or is generated

16. *data_space_return* was shown in *Audible: New Frontiers*, curated by Sally McIntyre for The Physics Room, Christchurch.

17. Quoted in Cox and Warner, “Introduction,” *Audio Culture: Readings in Modern Music*, 5.

18. Daniel Rosenberg suggests that the sounds of outer space can be rendered so familiar that it is possible that “the power of our shared auditory memory of this event might not rely more on the dense drama of the sonic background than on the thin surface of language in which it is clothed.” Daniel Rosenberg, “One Small Step for—

Nina Katchadourian—Sound Recording Review,” *Art Journal*, September (Fall 2002): 32 – 39.

19. Nam June Paik, *Afterlude to the Exposition of Experimental Television* (Wuppertal: Galerie Parnass, 1963) reprinted at *Media Art Net*, <http://www.medienkunstnetz.de/source-text/31/>

20. John Hanhardt and Jon Ippolito, eds. *The Worlds of Nam June Paik* (New York: Solomon R. Guggenheim Museum and Harry N. Abrams, 2000), 93. See also John Hanhardt, “Paik’s Video Sculpture,” in *Nam June Paik*, ed. John Hanhardt (New York: Whitney Museum of American Art, W. W. Norton, 1982), 91 – 100.

21. *Zen for Film* was one of Paik’s first works produced after his move to New York to join with Fluxus activities.

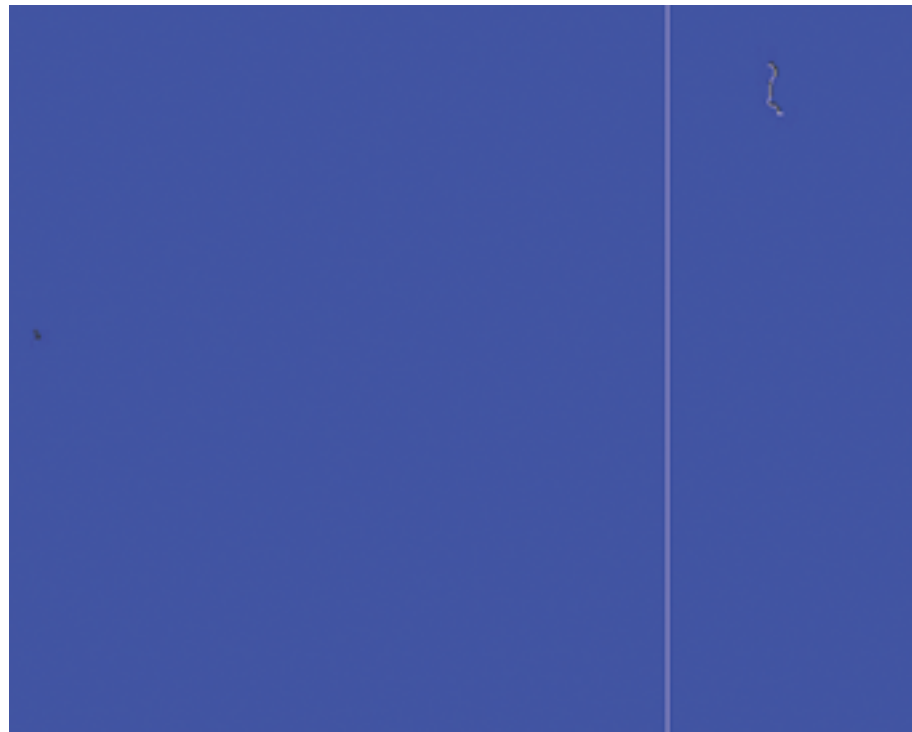


fig. 4

4: Stella Brennan, *ZenDV*: Bluescreen and Bars and Tone, 2002, two-channel DVD, 3 minutes.

through its signals. In *ZenDV* two video monitors sit on plinths side by side. They each play test signals. One monitor shows the default blue screen, a reference colour telling us that ‘no signal’ is coming into the system and is accompanied by a sound reminiscent of a diamond stylus scratching at the end of a vinyl recording. The other shows colour bars (white, yellow, cyan, green, magenta, red, blue) and plays the tone (usually for digital media this is 1kHz) used to calibrate playback equipment. Every screen, monitor and projector represents its colour differently; colour bars allow a mapping of the intended colour of a work to the actual colours of the screen. The calibration tone allows us to listen for any variation in the tonality of equipment. An oscillation or variation in the tone means the speed of playback is not exact.

The digital matter of *ZenDV* evokes noise, both visual and sonic. When a film is played or processed the scratches on its surface appear either black or white, depending on whether they are caused pre-exposure by dust within the camera, or post-exposure within the film bath or projection environment. With video tape, scratches are generally caused by the playback mechanism or by a physical stretching of the tape surface. Scratches or noise on the surface of digital video can render information mute or invisible. On the other hand, the digital scratches used by Brennan are constructed via pre-set digital filters. When applied within digital editing software, dust, scratch and flicker are the realisation of a series of codes that suggest an approximation of analogue effects. They are renditions of other images—of dust, scratches and light flicker—and not distortion in themselves.

In *ZenTV* the flattening of the image into the screen’s surface compresses all distinctions between information and noise. With *Zen for Film* the glitches are from dust, dirt, lines, scratches, things *added* to the surface; this is a potentially infinite process. Whereas the force of film through a projector is additive, the effect of digital interference on a surface is *subtractive*. If subjected to actual physical interference *ZenDV* will lose information. Over time the work may be rendered inoperable due to the discrete process of digital breakdown. The analogue tolerance of stretch is absent. In order for both sound and image to loop and ‘pick up’ dirt they need to be materially separate. This is what Brennan does with her two monitors.

remediation

The cultural battle of sound and image no longer seems quite so intense when it is formed within these digital spaces. A reason for this might be the way in which new media appear to constantly rework earlier media. Nathan Pohio’s *Du Sauvage* (2003) explicitly employs remediation as a tool. Pohio’s referents are the seminal moments of moving image as realised through the Hollywood blockbuster, and his work highlights the inadequacies of mapping ourselves onto these frameworks. Across three installation screens, Pohio performs the Wookiee, a character reflective of a generation whose first blockbuster experience was the overwhelmingly mystical release of George Lucas’s *Starwars* (1977). Oversized and cumbersome, the shaggy companion figure of Chewbacca never quite fitted in the human-sized filmic environments. Pohio’s repeated attempts at Wookiee portraiture highlight the disabling effects of the media culture that bought us the figure in the first place. On a small VHS monitor the artist is seen



fig. 5



fig. 6

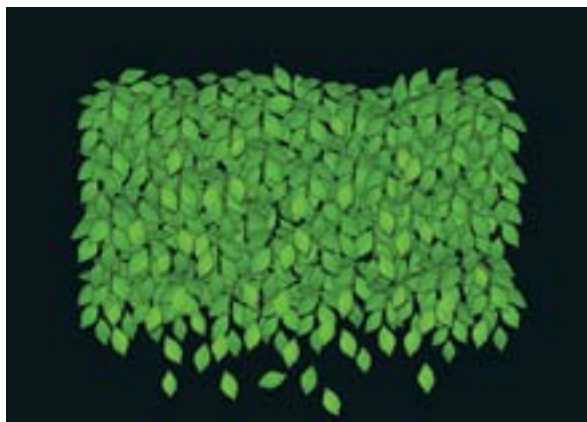


fig. 7

dressed in a Wookiee costume, rotating as if under anthropological examination. The figure spins as if aware of the gaze of the other (like a side-show freak). A DVD screen projection shows Pohio again in full fur, slowly fumbling his way through a jigsaw puzzle of Han Solo and Chewbacca (a kind of self-portrait). In a torturous act of stop-motion animation, we watch the pieces of the jigsaw appearing and slowly filling empty white spaces (the whole sequence takes 25 minutes). The empty jigsaw spaces mimic a gappy pixellated image. On the back wall is a portrait of Chewbacca rendered in white pastel on an oversized sheet of cardboard boxing.

Du Sauvage presents a self-contained performative space. The installation displaces the big-screen projection now expected from video works, the video image almost seems to be sliding off the wall. The monitor appears half-forgotten and easy to trip over. In his triple remediation of the screen, Pohio shows that the digital screen not as a cinematic window onto a world, but “windowed” itself, “with [additional] windows that open on to other representations or other media.”²² The windowed screen is our familiar interface with the digital. *Du Sauvage* is a remediation of the production and reception surfaces of both cinema and installation. Within the structure of the cinematic apparatus the screen was “the unseen frame for a perceived ‘stable’ world.”²³ In *Du Sauvage* the mediation of the screen introduces instability rather than an expected linear progression through newer media. This instability even begins to infect the installation’s analogue image as the white oil crayon slips around on the surface of the corrugated card. In a parodic invocation of the space where the third screen of the immersive environment should be, we find a dodgy material substitute. Crayon on card has been subsumed into (and remediates) the messy logic of the digital.

information

In 1946 Claude Shannon wrote a mathematical formula that mapped out the channels of information transmission.²⁴ In his formulation noise was not the opposite of information but an interruption that added unwanted information to the transmitted signal. Noise for Shannon was a material intermediary, a shifting signifier of both the unwanted and the repressed. There is no noiseless received sound, no noiseless received information, and the implication is that there is no pure *sent* sound or information (from outer space or otherwise).

The imbrications of information and noise is manifest in et al.’s *maintenance of social solidarity—instance 5* (2006). The installation occupies a small alcove that is partially blocked by a military-style portable table stacked with newspapers. Inside the space are an audience of three grey wooden chairs, some headphones and a modified data projection of Google Earth. It is not immediately clear if the viewer is allowed within the alcove to listen to the headphones. Monotonous voices spill from the space intoning political, social and religious platitudes. It is as if multiple messages have been sent, but their source, channel and transmitter are unintelligible to the receiver. All that is left is information divorced from meaning. On screen, and apparently integral to the Google Earth imagery, are five animated and imposing black monoliths. Because of their connection to the voices in the headphones, the monoliths seem to map the imposition of narrative, power and force on the landscape. Like their sudden

22. J. David Bolter and Richard Grusin, *Remediation: Understanding New Media* (Cambridge MA and London: MIT Press, 1999), 34.
 23. Andrew Murphie, “Putting the Virtual Back into VR,” in *A Shock to Thought: Expression after Deleuze and Guattari*, ed. Brian Massumi (London and New York: Routledge, 2002), 191.
 24. Claude Shannon, “A Mathematical Theory of Communication,” in *The Bell System Technical Journal* 27, (reprinted with corrections July, October 1948) Bell Labs, <http://cm.bell-labs.com/cm/ms/what/shannonday/paper.html>

5: Nathan Pohio, *Du Sauvage*, 2003, video projection, VHS monitor, olistick and card.
 6: Kenjiro Yamada, *Tampopo*, 2005, interactive installation.
 7: Aaron and Hannah Beebe, *Hedges*, 2003, interactive installation.

arrival in Kubrick's *2001: A Space Odyssey* (1968) it is the visibility and improbability of the monoliths that renders them believable. In the video landscape the monoliths apparently house the dispassionate voices of many authorities. Their unearthly presence modulates the layering of political and media forces. And despite the best efforts of the information controllers "error as a matter of normal operation and not solely ... as an accident attributable to some definite breakdown, nevertheless creeps in."²⁵

Error creeps in. Error is the noise that concerned Shannon the most. In the *maintenance of social solidarity-instance 5* gaps are left for viewers to introduce misreadings of scale, space and apprehension. To don the headphones and occupy one of the soulless grey chairs is to occupy a relationship to power, power in a constant state of flux. The sound of the installation draws the viewer into its open, yet also somehow impenetrable system.²⁶ Although mapping these forces, the work does not locate them. et al. demonstrates the impossibility of information without noise.

feedback

Since the cybernetic dreams of the 1950s, feedback has been central to anything that might be considered digital. When cybernetics moved into art practice audiences were offered new tools to interact physically with the artworks. Viewers experienced a direct feedback loop, a haptic engagement and the instant pleasure of our actions impacting on the work. Often, though, the result was disappointing, emerging from constrained notions of human-computer interaction.²⁷ Within the gallery, a button was pushed and something happened, it was pushed again, and again, something happened. The experience was as controlled and sterile as the white cube. Some exceptions emerged.

Kentaro Yamada's *Tampopo* (2005) harnesses feedback, pulling together sound, movement and image. A microphone stands in front of a human-sized projection of a three-dimensional rendered dandelion. As the viewer blows into this microphone, the seeds of the dandelion scatter. The sound of breath is amplified and depending on the volume and distance of the viewer from the microphone the seeds can scatter across the whole wall. The direct responsiveness of this work shares much with Aaron and Hannah Beehre's *Hedge* (2003). *Hedge* responds to viewers' footsteps across the gallery floor. The sound of footsteps causes leaves to fall from a large digitally rendered projection of a hedge. As they fall they are immediately replaced, generating a loop of action, reminiscent of a screen saver.

In both these works there is a sense that feedback is one way; the performance is based entirely on received information. After each interaction, the dandelion returns to a rest (whole) position and no matter how many leaves drop from the hedge they are instantly replaced. Feedback in both works is a maintenance device balancing the noise or interventions of the viewer by equilibrating the system. Operating like a thermostat the works' negative feedback systems measure and compensate for random changes in the environment. Because its function is one of balance (or stabilisation), negative feedback keeps all parts of a system in play.

25. John von Neumann, "The General and Logical Theory of Automata," in *Collected Works*, ed. A. H. Taub (Oxford: Pergamon Press, 1963), 294.

26. This argument parallels Sean Cubitt's statement "We are media: we are not endpoints, or conduits for it." Sean Cubitt, "New Light: Fragments and Responsibilities," paper presented at *Transforming Aesthetics*, AAANZ Conference, Art Gallery of New South Wales, Sydney, 9 July 2005.

27. See the discussion of users and useability in Peter Lunenfeld, *Snap to Grid: A User's Guide to Digital Arts, Media and Cultures* (Cambridge MA and London: MIT Press, 2000).

Feedback is also a tool to generate resonance. In *Sonic Pixel and the Blockbuster* (2007) Alex Monteith reworked the closing fifteen minutes of the top fifteen highest grossing blockbuster movies of the twentieth century. Split between two screens, the left hand rolls films up to 1956, and the right hand, films from 1956 to the present. All thirty films play simultaneously, layered on top of one another. Moiré patterns emerge. First we catch some information: a title, scraps of images, a name repeated. The signal is so densely overlaid that it is only through the repetition of visual clues that it is possible to extract any specific information. More often than not it is the difference between the two sides of the screen that dominates. Until the 1950s cinema was dominantly a visual medium. The end of a film was an opportunity for the story to round itself out as key narrative elements played out in the final moments and the audience lingered in the theatre for the concluding title: 'the end'. But after the 1950s things changed. Television meant that movies had new competition, blockbusters had to change their mode of address. By the last moments of a film there is no longer a narrative to be completed, but a story of production to be told. The final ten minutes of a late twentieth century blockbuster meticulously detail the industrial and cultural resources that have created the event just viewed. And of course, most people have left the theatre by the time these endless credits roll. In Monteith's hands, and layered one over the other, these credits become visual noise; occasionally through the flickering lines a name repeats. A vast and complex industry is reduced to this noisy wonder of rolling credit lines. The screening of the work was accompanied by live sound produced by Sean Kerr via image processing technology, and an ambient soundtrack by Clinton Watkins. Kerr used a mobile camera pointed at the screens to trigger live sound samples sliced from the first fifteen seconds of the fifteen films 'blockbusting' prior to 1956, generating sharp, attenuated sounds. Watkins worked with the final fifteen seconds of the 1956 – 2006 blockbusters, composing a sound piece that he then mixed live. Both artists used portable technologies to further remix the sound of the visual. The fluid movements of the sound highlighted the rigid repetitive patterning making up the visuals.

So does *Sonic Pixel and the Blockbuster* highlight an ongoing cultural battle where sound is free to roam, and the image remains curtailed by its formal framing? The works discussed here demonstrate the digital is always enfolded with the analogue. As Gilles Deleuze writes of the digital in contrast to the analogue, in the analogical realm, the:

...various placements or sites of confinement through which individuals pass are independent variables: we're supposed to start all over again each time. [Whereas in the digital] the various forms of control ... are inseparable variations, forming a system of varying geometry whose language is digital (though not necessarily binary).²⁸

The digital for Deleuze is a mode of control; a technology in the Foucauldian sense: "the digital language of control is made up of codes indicating whether access to some information should be allowed or denied."²⁹ The analogical allows independent shifts and movements in variability. The digital also holds this potential, but when it is materialised within a system of control (in my examples,

28. Gilles Deleuze, *Negotiations, 1972 – 1990*, ed. Lawrence Kritzman, trans. Martin Joughin (New York and Chichester, West Sussex: Columbia University Press, 1990), 178.

29. Deleuze, *Negotiations*, 180.

a gallery) it sticks to its geometry and pattern. Control maintains a clarity of signal. Control gives us information. But these trends are neither purely digital nor the result of new sounds. They are old noises. Perhaps there is no battle at all.

old noises

*My film stuff is old brain stuff. It is nothing to the new brain and literature. It is to do with the body and kicking around.*³⁰

Len Lye's understanding of the "body and kicking around" was found in the old brain, that we might variously equate with intuition or the subconscious. The point for Lye was in a realisation of subjectivity, evident in *Free Radicals* (1958, reworked 1979) where direct scratching onto the film surface resulted in choreographed matter. In *Free Radicals* movements appear to shift off the surface of the film, outside the boundaries of the drawn object and into the room in which it is projected. Lye demonstrated that moving image was both about a form of uncontained motion, and a series of radiations whereby light moved matter. The key thing for Lye was that he was not looking at objects moving but, what he termed: the "pure figure of motion."³¹ For Lye divisions into material disciplines presented convenient but misleading formulas. He was not primarily interested in the material of film (which he removed by scratching to make light shine through the opaque surface), but in its apparent movement. His sculptures present similar boundary shifts, occupying uncertain architectures, becoming at once sound and motion. *Blade* (1965), for example, shudders, spins and kicks around to a pre-programmed, yet seemingly random, itinerary. Spinning on a mobilised base *Blade* operates through vibration, moving in a double sine-wave until it bursts uncontrollably into unpredictable motion, clanging against a suspended cork ball. This is visible noise. For Lye, art was part of an ongoing process that connected an old brain with a new brain and shifted established patterns of thought. Lye's reworking of media and discipline into collective motion suggests an avoidance strategy for any form of cultural battle.

In 2004 Sean Cubitt wrote to the Aotearoa Digital Arts list that "media mediate—they are physical and dimensional and informational structures of real materiality that communication embodies in."³² When these media are digital, when they get caught up in gallery spaces, and when they begin to make noises, even more happens. The avoidance of disciplinary boundaries begun by Lye now locates media to the fore. Lessing's divisions become redundant as time, motion and noise impact visual and sonic practices. For over a hundred years moving image has been a very real material. And like the first experiments in film, the works discussed here do not demonstrate a simplistic relationship of signal to noise. Rather, signal and noise are emergent from sound and image. Mediation is not simple, and in making use of the old noises of glitch, resonance and feedback these new media quietly make us aware of bad habits and entrenched positions, and begin to suggest new sounds.

8. Len Lye, *Free Radicals*, 1958 revised 1979, 4 minutes, 16 mm film, b&w, sound, courtesy the Len Lye Foundation, Govett-Brewster Art Gallery, New Plymouth.
 9. Len Lye, *Blade*, 1959-1976, steel and cork hammer on Formica and wood base with motor, 2850 x 1800 x 1800mm, courtesy the Len Lye Foundation, Govett-Brewster Art Gallery.
 10. Alex Monneith, *Sonic Pixel and the Blockbuster*, 2007, two-channel video, 15 minutes, 15 highest grossing films to 1956 (top), from 1956-2006 (bottom)



fig. 8



fig. 9



fig. 10

30. Wystan Curnow and Roger Horrocks eds. *Figures of Motion: Len Lye Selected Writings* (Auckland: Auckland University Press, 1984), 86.
 31. Roger Horrocks, *Len Lye: A Biography* (Auckland: Auckland University Press, 2001) 27.
 32. Sean Cubitt, "[Ada_List] Digits and Names." Aotearoa Digital Arts [discussion list], 18 July 2004. <http://www.aotearoadigitalarts.org>



Onsite and Online

Stella Brennan and Stephen Cleland

The relationship between contemporary art galleries and Internet art projects is complex. Many online projects are now lost; remaining archives are festooned with broken links, missing files and unavailable plug-ins. They represent an early bloom of interest when the Internet was seen as a new and experimental context, and artists were working out what exactly it might be good for. As the Internet has become more widely accessible and more ubiquitous, the impetus for galleries to stake a claim in the digital has subsided and the realms of gallery practice and online art have diverged. This separation avoids the often clumsy gallery articulations of net art that is decontextualised and removed from its network habitat, yet most galleries' use of the Internet as space for documentation misses the opportunity to expand discussions around digital practice. Surges of online art have often had connections with prominent contemporary art institutions, such as the Walker Art Centre's Gallery 9 that ran from 1997 to 2003 and the Internet works initiated in conjunction with Documenta 10 in 1997.¹ In a local context, the 1997 Codec project presented online works commissioned by artist-run galleries Teststrip in Auckland and Galerie Dessford Vogel in Dunedin, and public galleries Artspace in Auckland and The Physics Room in Christchurch.²

Michael Stevenson's work for Artspace, *alt.waysofseeing* was a project blending dodgy HTML aesthetics and luridly coloured text and tessellating images of UFO conspiracy sites with artworld paranoia. Could a sphinx-like structure on Mars be proof of alien influence in modern sculpture? Was Dan Graham secretly working for NASA? Stevenson worked with Robert Hutchinson in realising this project. Hutchinson's own Spatial State of A and B was the first local site dedicated to contemporary art projects for the Internet. As he describes it:

Really it was some kind of idealist fantasy: 'We can bring artists and technicians together and they can make amazing computer art.' I had been working in the web industry for a while so was able to access considerable resources at little or no expense.³

The first Spatial State project, in 1996, was Terrence Handscomb's *Before Information there were the Machines*,⁴ an Internet version of the interactive work included in the *Electronic Bodyscapes* exhibition held at Artspace that same year. *Electronic Bodyscapes*, curated by Deborah Lawler Dormer, was a key moment for digital art in New Zealand, investigating the interface of art, electronics and the body through the work of local and international practitioners. Works included Sean Kerr and Keri Whaiteri's *Dialogue*, an interactive installation juxtaposing Māori and European concepts of *te kore* or the void, French artist Orlan's photographs of her self-orchestrated cosmetic surgery and Australian artist Stelarc's performance *Ping Body*.

Ping Body interfaced the artist's body with the Internet. Pings are electronic signals measuring both physical network distance and traffic loading. In the performance, ping values controlled electrodes that applied voltage to the artist's body, creating a spasmodic contraction and relaxation of muscles, movement

Previous page top: Nathan Pohio, *Asleighofhamanewerihogofastillimgentinosomethingmoving: Horses 2*, 2006, dual screen video projection.
Below: Nathan Pohio, *Sleeper*, 1999, two-channel video, 3 minutes.
 "In the early eighteenth century Edward Muybridge used the most extraordinary technologies of the time to give still images the illusion of movement. One hundred and fifty years later, and after the cinema, the video, and the digital revolutions, Nathan Pohio reduces movement back into something realised by the human hand. Holding a lenticular photograph of horses in front of his camera Pohio reanimates the inanimate. In the dual screen projection *Asleighofhamanewerihogofastillimgentinosomethingmoving: Horses 2*, we see gentle blurred movements as running horses shift in and out of focus. This is cinema returned to its roots: tricks of the eye, illusions of movement, and the captivating magic of slow motion. *Sleeper* is an equally slow cinematic video. Movement is reduced to the flickering light of a surreal night sky. The artist's nephew dreams beneath the day-go lights of his decorated bedroom ceiling, to a soundtrack of Angel Corpus Christi's *Dream Baby Dream*. A peaceful portrait, evoking the deep calm of watching a child sleep, *Sleeper* generates an awareness of the intimate lure of the screen." (Su Ballard)

1. <http://gallery9.walkerart.org> and http://www.documenta12.de/archiv/dx/english/frm_home.htm
2. <http://www.dannybutt.net/codec.org.nz>
3. Danny Butt, "Spatial State of A and B: Robert Hutchinson," 1997. <http://www.dannybutt.net/codec.org.nz/robnj.html>
4. <http://www.terrence.org/old/>

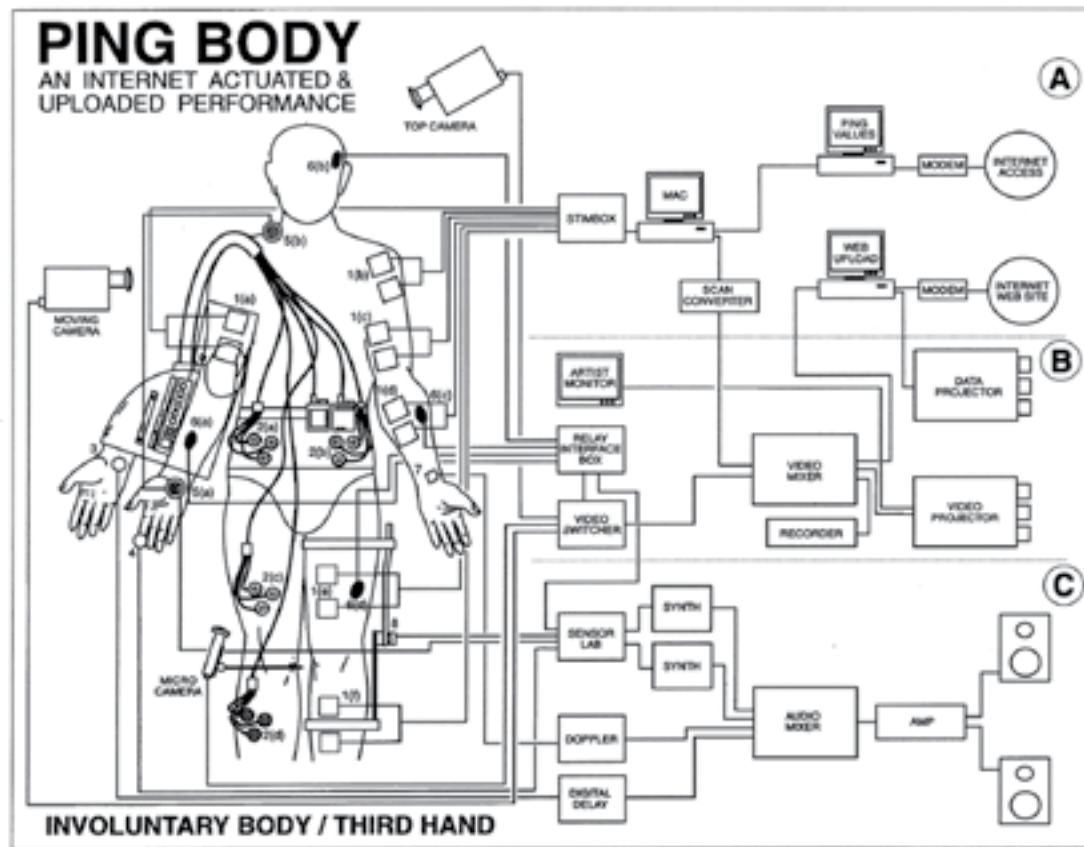


fig. 3

Onsite and Online

which in turn generated sounds related to the body's physical position and posture. Although Stelarc did not control the parts of his body under the influence of the stimulating electrodes, he could respond by activating his robotic 'Third Hand', using it to upload images of the performance for online viewing. In *Ping Body*, rather than exerting physical control of the human computer interface, the body was controlled by flows of data external to it, by the collectivity of Internet traffic.⁵

This relationship between the corporeal and technological was central to both Handscomb's *Before Information there were the Machines* and the later interactive, gallery-based *Space Invaders: black satire and the BBS* (1998). These visceral works incorporated explicit medical images of autopsies and deformities, photographs of murders and accidents, and extreme sexual practices. Much of this material was sourced from hardcore websites, discussion groups and bulletin board services (BBS); many of the images used were widely distributed online.

Handscomb's works subvert the language of the computer: drop-down menus offer options from 'Retreat' to 'Litigation', clicking on twitchy GIFs of bodies and organs spawns pop-up windows with grainy video and psycho-analytical texts, while dialogue boxes offer bleak diagnoses. With navigation that is often circuitous or dead-end, the works superimpose a recontextualised biological and social space. *Space Invaders* is metaphorically structured in terms of zones of the body where exterior and interior worlds meet: the 'Oral Frame,' the 'Optic Frame,' the 'Penile Frame,' and viewers navigate through the site as if penetrating a body.

*Bypassing the editorial structures which have traditionally regulated the distribution of information, the Internet provokes new darker issues of access, power and control. Space Invaders does not seek to glamorise pornography or to support marginal sectors of the Internet, but rather to indict and interrupt the utopian rhetoric that inadvertently supports them by embracing new technology as necessarily liberating, and somehow exempt from historical cultural and philosophical determinations.*⁶

In these works Handscomb is preoccupied with the way codes—legal, diagnostic, technical or linguistic—are used to marshal the wayward and excessive body. Censorship continues to be a key concern and these works trace early uses of the Internet as a contested subcultural space, before e-commerce, blogging and social networking broadened the online demographic and context.

Other works developed for Spatial State included Greg Wood's *Noisemill*, which, based on the names of visitors to the site, generated music from a bank of samples, Sean Kerr's *again-n-again*, which spawned an enormous, repetitive email ('againandagainandagainandagainandagainandagainandagain'), evoking threats from those inadvertently spammed with it, and Tessa Laird's *Elvishnu*, which followed the adventures of Elvis Presley as the 10th incarnation of the Vedic god.

In terms of the web presence of offline gallery spaces, beyond the specific moment of *Codec*, The Physics Room has had a sporadic online programme, while Dunedin artist-run space The Honeymoon Suite, established by Warren Olds, Emma Bugden, Jonathan Nicol and Kate Ross in 1997, featured works such as Olds' *Endless Summer*, a Quicktime VR offering a spooky 360-degree beach panorama with the same bikini-clad bathing beauty reappearing, clone-like in

5. <http://www.stelarc.va.com.au/pingbody/index.html>
 6. Robert Leonard, "Space Invaders: black satire and the BBS," *Artspace*, 2000. <http://www.artspace.org.nz/exhibitions/2000/terrencehandscomb.asp>



fig. 4

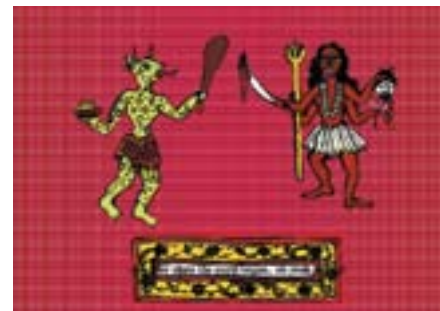


fig. 5

Onsite and Online

every segment of the digitally smoothed-together image. There was a lull in the early part of the decade, with galleries tending mostly to use their web presence for archiving text and images on shows and for publicity purposes. Window's Onsite and Online projects, running in parallel since 2004, represent a now more unusual conjunction of Internet art with an ongoing architecturally situated project.

Window itself is something of a hybrid: an artist-initiated and run gallery housed in a university context. Window was founded in 2002 by students at the Elam School of Art: Michelle Menzies, Stephen Cleland and Luke Duncalfe. Online projects began in advance of the construction of the Onsite gallery in 2004. The purpose-built Onsite space is positioned in a public setting—the foyer of the main library of the University of Auckland. The gallery is a glazed, fluoro-lit box, evoking both the shop window and the display case. It is a place for visual consumption, drawing in audiences beyond those already familiar with contemporary art and new media projects. Window Onsite draws on the tradition of exhibiting moving-image work in public spaces, such as the Auckland Film Archive's 2002 – 3 project using shop-window screens to show artists' film and video works—a kind of expansion of the black box of the monitor to an architectural scale. The situation in a foyer space also recalls the displays of corporate art collections in the glinty, glossy entrances of downtown high-rises. A shallow glazed room with the depthlessness and immutable framing of a painting, the Onsite space emphasises the mediations of the gallery context, analogous to the Online projects' bounding by the screen and by underlying computer and network structures. These reciprocal constraints emphasise that neither space is entirely neutral.

Window's programme sometimes draws together the physical works with an online component, while at other times projects run in parallel. In a work spanning both sites, Toby Collett's exhibition *Processing Vision* (2005), curated by Stephen Cleland, was a performance of Collett's doctoral research into engineering software for visually representing robotic perceptions of space. Collett considers that, "it is the programmer's lack of understanding of the robot's world view that makes robot programs difficult to code and debug."⁷ *Processing Vision* explored the use of Augmented Reality, combining real-time video with computer-generated graphics in order to enable viewers a better understanding of the world from a machine's perspective.

Onsite, the window was coated with translucent vinyl. The small, wheeled robot was visible as it approached the glass frontage, fading into a blur as it wandered deeper into the space. Live footage of the reverse view was rear-projected onto the vinyl and graphics overlaid this feed: red lines fanning out in front of the robot represented input from the robot's navigational sonar system. A single green line traced the robot's record of its movement through the space. While the visualisation of the sonar input demonstrated the basis for the robot's decisions, the convoluted mass of green lines mapping the robot's path was so wide in relation to the actual space that the robot clearly had no sense of its actual position in the world. Divorced from its spatial origin, the robot's record of its journey was streamed to the Online website, where it appeared as an autonomous drawing. The Augmented Reality video feed supplementing or replacing the viewer's glimpses of the robot through the frosted glass and the disconnected plan-view

7. Toby Collett, "Developer-oriented Visualisation of a Robot Program: An Augmented Reality Approach," 2005. <http://window.auckland.ac.nz/archive/2005/11/tech.php>

scribble of the robot's movements seen online represented partial, overlapping and sometimes contrasting methodologies for viewing, recording and controlling movement. *Processing Vision* succeeded in mapping the divergence of these systems across both physical and online spaces.

In a work located firmly within the online context, Luke Duncalfe's *Interlayers for Window* (2005) toys with imperfections in analogue processes. The works are animated specks and scribbles that hover over the browser's window, appearing like dust and scratches on a film's surface. These uncontrollable floaters rupture the analogy of the desktop, but also highlight the flaws of the retinal screen. The forms recall *muscae volitantes* or 'flying flies,' entopic images caused by flaws in the vitreous humor, the translucent gel filling our eyes. These opacities within the eye create the sensation of spots and threads that drift involuntarily across the field of vision, and are particularly noticeable when looking at a bright surface such as the sky or a screen, or a white page.

Duncalfe situates the most obstructive element of these screen animations on the Window home page: a diagonal cross covers the entire interface. In page layout documents the crossed box is a stand-in replacing lost or unlinked images. This wayward and disobedient stand-in points to the operative assumptions and controlling protocols of Internet space. When the user scrolls downwards, for instance, the box overstates this action, jerking wildly in the screen's foreground. A technology is never developed in isolation from the language and history of a culture. Rather, it pulls in information from existing technologies, appropriating the terminology and metaphors of existing tools. Duncalfe's drifting flies draw on Bolter and Grusin's notion that "all media are on one level a 'play of signs,'" superimposing artefacts of the physiological, the analogue and the digital.⁸

This mismatch between user input and computer response causes us to question our assumptions of control and the dominant logic of the human computer interface that creates the context for Internet art. Kento Yamada's interactive work *Listening Heads* (2006) plays with notions of interactivity and responsiveness, putting a human veneer on the computer, literalising the interface. In *Listening Heads*, two portrait-format screens show coolly-lit images of a man and a woman. Speaking into one of the microphones hanging in front of each of these large-scale video portraits evokes a silent but emotive response. The heads yawn or smile, look sleepy or turn away. Sometimes the spoken input and the video response coincide, but other times the head's reply leaves the viewer with the sense of a communication breakdown. *Listening Heads* plays with our human perception of the face as privileged object. By clothing his hardware and software in his friends' visages Yamada constructs a kind of wordless Turing test. The illusion that the heads listen and respond turns the portraits into a kind of mirror, returning our gaze.⁹

Window Onsite's international reach has included presentation of the collected works of expatriate New Zealand net artist and activist Josh On and American artist William Boling's work *You Ain't Wrong* (2007, curated by Luke Munn).¹⁰ *You Ain't Wrong* is an archive of auction pictures from the largest internet auction sites in New Zealand and the United States: TradeMe and eBay. The images of objects for sale are displayed in pairs, one for each day of the exhibition. Boling describes how these images are:

...usually presented artlessly and without pretension. The picture begins its

6. Toby Collett, *Processing Vision*, 2005, installation, robot with projection, projection details, window interior.
 7. Luke Duncalfe, *Interlayers for Window*, 2004, Flash and JavaScript.
 8. Kento Yamada, *Listening Heads*, 2006, interactive installation, photo: John B. Turner.



fig. 6



fig. 8



fig. 7

- 8. J. David Bolter and Richard Grusin, *Remediation: Understanding New Media* (Cambridge, MA and London: MIT Press, 1999), 19.
- 9. Jaenine Parkinson, "Onsite + Online/ Kiss / Kento Yamada," Window, 2006. <http://window.auckland.ac.nz/archive/2006/06/onsite.php>
- 10. <http://youaintwrong.com/about.html>

life with a certain purity of intent. The picture taker is primarily motivated to allow the viewer to 'see clearly' the item offered for sale... This artless stance leads to picturing subjects and aspects of subjects, e.g. the back of a refrigerator, that would not be photographed, but for the intended sale.¹¹

This daily pairing of found images forms a strange map of cultural difference, tracing the incidental and background details of a utilitarian but somehow exotic image bank.

At times there is a strong resonance between the methodologies and formal qualities of the works in the two spaces, such as the pairing of Jae Hoon Lee's works *Andrea 2001* and *A Leaf Onsite* with Alex Monteith's Internet project *Invisible Cities*. Monteith's work feeds the nouns and page numbers of Italo Calvino's novel *Invisible Cities* into a search engine, generating layered panes of images linked by the often tenuous relation of the search terms from the novel to the results pages. This aleatory collection reflects an anxiety about narrative and its subversion by technology often described in Calvino's works. Another of his books describes a novelist dismayed by a literary researcher's method of tracing his themes by atomising and electronically reading his works:

Now, every time I write a word, I see it spun around by the electronic brain, ranked according to its frequency, next to other words whose identity I cannot know, and so I wonder how many times I have used it, I feel the whole responsibility of writing weigh on those isolated syllables, I try to imagine what conclusions can be drawn from the fact that I have used this word once or fifty times. Maybe it would be better for me to erase it... But whatever other word I try to use seems unable to withstand the test... Perhaps instead of a book I could write lists of words, in alphabetical order, an avalanche of isolated words which expresses that truth I still do not know, and from which the computer, reversing its program, could construct the book, my book.¹²

Jae Hoon Lee breaks objects down into flat images, echoing this distillation of narrative into ranked and numbered words. Lee creates composites, using scanner and camera to capture forms and textures that he reassembles as videos and stills. His work digitally blends disparate angles and sources to create seamless yet oddly discontinuous images that are both highly descriptive and completely strange. *A Leaf* is a montage of scanned foliage accompanied by the white-noised hiss of summer cicadas. The video is mesmerising, scrolling endlessly up the screen in a rolling time-lapse as the leaves turn orange and brown and back to green again.

Andrea 2001 is an image of a naked woman's body, scanned in pieces, pasted together and displayed on a life-size lightbox. The flesh pressed against the flat glass of the scanner and the high level of detail it provides creates an image that is disturbingly flayed, rolled out for examination, a body as disjointed as Calvino's atomised novel.

The logic of montage is a key to the juxtapositions of works *Online* and *Onsite*. Bringing works in the two spaces into conversation has sometimes been physically achieved by having a computer available at *Onsite* openings, making the site available to gallery visitors. Another factor in the relationship between on and offline practice is economics. *Window Online*, hosted on the University server and maintained by voluntary labour, reflects Hutchinson's earlier

9: Jae Hoon Lee, *A Tree*, 2003, 1200 x 2000mm, digital print.
10: Jae Hoon Lee, *Andrea 2001*, 2001, 600 x 1800mm, Duratrans on light box.
11: Alex Monteith, *Invisible Cities*, 2004, screenshot, software designed by Sean Kerr.

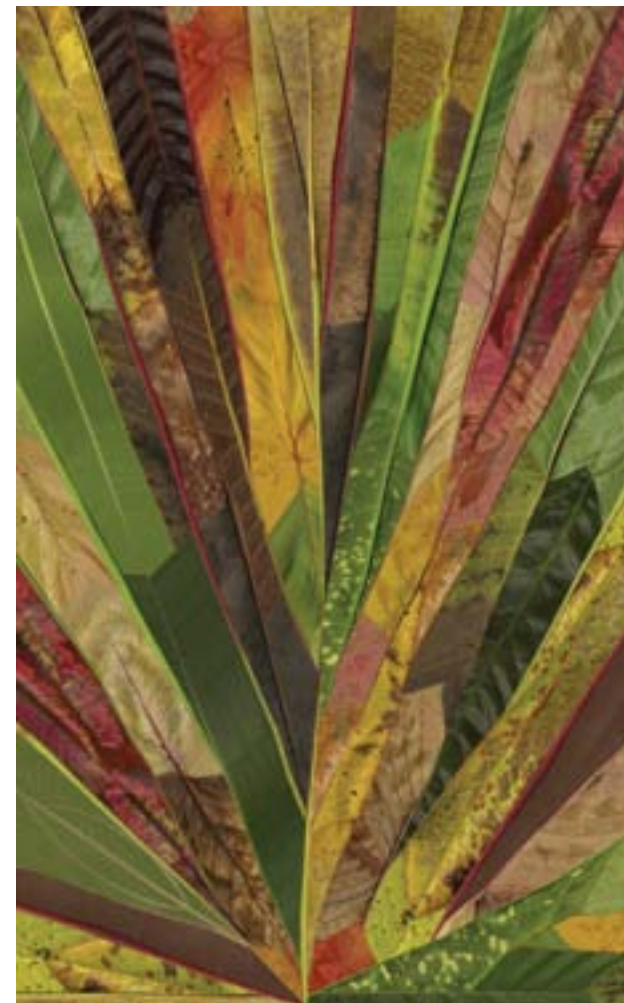


fig. 9



fig. 10



fig. 11

11. Stephen Shore, "Interview with William Boling," 2007. <http://www.window.auckland.ac.nz/archive/2007/08/online.php>
12. Italo Calvino, *If On a Winter's Night a Traveller*, trans. William Weaver (London: Secker and Warburg, 1981), 148.

leveraging of favours and expertise in completing projects for Spatial State of A and B. As Michael Betancourt describes it:

*The digital presents the illusion of a self-productive domain, infinite, capable of creating value without expenditure, unlike the reality of limited resources, time, expense... that otherwise govern all forms of value and production.*¹³

The Online space has “never cost a cent” while the bureaucratic processes of construction and maintenance have placed a definite dollar value on the physical space.¹⁴ This split between a gallery’s demands of rent and overheads and the often more insubstantial requirements of websites that are squirreled away on company or institutional servers and maintained in late-night coding binges underlines a more general Internet tendency of extracting corporate value from the voluntary labour of bloggers, posters and file sharers. But this volunteerism is also part of a grand tradition of artist-run spaces fuelled by the dedication, enthusiasm and self-interest of artists.

In New Zealand, with no dedicated funding support for art self-consciously identified as electronic, digital practices have remained disparate, linked to personal expertise and collaborative relationships. Digital art practice remains more contiguous with other aspects of contemporary art, often operating within the context of extant forms such as theatre or experimental film. This is less the case in comparable nations such as Australia in part because of the historical policy preferences of funders and the technical resources of exhibition spaces. In an early example of this local bias, Spatial State tended to present projects by artists such as Michael Stevenson and Tessa Laird who were well versed in contemporary practice, but not necessarily technically savvy. This is an approach with benefits as well as limitations. As Hutchinson noted, working with such artists was:

*...more work for me, and perhaps they aren’t as inclined to really push the medium as far as it can go, but the ideas are just as strong, and they’re being presented to an audience that may be used to ‘virtual bodies’ and ‘viral complexity’ but probably hasn’t dealt with a carefully placed fried egg on the floor.*¹⁵

13. Michael Betancourt, “The Aura of the Digital,” CTheory: 1000 Days of Theory, ed. Arthur and Marilouise Kroker, 9 June 2006. <http://www.ctheory.net/articles.aspx?id=519>

14. Luke Duncalfe in conversation with Stella Brennan, December 14 2007.

15. Butt, “Spatial State of A and B: Robert Hutchinson.”

Luke Duncalfe, *Untitled*, 2008. Duncalfe plays with a CAPTCHA, an acronym for ‘Completely Automated Public Turing Test to tell Computers and Humans Apart’. The tests are an online security measure attempting to sort the people from the bots, often through reading distorted text.



The Big Idea

Jacque Clarke

In July 2002 *the big idea* website was launched as an online space designed to enable connections, exchange and productive affinities between members of New Zealand's creative communities. Like many good ideas *the big idea* began in a series of casual conversations. A graduate student in design completing a temporary contract in Creative New Zealand's Auckland office was dreaming aloud one day. 'What I could do with right now,' she mused, 'would be a website to check out jobs and exhibition spaces, to find a flat and to show my work.' Another day, on a whim, a case worker from Work and Income in inner-city Auckland came to visit Creative New Zealand. He was concerned about increasing levels of unemployment amongst young graduates in the creative sector. He expressed this concern to Elisabeth Vaneveld, then Manager at Creative New Zealand, Auckland, about improving employment opportunities for this group. Vaneveld ensured that these conversations gained momentum, becoming agenda items, and then plans. A team of people grew around these ideas and thus *the big idea* was launched.¹

The big idea has grown into a significant community. What does this mean for a website? This idea of 'community' is alluring but elusive. The fertility of any given community is measured by its ability to grow and evolve. In a vernacular sense 'growing' a community has much in common with tending crops, fields, orchards or gardens. The desirability of growth is an intricate concept; it implies the movement of a living organism from juvenility through graduated stages of change towards maturity.

From an ecological or systems perspective, a community shares certain behavioural similarities to an ecosystem. An ecosystem supports the growth of interconnected species and organisms; it evolves resilience through its diversity and through the complex network of interdependents within its boundaries. In the paradigm used by social ecologists the complexity and diversity of any human community's pattern of interconnection determines its resilience and therefore its potential for growth.

Today the concept of community is often typified by the notion of 'networks'. Since the 1960s systems theorists have identified a paradigm shift that "includes a shift in social organisation from hierarchies to networks."² For French theorist Félix Guattari the ecological crisis of the 1990s was attended by an accompanying social crisis in which "kinship networks tend to be reduced to a bare minimum."³ Guattari noted that contemporary social formations emphasised individuality over relationship. His answer to the resulting social malaise required "reconstructing the modalities of 'group-being', not only through 'communicational' interventions but through existential mutations driven by the motor of subjectivity."⁴ Guattari argues that social regeneration or growth in an age of isolation and fragmentation is contingent on both individual subjectivity and connectivity. Against this backdrop the digital social network has emerged to support alternative kinship models that in many ways hark back to the 60s commune, the flourishing of large scale music festivals, and the rise of

1. <http://www.thebigidea.co.nz>
2. Fritjof Capra, *The Web of Life: A New Scientific Understanding of Living Systems* (New York: Double Day, 1996), 35.
3. Félix Guattari, *The Three Ecologies* (London and New Brunswick, NJ: The Athlone Press, 2000), 27.
4. Guattari, *The Three Ecologies*, 69.

the environmental movement. Networks like *the big idea* present a counter-space to hierarchical social models.

This essay suggests that it is possible to read *the big idea*, New Zealand's largest online creative sector community, as a localised digital social ecology. Since *the big idea* is not a theoretical nor aesthetic experiment but a community project, it follows that like most social organisations its main concern is for its evolution and survival. I use theories drawn from social ecology to speculate about the notion of growing in relation to *the big idea*, presenting a provisional consideration of *the big idea* as an organism.

Dee Hock writes, "Organisms and organisation are not separable. Nor can the physical world be separated from the social."⁵ The form of a living organism's growth is determined by its DNA structure which embeds a developmental path within each cell. How though does a website or web network propelled by social needs but locked into the formulas of coded computer language evolve? How does a social network grow?

Applying biological metaphors to a digital network is a speculative task. Every ecological space is unique and evolution is a provisional idea. While biologists may think of evolution in terms of optimum forms, in digital social networks the ability to create connections is the indicator of growth. Interestingly *the big idea*'s user registrations and daily visitor statistics have grown exponentially, despite the website's technological limitations. To understand this paradox of simultaneous growth in social complexity and stasis in technical development, I want to consider it firstly as a prototype in action, secondly as a virtual nodal structure, thirdly as a complex network and lastly as a living evolving social system.

The prototype in action

The big idea's growth has been somewhat atypical. Launched on the open-source platform PostNuke, the site was initially designed as a prototype to demonstrate the potential of the concept of networked community formation to funding bodies. Like many online networks *the big idea* was designed to provide the individual visitor with a hub of potential opportunity. From the simple nodal structure of the various segments of the site it was planned that visiting creative practitioners would build up a matrix of connections and information that nourished their practice and their contribution to the sector. It also sought to help individuals visualise future career pathways and provide key information across developmental nodes as they embarked on that journey. One of the project's core intentions was to arrest a drift by graduates of art, dance, and film academies towards dependence on social welfare agencies. This drift resulted in the gradual loss of creative skills acquired during tertiary training as social welfare policy insisted upon a shift away from creative activity towards 'real' employment options.

The community embraced the site, undeterred by limited technology and a lack of high-end design values. In its first year *the big idea* attracted five hundred subscribers and around two hundred visitors daily. Six years later, in early 2008, the site has over 15,000 subscribers and is visited by nearly five thousand people daily. Within any twenty-four hour period visitors from over fifty-five cities around the world check in. The site attracts ever-increasing uploads from

5. Dee Hock, *Birth of the Chaordic Age* (San Francisco: Berrett-Koehler, 1999), 99.

thousands of individual practitioners as well as educational institutions, not-for-profit and community groups, technology companies, government departments and many other individuals and organisations in the creative industries.

While social engagement with the site has extended its network, the architecture of the site remains in its prototypical form. A prototype actualises an idea before that concept is complete or perfect. If it does not become fully formed, the growth of the project is inhibited in many ways, being realised through iterations of the prototype. In *the big idea*'s case this arrested technological development means the community cannot use functions standard to many information networks, for example podcasting, sharing sound and document files, online chatting or conferencing. Some of the basic online information systems now expected from a semantic web environment are not available. In addition there are structural issues that can potentially inhibit access, such as problems with navigational flow and a lack of integration of modules and data.

Despite these technological limitations the community of users continues to embrace the site, creating exponential growth in both subscriber numbers and daily user statistics. Like physical pathways, web pathways become habitual; it's a bit like buying vegetables—you go where you know the source, or the price, or the range. Online network membership is driven by habit and loyalty and there is evidence to suggest that people don't move towards technology as much as they move towards other people, and thus begin to emulate other peoples' habits. Garcia writes that members of networked communities:

*...may postpone the adoption of new technologies—even when new components are far superior to old ones—until their entire network can be written off. On the one hand—and for the same reasons—if a number of users come to constitute a critical mass moving to a new technology, others will likely jump on the bandwagon, fearing that they will be left behind.*⁶

Nodal structures in web technology

The exponential growth of *the big idea* in terms of social engagement has been matched also by the increase in the density of information it now distributes. On *the big idea* constant sharing and profiling of information drives the impetus for interaction and for building the network. However, as more and more information flows into *the big idea* grid it has difficulty finding its way to a surface—this results in a kind of digital gridlock and distribution problems.

Ecological discourse often employs metaphors of nodal structures based on botanical forms to describe network distribution. In the biological growth of plants, the organised splitting and shooting that happens at a plant's nodal points enables it to receive sunlight and minerals for photosynthesis and growth. The internode is the point in the plant where bifurcation or branching happens and is activated at a point of tension. In websites the equivalent distribution channels are the network pathways which users move through habitually. Information must be distributed optimally across the network to allow for its easy uptake. Unlike the three-dimensional branching structure of a plant, a website has an initially linear structure. If bifurcations do not occur at points of stress to create new nodes, then web pages can become long trails of information that are difficult to access. There is growth, but it is linear, and in the case of *the big idea*, undifferentiated and at times inaccessible.

6. D. Linda Garcia, "The Architecture of Global Networking Technologies" in *Global Networks, Linked Cities*, ed. S. Sassen (New York and London: Routledge, 2002), 42.

Linearity is like the digital version of urban sprawl—when people on the outskirts of a town can no longer walk to the centre then a city begins to lack human scale. Websites too can emulate the grid-like patterns of habitation of physical landscapes. On *the big idea* the lack of bifurcation and distribution of information means that the network is not evolving to allow nodes to connect to other nodes and subsequently create networks within networks.⁷

Living Systems

How then, can *the big idea* move beyond linearity and keep evolving as a complex network? In Wolfgang Goethe's eighteenth century studies of biology, he notes that a nodal point activates four stages of organic activity. In his syntax, a nodal point can be described as a new form that develops initially by shooting and then by articulating, spreading and stemming.⁸ This model can be applied to the information ecology of *the big idea*. An article appears (shooting), it takes shape in a new environment (articulating), it is received by readers (spreading), and finally it links to other networks (stemming).

Perhaps networked digital technologies are an appropriate new space for these biological morphologies. Recent experimentations into node behaviour by levitated.net, a New Mexico-based design team, have explored a range of free-associating nodal activity. Levitated.net provides open source Flash modules that allow users to explore nodal growth within an object-orientated graphic environment. A node in the node gardens of levitated.net can ideally be capable of:

*...self-locomotion, message passing, information storage, and some degree of arbitrary free will. Additionally it should have the ability to bond, breakaway, regroup, transform, etc. Each node is capable of searching for and making connections, and negotiating forces received through connections.*⁹

Connectivity drives this nodal process. The 'evolution' of a digital community could be seen as a trajectory towards increased connectivity and mobility. In Felix Guattari's terms, a successful digital community should enable both connectivity and individual subjectivity. In the past five years there have been significant technological evolutions within social networking technologies. These mostly relate to the subjective possibilities for participants in social networks such as MySpace and Bebo, and with the 3D, avatar-driven moving, talking, acting, experiential digital bodies found in Second Life; described by one commentator as "the penultimate lonely romantic empty city."¹⁰

The question for any digital community is: which way forward? Thus far *the big idea* has managed to avoid some of the downsides of digital social networks such as the distributed celebrity culture models that exist in MySpace and Bebo. Additionally it has avoided the aggressive acquisitive friendship systems that have emerged in those spaces. It begs the question again: can a social network actually evolve or does it become redundant as new forms emerge?

The paradox of growth

Like an ecological phenomenon, the Internet emulates Goethe's description of nature: unsystematic and "an ever-changing proteus."¹¹ Often the Internet generates new social patterning from what could be perceived as transgressive behaviour. However, what may appear to be transgressive within the culturally

7. See Capra, *The Web of Life*, 35.

8. Johann Wolfgang von Goethe, "The Metamorphosis of Plants," (1893) *Journal of Botany*, December 1863 – 1871, trans. Emily Cox (London: Robert Hardwicke, 1863), 47 – 58.

9. Jared Tarbell, *Levitated.net*, 2007. <http://www.levitated.net/daily/leviterative1K.html>

10. G. H. Hovagimyan, "Empyre: Prototyping on Second Life" *Empyre* [discussion list], August 2007. <https://mail.cofa.unsw.edu.au/pipermail/empyre/2007-August/>

11. Goethe, *The Metamorphosis of Plants*.

encoded constraints of a traditional social politic may actually constitute as progressive or adaptive within an ecological process.

The connectivity and complexity of *the big idea* community is difficult to perceive from the outside. *The big idea* maintains an intimate scale and has a kind of suspended sense of homeliness. The facility for uploading member-content provides a key niche media opportunity for local practitioners. The site does not distinguish between the process and outcomes of creative output, nor does it rank contributions. This open door policy addresses naturalised hierarchies within New Zealand's various creative sector communities. Members have engaged with the project from across a wide demographic and geographic range. Market research indicates that users of *the big idea*: find collaborators, feel more informed, discover old friends, find a job, a grant, a leg up, a sub-network, and have mapped-out future career pathways.

There are however other types of encounter occurring, encounters existing in what Guatarri calls the "microsocial."¹² These interactions are not able to be mapped or gridded, largely because they exist in experiential psychic space. In real space, the microsocial is made up of glances and looks. On a website, the microsocial potentially exists as a counter to isolation, in the form of a moment of synchronicity or co-incidence, as a favour or an insult; the type of connection that is subjective and connective at the same time. Marshall McLuhan put this succinctly when he wrote: "The meaning of meaning is relationship."¹³ Networks are radical (in the literal sense of springing from the root) because they are so significant to wellbeing and, in a biological sense connectivity is the signature of health.

A network does not evolve into a predictable end product, but instead exists as a responsive environment. As a digital network and a generative social space, *the big idea* provides its visitors, its community, with information, new experiences, interactivity and a sense of connection. A digital social network however cannot evolve through design processes alone. Networks must always prioritise connectivity and the relational. The struggle for a network like *the big idea* to grow, evolve, adapt and survive is bound by overlapping forces: technical, political, social and economic. Today's network users may be able to think of themselves as authors rather than consumers. However authorship and participation are limited by the boundaries of the system. In spite of this, the economics of networks still offer a counter space to hierarchies. The challenge now is for digital social networks to not only create productive social environments but also stimulate alternative economies which become both self-supporting and self-organising.

12. Guatarri, *The Three Ecologies*, 35.

13. Marshall McLuhan and Barrington Nevitt, *Take Today: The Executive as Dropout* (Ontario: Don Mills and Longman, 1972), 3.

A System of Drawing

Kurt Adams

The spontaneity of drawing allows a tactile passage into three-dimensional modelling software, contradicting the precision of its intended use. I am fascinated by the fingerprint on the screen, the varied density of the hand-drawn line, the crumb of graphite, the paper's folded edges. I began from landscape drawings, rough sketches of leaves and branches, diagrams of cloud patterns and tree silhouettes. The pages were scanned and the white of the paper removed, leaving a layer of fragmentary marks nested within the screen's array of clean shiny buttons and drop shadow menus. This library of digital drawing was utilised in 3D software as blueprints, textures or to deform flat architectural planes. The dark graphite lines created ranges of angular hills while smudges carved crevasses over the Cartesian grid.

Despite the alluring mutability offered by the computer, this method at first alienated me from my practice, changing the fluidity of mark making into a block puzzle where I clicked and slid wafers of drawings throughout the 3D grid. I tended to the scene each day and as I fed my virtual environment more and more images, the saturation of information provoked errors and software crashes. Traditional 3D graphics construct an environment in advance of plotting a virtual camera path through it, rendering this point of view as a sequence of moving images. This positioning of a camera and framing scenes within it is like setting a stage and positioning props. My method was more improvisational, mixing together drawing and audio, which I used to generate erratic movement. The 3D software converts the amplitude of a sound wave into a value that can be used to animate any parameter within the virtual environment. At a basic level the audio can work like a switch, turning something on or off at a certain threshold, but it can also be used to control an incremental change, a texture fading in or out for example. If the sound's waveform is very jagged and angular then it causes unpredictable stress in an object or texture, the landscape spasms and falls apart, tree silhouettes flicker and distort.

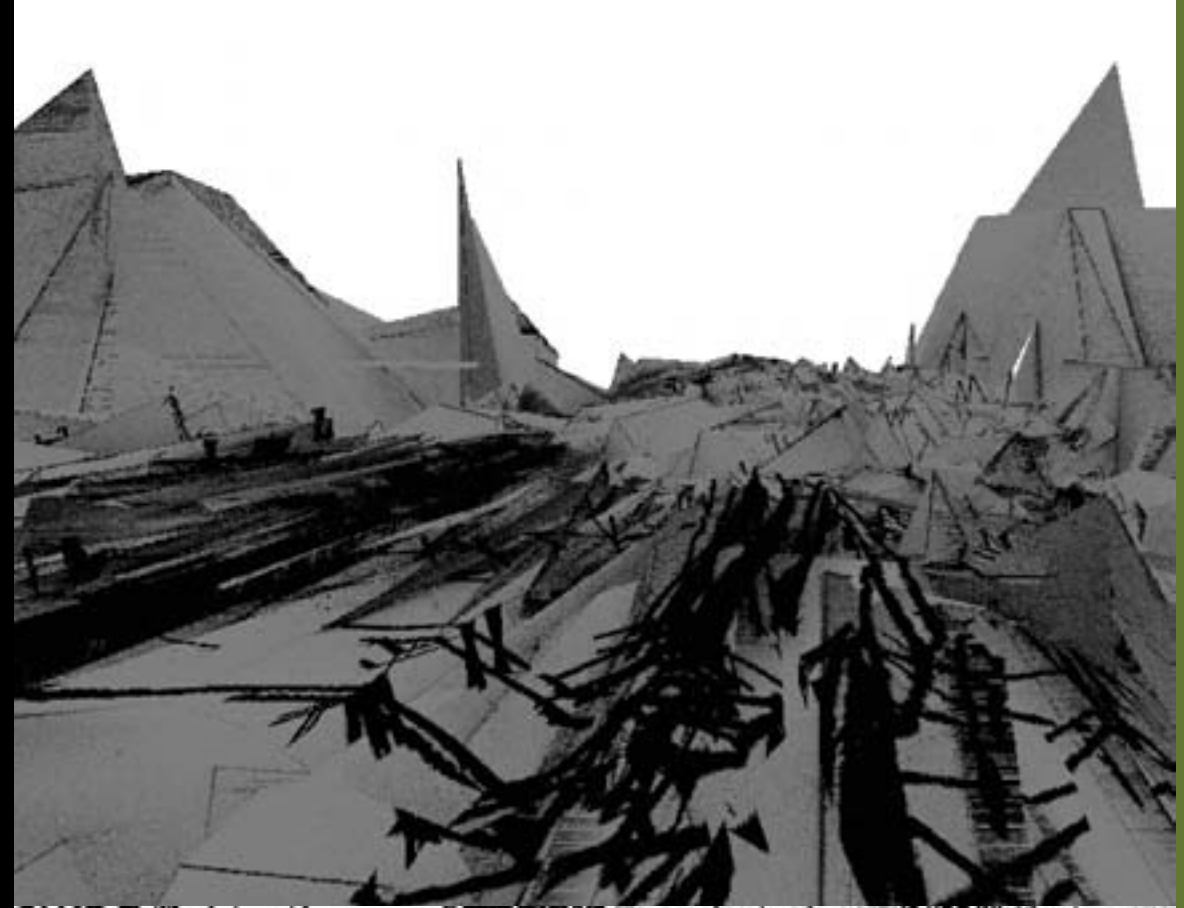
My video output of the 3D space was like working over a canvas and periodically photographing the building-up of the surface, akin to William Kentridge's process of drawing for the camera, his animated charcoal reworkings and erasures creating a narrative. My environment at times was so fragile due to file size, limited computing power, and software instability, that getting a camera to pass over the 3D landscape without crashing was difficult. But the space was so chaotic, it wasn't until inserting a camera that I gained a sense of a horizon and framing. The result was more like witnessing a space unfolding, rather than examining a modelled object.

As fragments crunched and flickered into new compositions I witnessed elements of drawings crumple and compost into the folds of geometry. Certain areas produced vast crops of glitches and surface anomalies, fingerprints grew odd polygon artefacts and the subtle translucence of smudges generated seductive glitches. As I pulled the camera backward through the sprawl of this shimmering garden, the viewpoint was like looking out the back window of a car as the receding landscape is slowly revealed. There is a tension and unease created with this constant falling backwards into an unknown environment.

Eventually geometric debris flooded the viewpoint. With each camera path providing endless baroque arrangements I became absorbed in the scenes' complexity. Some imperfections and irregularities seemed familiar, with their pockets of recognisable drawings and flecks of handwritten notes, yet I felt dizzy, immersed in overgrown fields of information. Finally, travelling through this world, I got lost. Unable to find my way back to my previous day's work I sat and sketched from the screen as if I were a *plein air* painter sitting in a field, gazing at a landscape for the first time. In those new drawings I lost all contact with the original composition. Each subsequent sketch was another fold, another iteration. After a while I began to see Bezier points and vertices in my marks. The language of my digital tools was emerging through my drawings. The lure of the polygons was overwhelming. The crowded screen couldn't disguise my circuitous betrayal.



Above: Kurt Adams, *Error Curve*, 2006, 7:24 minutes, 3D animation.
Next pages: Kurt Adams, *Grayscale Drawing*, 2003, 39:43 minutes, 3D animation.



Electromagnetic Dreams: New Zealand Artists in Radio Space

Zita Joyce

Radio waves, the electromagnetic waves transmitted by human communications devices, flow constantly around and through us all, permeating our bodies and our environments with a constant stream of information. In their ubiquity, radio waves are described by French art collective Bureau d'Etudes as a new kind of natural object, one with which, after slightly more than one hundred years of use, humans have become intrinsically connected.¹ As a result, "In a world constituted by electromagnetic cosmology (and industry), understanding the electromagnetic wave field is the only way to understand ourselves and our surroundings."² When media theorist Mackenzie Wark observes that "Television passes through and permeates every pore of my body," he is referring to his absorption of the content of television, which renders his body "90 percent TV drama and pop songs and other trash that wafted in on the vector."³ In this, Wark incidentally acknowledges the permeation of his body by the waves that carry television information, to which could be added radio sounds, cell phone calls, and data transfer.

Radio and other electromagnetic waves are so intrinsic in contemporary communications that German new media artist and curator Armin Medosch describes them as the "invisible workhorses of electronic mass society" and the fundamental medium of media art.⁴ Radio waves are the medium of art that works with broadcast radio and television signals, of projects that use wireless networking and ubiquitous connectivity, of GPS-enabled locative media, and of cell phone-based interactivity. In using radio technologies artists are not simply exploiting their cultural meaning, instant connectivity and location-awareness. Rather, artists are engaging with the medium of radio waves in ways that reveal new aspects of our electromagnetic environment, and raise awareness of the role of these 'invisible workhorses' in our lives, as well as the social, political, technical and economic forces that shape our interaction with them. By engaging with these kinds of issues, Marshall McLuhan wrote, the artist is "indispensable in the shaping and analysis and understanding of the life of forms and structures created by electric technology."⁵

McLuhan viewed 'art' as a means of apprehending the world, a preparation for coping with new technologies.⁶ This is articulated by Canadian artist Robert Adrian X in terms of a now-old 'new' technology as he discusses a 1982 work, an international telecommunications networking project using slow-scan television and telefax machines, which he directed. Of the role of artists in relation to new technologies he writes:

We can at least try to discover ways to insert human content into the commercial/military world floating in this electronic space. And this is where artists are traditionally strong... in discovering new ways to use media and materials, in inventing new and contradictory meanings for existing organisations and systems, in subverting self-serving power structures in the interests of nearly

*everyone. Artists using electronic telecommunications are trying to find human meaning in an electronic space.*⁷

In the case of radio waves this "electronic space" is the physical space of the everyday, which makes the role of artists in finding new ways to use radio technologies, subverting the power structures that control them and inserting human meaning into radio waves, all the more significant.

The "electronic space" of radio is a permeable and permeating virtual space. This kind of space is created all around us by the multitude of broadcast and telecommunications transmissions, but also by radio objects that are not documented on databases, by multiple small-scale sources of radio waves. In the introduction to the essay collection *Radiotext(e)* Neil Strauss observes that 'radio' is much more than just the receiving boxes usually associated with the word, "Radio itself is something you can't see, or necessarily even hear; it's radio receivers that are visible and audible."⁸ Receivers are simply interventions within the broader progress of radio waves themselves: outside the receiving box, radio "knows no boundaries; its signal is as unavoidable as it is unstoppable."⁹ John Cage described radio in terms like this in a 1966 broadcast with fellow composer Morton Feldman, who complained about the ubiquity of sound from transistors. In response Cage argued:

*All that radio is... is making available to your ears what was already in the air and available to your ears but you couldn't hear it. In other words, all it is is making audible something which you're already in. You are bathed in radio waves.*¹⁰

This sense of radio evokes the permeation of the body suggested by Mackenzie Wark, and the electromagnetic wave-field described by the Bureau d'Etudes. Radio space is the pervasive quasi-natural presence of broadcast and communications transmissions, the electromagnetic pulses of astronomical objects, the signals of wireless networking, and what Anthony Dunne calls the "electromagnetic dreams" of electronic objects. These dreams describe the tendency of devices to "leak radiation into the space and objects around them, including our bodies."¹¹ Dunne observes that:

*All electronic objects are a form of radio. If our eyes could see (tune into) energy of a lower frequency these objects would not only appear different but their boundaries would extend much further into space, interpenetrating other objects considered discrete at the frequency of light.*¹²

This extension through radio frequencies reveals the extrasensory 'leakiness' and fluidity of visually inert objects, in which they take forms we can't interpret with our biological receivers. This sense of the invisible and inaudible radio world is explored by projects that intercept radio waves and translate them into sound, making audible the ubiquity of waves in the environment and reflecting on the broader implications of extended radio wave networks.

Boundary dissolution in radio space

radioquai's *Radioastronomy* project (begun in 2004) reveals the most pervasive and ubiquitous of environmental radio signals by audifying the electromagnetic emissions of the sun and distant extra-terrestrial objects, the radio-rays that bathe the planet. *Radioastronomy* connects the output of major

1. Bureau d'Etudes, "Electro-Magnetic Propaganda—The Statement of Industrial Dogma," in *Waves: Electromagnetic Waves as Material and Medium for Arts*, ed. Rasa Smite, et al. (Riga: RIXC Centre for New Media Culture, 2006), 44.
2. Bureau d'Etudes, "Electro-Magnetic Propaganda—The Statement of Industrial Dogma," 44.
3. Mackenzie Wark, *Virtual Geography: Living with Global Media Events* (Bloomington: Indiana University Press, 1994), 16.
4. Armin Medosch, "Waves—An Introduction," in *Waves: Electromagnetic Waves as Material and Medium for Arts*, 18.
5. Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: Mentor and Penguin, 1964), 70.
6. McLuhan, *Understanding Media: The Extensions of Man*, 71.

7. Robert Adrian X, "The World in 24 Hours," in *Ars Electronica: Facing the Future*, ed. Timothy Druckery with Ars Electronica (Cambridge, MA: MIT Press, 1999), 346.
8. Strauss, "Introduction," in *Radiotext(e)*, ed. Neil Strauss and Dave Mandl (New York: Semiotext(e), 1993), 9.
9. Strauss, "Introduction," 9.
10. Quoted in Joe Milutis, *Ether: The Nothing that Connects Everything* (Minneapolis: University of Minnesota Press, 2006), 98.
11. Anthony Dunne, *Hertzian Tales: Electronic Products, Aesthetic Experience and Critical Design* (London: Royal College of Art, 1999), 90.
12. Dunne, *Hertzian Tales: Electronic Products, Aesthetic Experience and Critical Design*, 89.

radio telescopes around the world via the Internet and uses a process of data audification to allow anyone to ‘listen’ to the sounds of the universe online. The *Solar Listening Station* iteration of the project foregrounds the sun’s electromagnetism and reveals the radio telescope to be simply a receiver tuned to the biggest radio station in the solar system. Ever since Dr Watson tuned into the first telephone cable, laid across the rooftops of Boston, in the 1870s, the sound of the sun has been treated as interference. Watson believed that the ethereal squeals and hisses along the line were the sound of explosions on the sun, but although they fascinated him, the search for a clear connection required the removal of an earth-wire, rendering the line immune to the solar signals.¹³ The discipline of radio astronomy was founded in the 1930s, after the realisation that the background hum in telephone systems was formed by traces of the radiation of the Big Bang. Solar electromagnetism is still a major source of so-called ‘interference’ in telecommunications systems, and rather than try to avoid this, the *Solar Listening Station* tunes directly into the sun, treating it as both source and content. The work makes available to our ears what is already in the air, and expands our perceptions of the sun beyond the frequencies of heat and light that we can see and feel, revealing the extent of its electromagnetic dreams.

Wifio (2006), a project by New Zealander Adam Hyde, with Aleksander Erkalovic and Lotte Meijer, exploits the openness of wireless networks to reveal the permeation of lived spaces by wireless transmissions and the insecurity of communications that take place within them. *Wifio* is a conceptual device, a radio receiver tuned into the 2.4 GHz band on which Wi-Fi signals are transmitted. The tuner receives all the signals exchanged between Wi-Fi devices within its range and reads aloud the text carried by the unencoded waves. By exploiting the unseen extensions of computers in Wi-Fi space, their ‘wireless dreams’, *Wifio* implicitly reveals the extensions of human consciousness through wireless networks. Users may imagine that emails and instant messages exist only as visible, textual objects, which simply disappear in the gap between computers, but *Wifio* reveals the presence of those words in the space beyond the wireless card and the router. The security implications of this are explicitly promoted by the faux marketing language used in the work’s exhibition material, which describes *Wifio* as a fun way for the family to hear what their neighbours are up to—“just turn on Wifio and find out what’s happening on the world wide web in your neighbourhood”, or “listen to what your neighbours are discussing using the new Voice Over IP telephones.”¹⁴ The language of *Wifio* frames it as family entertainment, but the project fundamentally emphasises the insecurity of Wi-Fi transmissions, and suggests that the flow of wireless communications within the 2.4 GHz range constitutes a form of externalised, extended consciousness.

From another angle, the musical practice of Adam Willetts engages with the electromagnetic dreams of objects across multiple wave frequencies, as he translates transmissions into dense layers of sound. Performing in the midst of walkie-talkies, telephone pick-up coils, wireless game controllers and an ‘electrosmog’ detector, he really does seem to be “bathed in radio waves”. The walkie-talkies create feedback loops of sound as the game controllers manipulate live sampling software on a laptop. Both create radio signals that are read by the ‘electrosmog’ detector, which receives and audifies all radio waves from 50MHz

1: RT16 antenna at Ventpils International Radio Astronomy Centre, Latvia, 2009, photographed for the *Radio Astronomy* project by *radioqualia*.
 2: RT12 antenna at Ventpils International Radio Astronomy Centre, Latvia, 2009, photo: RIXC.
 3: Zlita Joyce, with Igor Dreeki, Alan Kwok Lun Cheung and Steve Smith, *Ethernapping*, 2005 – 2006, A0 map detailing data from GIS and transmission data from the Radio Spectrum Management Group’s *Spectrum Online* database. The *Ethernapping* locates transmitters and the frequencies they transmit to illustrate the relationship between the physical and electromagnetic geographies of Auckland. In this map the only physical trace of Auckland is the blue outline of coast around the Waitemata Harbour and Rangitoto Island. Transmissions stretch across these boundaries, while a cluster of transmitters marks the density of communications in the inner city. The largest transmission circles emanate from the Sky Tower, a landmark, an entertainment complex, and the most powerful transmitter in the city.

13. Erik Davis, *Technognosis: Myth, Magic, Mysticism in the Age of Information* (New York: Harmony Books, 1998), 73.

14. Adam Hyde, Aleksander Erkalovic and Lotte Meijer, “Wifio,” in *Waves: Electromagnetic Waves as Material and Medium for Arts*, 74.



fig. 1

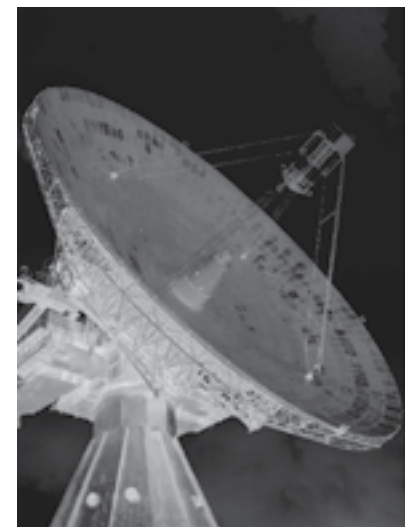


fig. 2

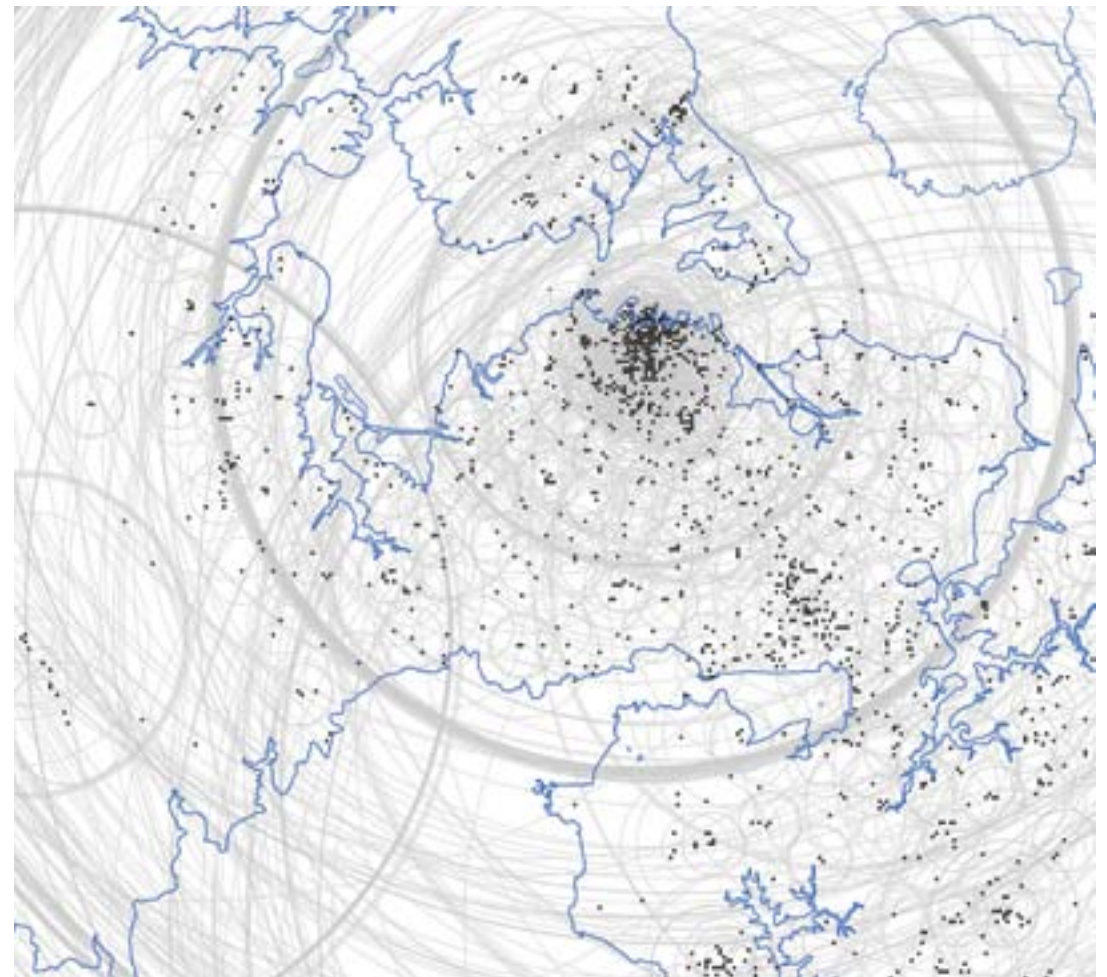


fig. 3

to 3GHz, locating the controller and walkie-talkie signals in a complex soup of intersecting broadcast, cell phone and communications signals. The telephone pick-up coils in turn dissolve the external shell of the computer, audifying the electromagnetic emissions of its internal electronics and making manifest the way it extends in space beyond its visible aluminium boundaries. In the middle of this array of devices, Willetts physically intersects the networks of radio waves he manipulates, extending his physical self, like his laptop, into multiple radio zones, layers of frequencies, an intermingling mass of radio waves. The devices create a variegated radio space, which at some frequencies barely extends beyond the electronics themselves, and at others reaches out into the audience or fills the room, or broadcasts beyond the performance venue on public communication channels. In this space the air seems viscous, filled with a tangible sense of the density of radio signals in which performer, instruments, and audience are immersed. The music appears to be crafted out of the air itself, sculpted into viscerally audible shapes. Like the *Solar Listening Station* Adam Willetts' practice foregrounds the noise that electronic music usually tries to eradicate, the 'interference' created by the instruments themselves. The signals his music draws on are not simply aesthetic devices however, they are iterations of political and economic networks, owned by commercial interests, and managed by the state. By pulling signals from the air and into his music Adam Willetts reveals not only the electromagnetic dreams of his laptop and radio tools, but those of the cell phone, broadcast, and communications networks that extend through his performance space.

Tracing property in radio space

The form and content of radio waves that are available 'in the ether' for artists to work with are influenced by forms of control that determine how radio signals may be used, transmitted, received, and interpreted. In New Zealand the transmission of radio signals has been managed by the state since the 1903 Wireless Telegraphy Act prohibited all unlicensed wireless communication—the first legislation in the world to do so. The licensing of radio transmissions, and the allocation of frequencies used for broadcasting and communications, was, like other areas of the economy, deregulated in 1989. This meant the government relinquished much of its control over who could use radio devices and for what purpose. Instead of the transmission licensing systems of the Post Office and Broadcasting Tribunal, the government established a market-based system for allocating radio frequencies by auction, creating a form of property right in the virtual space of the 'radio spectrum'. The radio spectrum describes the sequence of radio frequencies used for human communications. In New Zealand those frequencies are currently allocated by a combination of property rights and state-administered licensing, with a few designated as commons. Artists using radio waves in New Zealand are therefore not simply drawing on ethereal aesthetic tools, but are engaging with a form of electronic space that is inherently imbued with power relationships and financial interests.

The proprietisation of New Zealand's radio spectrum has been largely unexamined, and the extent and implications of the market in frequency property rights is for the most part only publicly apparent in the heavily commercialised nature of most New Zealand broadcasting. To raise awareness of the extent

and nature of ownership in the New Zealand radio spectrum, *Ethermapping* is a mapping project developed by Zita Joyce with Igor Drecki, Steve Smith and Alan Kwok Lun Cheung that attempts to draw connections between the radio transmissions within which we live and the ownership of property rights to those frequencies. The *Ethermapping* project is focused on a map that identifies the location of 1800 transmitters in the Auckland area and plots an approximation of the coverage of the 6000 radio frequencies transmitted from them. It is an expanded version of the 'node maps' used for freenetworking, on which people who keep their wireless routers 'open'—meaning that anyone can use them without payment or a password—can register the location and technical details of the wireless signal. In this way a node map traces a small proportion of the total transmissions at the 2.4 GHz frequency within a city. By documenting the 'closed', licensed, spectrum, *Ethermapping* seeks to reveal more powerful radio waves and their location in flows of finance and control, as well as the location of their transmission sources. Although many transmitters are physically large and visually imposing, their silence and passivity as objects can mean their role in translating between physical space and the flows of radio waves is overlooked. *Ethermapping* acknowledges the presence of transmitters in the landscape, and the way in which they reach beyond the visual boundaries of their physical construction into radio space. *Ethermapping* is an interactive digital map linked to a database of radio frequency licenses in New Zealand. The transmitters are represented as nodes, on which users can click to reveal a representation of the physical extent of the transmissions from that point. The map also shows ownership details of the frequencies transmitted from each point, along with technical parameters of the transmissions.

The information represented comes from a publicly available but complex database of radio frequency licenses maintained by the Radio Spectrum Management Group within the New Zealand Ministry of Economic Development. Without this level of access to the information the project would be impossible—similar data could not, for example, easily be compiled by walking around a city with a scanning device and measuring the extent of every radio signal. The database records all allocated frequencies in New Zealand, the owners of the licenses, the location of the transmitters, and the technical details of the transmissions. It ensures that information on the ownership of frequency licenses is accessible to potential bidders, as well as to the general public. However, this information is very technical and difficult to drill down into and interpret as a whole, so *Ethermapping* reframes it in a way intended to make it more accessible and meaningful for public users. As it is, the map currently treats the Auckland topography as an idealised flat expanse with consistent surface characteristics and atmosphere. The represented transmissions can only be a suggestive indication of the extent of Auckland's radio space. *Ethermapping* was developed to provide a context for the growing field of media art that uses radio waves, to represent the radio waves themselves, and to connect their artistic exploration with the economic, political, and technical forces that structure these technologies.

Not all of New Zealand radio spectrum is treated as property, however. Some frequencies are reserved for shared, unlicensed use that is not documented in the spectrum database. These include the 2.4 GHz bands used for wireless

networking, and also the 'guardband' frequencies which were opened up for unlicensed 'low power fm' (lpfm) broadcasting in 2003. Most low power stations in New Zealand are run along the model of 'normal' broadcasters. They have songs, voicebreaks, even advertising, but low power fm could be a space for more creative use of radio. The *Radio Kiosk* project initiated by Zita Joyce and Adam Willetts in the Kiosk public art space in Christchurch in June 2006 used a very low powered fm transmitter, which was built by Adam Hyde to a design by Japanese 'mini-fm' pioneer Tetsuo Kogawa, to create an art radio station out of content contributed by broadcasters and podcasters in New Zealand, Australia, and the Netherlands. *Radio Kiosk* was a commentary on the diminishing space for experimental and art programming on radio around the world and it carved out a little physical space of transmissions dedicated to creative radio. The transience, smallness and invisibility of the transmissions inevitably made this a somewhat futile gesture however, amplifying the difficulty of creating and maintaining space and recognition for art radio.

The delicacy of very low powered fm broadcasting is exemplified by the use of radio in the multifaceted *No Chinatown* project; a reflection on Auckland's lack of a recognisable Chinatown area initiated as part of the 2007 Auckland Triennial by Chinese collective The Long March with New Zealand artists Daniel Malone and Kah Bee Chow. The *Friendly Road Radio* broadcasts accompanied the project's architecture competition, held in the Gus Fisher Gallery, in which exhibition visitors were invited to create models of a potential Chinatown. These transmissions appropriated space in the overcrowded radio spectrum of downtown Auckland, using the publicly zoned low powered fm radio band to extend the space of the *No Chinatown* project, creating a kind of Chinatown of the airwaves, what Daniel Malone calls an 'allegorical model' of what a Chinatown might mean. The fragility of the low powered broadcast, the interference, unstable tuning and small scale of transmission mirrors the intangibility of cultural spaces in a city with multiple forms of Chinese cultural presence but no Chinatown.

Friendly Road Radio complemented the *No Chinatown* project's spatial and discursive concerns—the fragile cardboard models and the contingent and performative aspects of the project's planning and realisation. The contingency was emphasised by an unstable radio space that combined programmes from various local and international Chinese radio stations with historical New Zealand recordings and sound works such as *The Jamming Incident*, James Pinker's 2003 piece about the jamming of Uncle Scrim's radio show by the New Zealand government. 'Uncle Scrim' broadcast a programme on Auckland station 1ZB during the Great Depression, in which he offered support for the poor and downtrodden in the form of a 'radio church'. The 'Church of the Friendly Road' was revolutionary in offering space for ordinary New Zealanders to speak about the realities of their lives in the Depression in its vox-pop 'Man in the Street' sessions. Scrim's active support for Labour in the lead-up to the 1935 General Election was considered so threatening to the conservative government that a critical broadcast just days before the election was 'jammed' by the Post and Telegraph Department and the Friendly Road was drowned out by powerful interference. Long after Labour's resulting victory, and the end of Scrim's own career in the New Zealand Commercial Broadcasting Service, in 1959 Scrim served as an advisor for the

Chinese television service. Uncle Scrim serves here not just as a tangential link to Chinese state broadcasting, but as a reminder of the community-building possibilities of radio, its role as a site of public discourse, and the potentially precarious nature of access to the means of transmission.

The mainstream broadcasters form a predominantly Pakeha presence in the commercial, propertised areas of the New Zealand radio spectrum. Other cultural identities are marginalised into community stations and the low power fm bands. These radio spaces still maintain a potential tactical power however, mobilised through low power fm's small scale and temporal immediacy, the specificity of its geographical and community location. *Friendly Road Radio* asserts a Chinese presence in the public space of the low power fm bands, a makeshift Chinatown cobbled together from local historical discourses, and transplanted cultural reference points. Its transmission area was tiny, largely containing the project within Auckland's Gus Fisher Gallery, a grand brick edifice built in 1935 for state-owned commercial broadcaster 1YA in Shortland St. The low power broadcast returned the building to a micro version of its original purpose and tactically transplanted Scrim's broadcasts into the heart of the original state broadcasting establishment.

The art projects documented here use radio technologies that are frequently overlooked, taken for granted, or perceived in purely utilitarian terms. In these works however, radio is revealed to be a means of connecting into broader networks of social meaning, naturally occurring transmissions, and economic and political interests. New Zealand's radio space is heavily commercialised and imbued with a legacy of strict regulation. These artists are trying to find human meaning in radio space, to translate its content and networks into new and surprising forms using the radio signals that permeate the pores of our bodies, and describe our electromagnetic dreams. The invisible workhorses of electronic mass society are shaped by systems of allocation, administration and control, by the ideologies of economic and political power, and by the way in which users engage with them. In their representations of radio technologies and the connections they make possible, these artists make available what is already in the air in new and potentially challenging and revealing ways.

New Work for PCs and Unreal Gallery

Morgan Oliver

New Work for PCs (2007) is based on a simple scenario. A visitor walking into the gallery triggers a motion sensor, which prompts the generation of a random character in the video game projected on the wall. The video game space mirrors the actual space, but in the virtual gallery no visitor ever leaves voluntarily, so the population of the virtual space increases with every new visitor. Eventually the game is slowed by the computer's need to calculate all these virtual bodies, creating a lethargic slideshow of unpredictable polygons and clipped geometry. There is, however, a solution to this virtual population explosion. One press of a button on the wall of the actual space blows the characters into chunks of digital flesh. Another button unleashes a series of monsters into the game space, creating a flurry of noise and action as the gallery-goers leap into defensive action.

New Work for PCs is moronic reduction of video game logic to its most basic functions: spawn/kill. It's not likely to immerse you in its lifelike depiction of gallery activity. In fact its goal is to create a kind of Brechtian alienation effect, to make the game look strange, to allow the observer to be consciously critical of both the game space and the actual space. It fosters a distancing between the viewer and the work that resists the exacting verisimilitude of modern gaming, which has immersion as its highest goal. Yet the depictions are real enough to induce a healthy sense of unease. White cube gallery spaces are custom-made for virtualisation. In a sense they already are virtual—mutable and experimental—separate from the everyday. So despite the heavy-handed cartoonish violence, we still find ourselves looking over our shoulder when shots ring out.

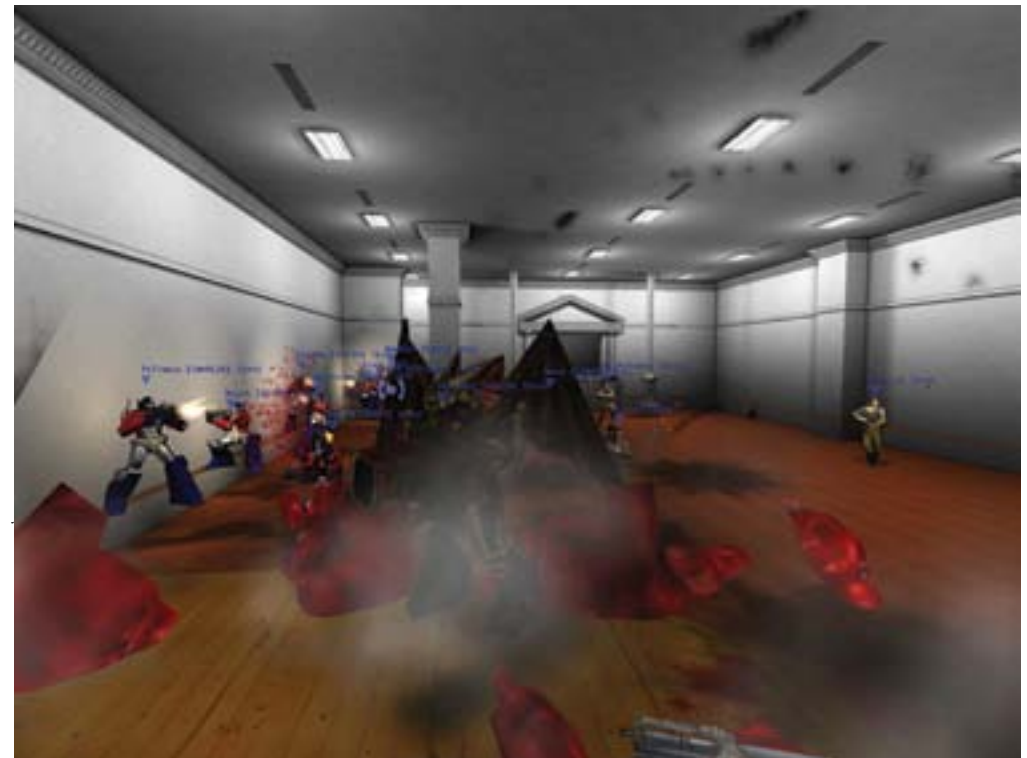
Another context for these works is the community of game modifiers, who exist largely outside of the borders of contemporary art. Each character used in these works represents a member of the modding community. I received permission from each modder to use their avatar in art projects, enabling me to build up a visual cross-section, a collection not only of homebrew avatar creation, but also of pop-cultural signifiers close to the hearts of gamers.

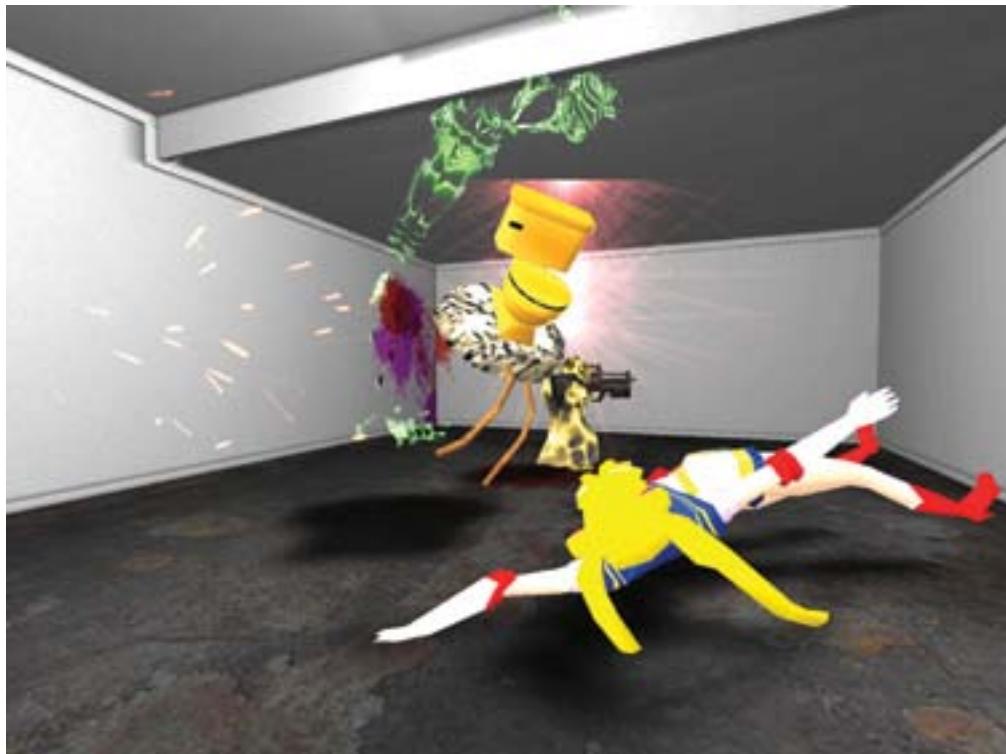
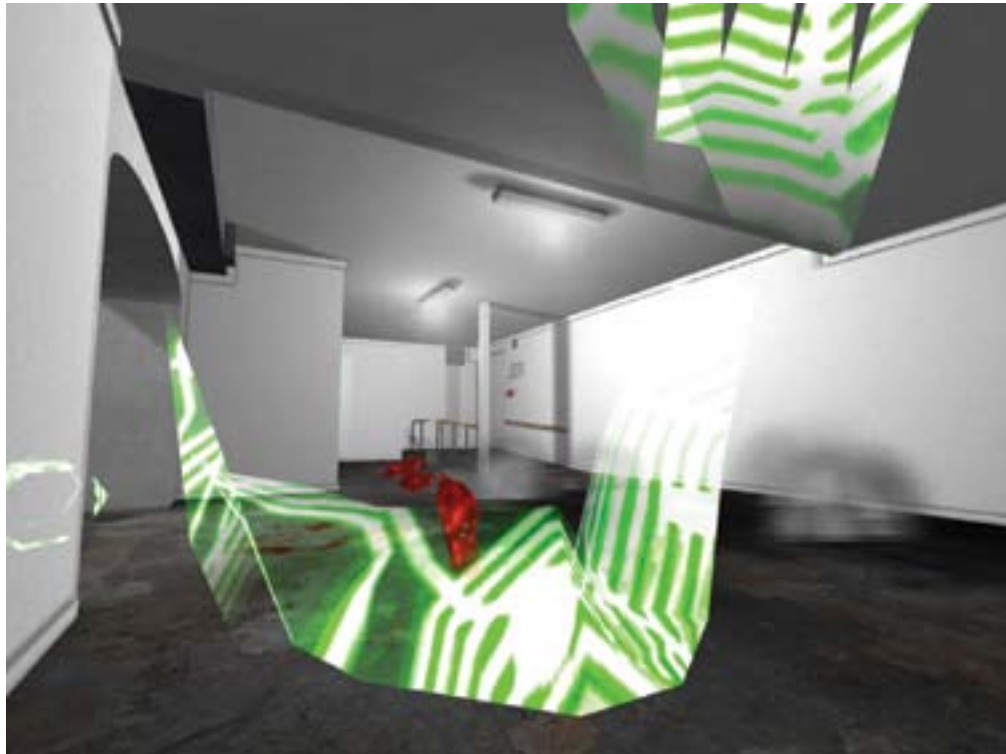
Unreal Gallery (2007) was made for a group show called *Play* at the Blue Oyster Gallery in Dunedin. It thus begins with a performance based approach. Again the gallery is reproduced as a 3D landscape in an off-the-shelf first person shooter PC game. Prior to the show, students were invited to participate in a day-long fight to the finish within these virtual gallery walls. Players come and go as they please, the action ebbs and flows. Some participants investigate the space, hiding out, exploiting software glitches to spawn multiple identical characters, or using bullet-hole decals to graffiti walls. Duels take place while onlookers and players explore the range of avatars on offer.

Over the course of the day, the game engine maps and records the movements and actions of every player. After the melee ends, these files are played back in real-time, projected into an alcove in the gallery. A button on the wall allows viewers to cycle through the first-person points of view of the players, as well as the records of static cameras situated within the game. Because of the length of the game, its looped playback, and the number of participants over the game's duration, what is created is a never-ending, never-the-same video.

Unreal Gallery is a critique of verisimilitude using the gallery as a test environment. There is a gap between the virtual yet apparently 'real' gallery and the scruffy menagerie of homemade characters populating it. Over the course of two weeks in the actual gallery, viewers were liable to have quite different experiences with the work depending on the time of day and camera view.

As an artist, I see videogames as image-makers of great complexity, tools for creating autonomous digital constructs. Game software can create navigable spaces and draw lifelike images dozens of times a second. The at-times frenetic pace and cartoon ultra-violence of these games leaves some viewers breathless and disoriented. But *New Work for PCs* and *Unreal Gallery* aren't critiques of videogame violence, they are transparent models of games; a demonstration of the potential of play to become art.





Morgan Oliver, *New Work for PCs*, 2007, real-time projection, game mod.

1980s Home Coding: The Art of Amateur Programming¹

Melanie Swalwell

Writing code oneself was a key part of the reception and culture of early home computers; systems such as the BBC, the Spectrums, the TRS-80, the Atari, Commodore and Amiga ranges, and the Sega SC3000.² In the 1980s, home coding was a significant use of these computers, both in terms of the numbers of people who dabbled at coding, and as a mode of engagement with a then–new technology. A highly experimental practice, it presaged many of the contemporary practices involved in digital culture, the often-discussed phenomena of appropriation, modification, and remixing. Yet while the ‘advent’ of Web 2.0 has raised the profile of productive consumers, remarkably little attention has been paid to the earlier practices of home coders.

This essay focuses on the *experimental* basis of home coding in the 1980s, drawing on archival and interview-based research into the New Zealand reception of computers and digital games during this decade.³ This research into home coding enables us to develop a clearer understanding of the uses that people made of home computers. After the French theorist, Michel de Certeau, I suggest that we know very little about what people actually *did* with these early items of digital consumer technology.⁴ Though some accounts do exist, these tend to be more concerned with either the spectacular (hacking) or the feared potentials of the ‘computer revolution’, such as job losses, thus they provide only partial understandings of early engagements with digital technology.⁵ One reason why home coding may have been overlooked is its *everydayness*, its homeliness, if you like. Even today, those who dabbled at writing software at home—after school or on the weekend—typically consider that their activities were unremarkable, expressing their sense that ‘everyone was doing it.’ Unfortunately, this popularity does not guarantee that home coding will be remembered; indeed, many of the creations of this era—dubbed ‘hobbyware’ by one of my informants—have already been lost.⁶

I have conducted in-depth interviews with people who were active home coders, and in this essay I blend extracts from the accounts of Katharine Neil, Mark Sibly and Simon Armstrong, Fiona Beals, and John Perry, with material from other informants (including the founding editor of *Bits and Bytes* magazine and technology journalist, Neill Birss) and archival sources. I focus here on the twin issues of how my informants learnt to code and what it was that they wrote. In many, if not most cases, the simple answer to the question of what they wrote was, ‘games.’ I have pursued informants who are knowledgeable about early games, because games were often a key reason why people purchased or otherwise acquired a computer. An important driver not just of the development of early home computers—or ‘micro-computers’, as computers for the home or office user were then called—games also drove the uptake of many early home computer systems, as Neill Birss observed. Though they are often deemed unworthy of serious consideration, digital games are significant in the histories of both home computer use and amateur coding.

1. This research was made possible by grants from the Faculty of Humanities and Social Sciences, and the University Research Fund, Victoria University of Wellington.

2. This last system attracted immense interest in New Zealand, probably because there was little commercial English-language software available for it, at least to start with; because of this gap, people rose to the challenge and wrote their own. Collectors have compiled a list of literally hundreds of software titles that were locally written. See A. Wheeler and M. Davidson, “SC3K Tape software list,” *Sega Paradise*, 28 May 2005. <http://homepages.paradise.net.nz/atari/sc3000lists.html>. This system is the focus of a pilot project by VUW’s NZTronix research team, of which I am a member: we plan to port and re-distribute an early locally written game title for use on a mobile phone platform. For more information, see <http://www.nztronix.org.nz>

3. New Zealand is a specific case in the reception of early home computers with its own idiosyncracies. Research indicates that the advent and arrival of early computers in New Zealand was uneven *vis à vis* the rest of the world, both in terms of the systems that were brought in and the issue of delay or ‘lag.’ Nevertheless, a number of similarities exist between the New Zealand reception of home computers and that of other geographic contexts. Some of the research detailed here will, therefore, resonate with the histories of computing in other locales. See Melanie Swalwell, “Early Games Production in New Zealand,” paper presented at *Digital Games Research Association Conference*, Vancouver, Canada, 17 June 2005, and Melanie Swalwell and Loyer, “Castoffs from the Golden Age,” *Vectors: Journal of Culture and Technology in a Dynamic Vernacular* 3, April 2006. <http://www.vectorsjournal.org>

As early adopters of digital computers, home coders were effectively inventing uses for home computers. Though a number of magazines advocated the usefulness of programs to help with household budgets, and word processors to compile recipe collections, none of these could be considered the ‘killer-app’ of home computing. Compared to other technologies whose use is clearly part of, or implied by, their function, early computers were a technology in search of a use. On their own, they were essentially *useless*. Programming was the only use that was indigenous to the computer. As Katharine Neil explains:

...you couldn't really do much with computers back then unless you learnt a bit of code. You'd do really dumb, primitive things, but... In those days, people bought games and they'd play games, but the coolest thing was to write stuff yourself. In those days, you bought a computer and you bought a book on how to program it, and there was only one way you could do it! And if you didn't do it, then what was the point of having a computer, because it didn't do anything, it didn't do anything for you.

Learning to code

In 1983, Colin Boswell predicted that “computer education would take place in two places—the school and the home.”⁷ While computer classes were on offer in some schools (and the debate about computers in schools was heated and long running), and enrolments in formal computer science degrees rapidly escalated during the 1980s, many programmers were self-taught, at least initially.

The computers of the 1980s demanded that users learn to program. Programming might therefore be thought of as a use that was *implied*. As Mark Sibly and Simon Armstrong explain, in response to my asking how they learnt to code:

Mark: *It was much easier in those days, because you turned on a computer and you basically had to program. That was all you could really do. So, the first thing you had to do was command to load a program and then run it.*

Simon: *And you've learned two commands, 'load' and 'run' and you go from there.*

Mark: *And the manual that came with those early computers would have, in the back of it, a hardware diagram. It would have all the highly technical machine code stuff at the back... everything you would possibly need to know about it.*

This is in sharp contrast to contemporary computers: effectively ‘black boxed’, most people know very little about what goes on inside them.⁸ As Sibly and Armstrong continue:

Mark: *Nowadays, if you want to find out something about computers, you can spend a week on the internet and still not find it.*

Simon: *It would be a bit like, if you have an old car, you can buy one of those books, and you can pretty much take cars to bits and put them back together again with one of those books. But there's no way you could do that now with new cars. And computers, it is the same, you can [sic] get a book that actually tells you everything, so you can teach yourself.*

1: John Perry, *City Lander*, 1984, computer game.

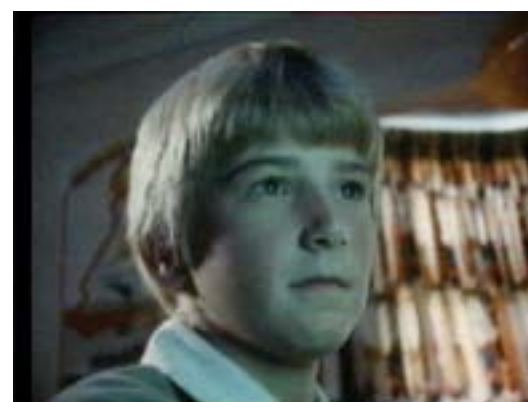


fig. 1

4. Michel de Certeau, “General Introduction,” in *The Practice of Everyday Life*, trans. Steven Rendall (Berkeley: University of California Press, 1984), xii-xvi.

5. Colin Beardon, *Computer Culture: The Information Revolution in New Zealand* (Auckland: Reed Methuen, 1985).

6. Swalwell, “The Remembering and the Forgetting of Early Digital Games: From Novelty to Detritus and Back Again,” *Journal of Visual Culture* 6, no. 2 (2007): 255 – 273.

7. Quoted in Pat Churchill, “Coming Up: More Home Learning,” *Bits and Bytes*, December – January (1983 – 84): 63.

8. Dylan Evans, “Smash the Windows,” *The Guardian*, November 6, 2003, np.

Like Sibly and Armstrong, my other informants' learning was also largely informal. Typically, it was a process of trying and testing, trial and error.⁹ John Perry described how he came to understand Basic as if he were "learning a new language." While his family had some books around, which he would occasionally refer to, more often, he recalls:

...you learn a 'word'—a function, a command—and you use that, and suddenly it changes all your programs, because suddenly you've got something that you can do. And then you learn some other trick. And generally I'd see someone use it in a program or something, and I'd look it up in a book sometimes, but mostly there was [no need for a book]. Mostly to start with you'd just copy the program and change a few little things to work out what was going on.

Fiona Beals received her ZX Spectrum from an elderly couple whom her mother knew. They had decided it wasn't much use to them. The instruction book that came with it wasn't helpful, telling only how to set up the computer to type a letter. Beals found the Usborne range of books more useful, and, using these, she taught herself to program. To start with, she would type in other peoples' game programs. Then:

Once I clicked onto what was happening with the book, I was able to go 'well actually I don't want it to do this, I want it to do that.' I could start manipulating the code to do other stuff...

Like Perry, hers was a process of learning by doing:

When I was writing the code myself, I would always write 5 or 6 lines of code and then end it, and test it, run it and see how it would go.

Beals grew up in Westport, an isolated region of New Zealand, with little contact with others who were programming. As such, she recalls not knowing that what she was writing was a computer language:

I didn't know that until I learnt Basic in high school, and I was like 'Hey, I know all of this, I know this idea.' I didn't know all those things were actually a computer language. I had just thought 'oh, you have to give the computer instructions', and I actually clicked onto as a kid that the instructions were like a flow chart—that you could send it back and forth and stuff like that.¹⁰

Magazines were another useful resource for the budding programmer. Typically, magazines of the period contained source code, as Katharine Neil explains:

You know how you buy games magazines now and they have CDs or DVDs on the cover, in plastic attached to the cover? In those days they had the source code, they printed the source code [in the magazine], in Basic. And you'd type it in. So they'd have a couple of pages of the code for a game, a sample, simple little game.

In New Zealand, the locally published *Sega Computer, Bits and Bytes*, and *Computer Input* (known simply as *Input* to those 'in the know') were important for staying in touch with other coders. The contributions of readers/users to these magazines were many: subscribers sent in their programs, high scores, and the contact details of user groups in their area. As the editor of *Sega Computer* wrote encouragingly:

It is important to note that this is YOUR magazine. So please send in any programs that you have, be them [sic] small or large, complex or simple...it matters not. If someone sends in a program and someone else learns from it then it has been worth it! To be quite frank I could name ten people in the UK, and three in New Zealand who now make a lot of money through writing programs, and they all started by writing a few simple programs and having them published in computer magazines! SO GET WRITING!¹¹

Magazines were also the place where the achievements of fellow programmers were celebrated, such as the 1984 publication by Grandstand of the 13 year old John Perry's game, *City Lander*.¹² And *Sega Computer* provided the enterprising Allan Rodgers of Gore—then 17—with a contact for Grandstand's in-house programmer, Michael Howard, to whom he wrote for advice on a career in programming.¹³

Some schools allowed pupils to take school computers home on weekends and over holiday periods, or to frequent the computer room at lunchtime, and these provided important opportunities to master coding techniques. Yet few of my informants credit formal school computer classes with igniting their interest in programming. Some gleaned knowledge from local users' groups, of which New Zealand had a considerable number. For their part, Sibly and Armstrong found these meetings too much "like church" and only attended a couple of meetings, preferring to spend time "at home or at friends' houses, learning how to program and making little games, experimenting with them."

Finally, computer camps, such as the ones planned by Peter R. Carr and Barry C. Small for the summer school holidays one year, offered another source of information and learning about computers. This series of camps aimed:

...to make the children aware of computers, the power and versatility of computers and the effect of modern technology on society now and in the future... teaching them to use standard application programmes and packages, teaching robotics, and voice synthesis methods and electronic and servicing techniques through building a simple computer. Other topics including vocational guidance, future developments, effect on society, covered by use of visiting lecturers and video training films.¹⁴

Whether the attendees learnt to code or not isn't clear from the brochure. But like some user groups, one wonders how much fun the kids would have found some of the activities (i.e. were schoolkids of the 1980s interested in the societal effects of computers?).

Users as makers

The use of home computers, as the above accounts indicate, was fundamentally experimental. And this home use is one of the first moments when experimentation with digital technology is widespread. Home coders represent a classic case of use and consumption as a form of active production. In *The Practice of Everyday Life*, De Certeau makes a distinction between production and the uses that are made of products by users who are not producers.¹⁵ His work is useful for understanding the active form of consumption that is experimentation: the verb '*faire*' in De Certeau's French title *Arts de Faire*, communicates more

9. I draw here from Raymond Williams' meditation on the term 'experience' in *Keywords*. Noting the term's complexity, he writes that experience was "once the present participle not of 'feeling' but of 'trying' or 'testing' something," that is, of experimentation. Raymond Williams, *Keywords: A Vocabulary of Culture and Society*, revised ed. (London: Flamingo/Fontana, 1983), 128.

10. I have had a similar realisation during the course of this research that I, too, knew some Basic, though in my case, this was taught in computer classes at school in Australia.

11. *Sega Computer*, "Editorial," *Sega Computer*, Jan/Feb/Mar/Apr (1986): 1.

12. *Sega Computer*, "Sega's Young Programmers: Today New Zealand, Tomorrow the World," *Sega Computer*, 1 (1984): 21.

13. Allan Rodgers, email message to author, 16 November 2007, citing letter from Michael Howard to Allan Rodgers, 3 December 1985.

14. *Hey! These Holidays you can go to the 6 Day 'Computer Fun Camp'* [brochure]. Auckland Collection: City Library, New Zealand Department, Ephemera/Computers, no date.

15. De Certeau, "General Introduction," xii-xvi.

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Computer Age Learning

By Pat Churchill

There is no disputing the magnetic attraction of the computer. Wherever a computer is on public display going through its paces you can almost guarantee the surrounding few metres will soon be packed with people wanting a look, or better still a go at the keyboard.

The Learning in the Computer Age Exhibition at Wellington's Michael Fowler Centre in October was no exception.

Organised by the Wellington branch of the New Zealand Educational Administration Society (NZEAS) the exhibition featured the latest in computer software and audio-visual educational materials, plus a comprehensive range of computer literature. It was very much a "show and tell" affair with an opportunity in the afternoon for teachers, students, and parents to look over the displays.

Exhibitors showed educational software for a variety of computers including the Poly 1, Atari, Commodore, BBC, Apple, ZX81, BMC, and Pencil II. There were also packages for teachers and school administrators covering such topics as time-tabling and course options.

The Wellington Polytechnic's Poly 1 display attracted considerable interest, and an adjacent display showed how physically handicapped children at Kimi Ora School in Wellington are able to use a Poly 1. The bright yellow machine featured three large keys to enable users to tap out letters in Morse code — a dots key, a dashes key and an "enter" key. This was just one way a disabled child could operate a computer.

One interesting feature was the number of youngsters introducing their parents to computers. The

exhibition will no doubt generate another round of cake stalls.

As Dr Colin Boswell, president of the New Zealand Computer Society, told a local newspaper covering the exhibition, "cake stall money" has provided more than \$1,500,000 towards computers for New Zealand schools — more than the Education Department has allocated for the same purpose.

Dr Boswell, director of the computer services centre at Victoria University, said the Education Department had established a two-person curriculum unit to make programs available to schools, and had identified five preferred computers for secondary schools, but it needed to do much more or New Zealand would slip behind the rest of the world.

Parents viewing the exhibits were certainly enthusiastic and keen for their children to have access to computers at school. Some were clearly interested in the display with a view to purchasing home computers.

Dr Lynette Hardie Wills, of NZEAS, said the society was delighted with the response to the exhibition. A series of musical activities was organised in conjunction with the exhibition and participating youngsters were encouraged to bring their parents to view the displays as well as to hear the music.

"In addition to having parents and teachers present, we also wanted members of the education community who are making decisions about buying materials to come along. And we invited school councils and representatives from the Education and Labour Departments.

The Department of Education had been very supportive, she said, and had mounted a striking display.

Dr Wills said the exhibitors, too, were delighted with the amount of interest shown.

"There was a lot of informing going on."

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effectively the sense of an active making (in French, *faire* means to make or to do) than does the English term 'use', which tends to imply functionality and instrumentality.

Writing games at home was undoubtedly one of the most common *uses* that were made of early home computers. Fiona Beals describes one of the programs she wrote:

The one program I do remember, which was totally fresh, was that I generated a pyramid on the screen that was firing bullets, simulated style, probably numbers and letters (I used to use x's to generate the picture). So I had this pyramid of x's, bullets that were x's, and aeroplanes that were flying across, and it was all random. When the bullet hit the aeroplane, the aeroplane would explode, but it was done in a randomised way, so that you never knew where it was going to hit. I remember that I left it on because it was such a great thing, and my computer overheated.

Katharine Neil's home coding labours produced a tic-tac-toe game. Neil recalls:

I didn't know anything about graphics, so I wrote a tic-tac-toe game in ASCII, because I didn't know ...no, I knew how to draw lines. I drew lines and I used ASCII characters. I thought it was very, very clever, because I thought my computer AI was very, very clever, because the computer would always draw or win. It was impossible for my computer to lose. And I thought that was very clever for a few years, until I realised that everyone knew that!

The majority of home coders were amateurs, whose coding remained a hobby. Indeed, all of my informants were still at secondary school during the 1980s (subsequently, a number would have careers in various aspects of software development). There were, however, opportunities for home coders to gain *some* type of advantage from their programs. As already mentioned, magazines talked up the possibility of hobbyists turning professional, and the advertisement placed by Dick Smith Electronics in the December/January 1983 - 84 issue of *Bits and Bytes*—advocating "enterprising computer buffs" to profit from their hobby by writing programs for the new Dick Smith Colour Computer—illustrates this interest in the programs of home coders. Some coders, such as the young Mark Sibly, were thus able to benefit from their hobbyist involvement, albeit in a small way. Sibly "sold" his Vic-20 game "Dinky Kong" to an Auckland computer store owner, who later commercialised it in the U.S. His return from the transaction was an external floppy drive, enabling him to save his programs to removable storage media.

There is, however, a degree of instability or slippage around this apparent hobbyist mercantilism. I have heard a number of stories from people who aspired to sell their games, and were not able to. For instance, after having the code for his game "Harbour" published in *Computer Input* and selling "City Lander" to Grandstand for \$300.00 in the same year, John Perry wrote another game which he also showed the company.¹⁶ Grandstand, however, were not interested, as they already had a title in "Dungeons Beneath Cairo" that was similar to the one he was offering. "Dungeons Beneath Cairo" was considered superior because it was written in machine code rather than Basic. Others, like Andrew Kerr, who intended trying to have his untitled machine coded game endorsed by Poseidon software, never got around to it ("but it did get me an 'A' in computers

16. John Perry, "Harbour," *Computer Input*, July (1984): 21 - 23.

at college!”).¹⁷ In part, too, the energy and experimentalism of home coding ensured it would remain on the margins of ‘legitimate’ production. Despite the importance of games in driving the uptake of early computers, ‘serious’ software people (such as those who wrote software for mainframes or for accounting purposes) adopted a kind of ‘snobbery’ towards the user end of the market: fearing the association with games would diminish their credibility, Neill Birss recalls they wouldn’t advertise in *Bits and Bytes*. Whilst productive, then, in most cases home coding remained a practice that “produce[d] without capitalising.”¹⁸

A computer in the 1980s was, as Katharine Neil puts it, “an expensive toy”:

[People] use computers for work now. You didn’t used to use computers for work. People with home PCs use them for writing their CVs, and doing work-y things like using them as a communication portal and all that. Whereas computers in the 80s, when I was a kid, a computer was a luxury item for having fun... it wasn’t something that you had in your house because you needed a computer, like you need a mobile phone or something, and you do a bit of work on it as well. It was definitely a fun toy... far more of a toy than it is now. Today, people are like ‘Oh, I spend so much time in front of a computer, I go home and I don’t want to spend any more time.’ Whereas back then, it was like some cool novelty—it was like a Ferrari or something. It was like a Sunday drive: it was a luxury car that you drove around in on a Sunday, not a commuter vehicle that you sit in traffic jams every day in.

Home coders’ involvement with the computer as a “fun toy” laid the ground for an everyday, creative engagement with computers: a *messing around with computers*, a seeing what was possible. Theirs was a curiosity driven experimentation, in the tradition of making crystal set radios and hotting up cars, according to Neill Birss. Reflecting on teenagers’ ready embrace of the challenge of coding, Birss ponders whether or not there was a peculiarly New Zealand dimension to this:

I think perhaps when you’re very remote you don’t have the sense that hey, this is a big thing. Maybe if you grew up in Silicon Valley and you thought about writing something you’d see all these huge guys and you might be a bit more daunted in some ways.

While New Zealand’s remoteness is sometimes a popular ‘cultural narrative’ for the creativity of its inhabitants, I am more interested in thinking through what home coders did and what the significance of their activity is (rather than *why* they did what they did).¹⁹ Home coders’ ways of using the computer are particularly compelling. In the 1980s, programming seemed to involve an element of play, whether users were writing games or something else. This playful approach is distinct from the common instrumental relation to technology—so well diagnosed by Martin Heidegger—where the computer is viewed (predominantly) as productivity tool.²⁰ The persuasiveness of Heidegger’s critique of the instrumental conception of technology, and the status of his essay, “The Question Concerning Technology,” as one of the seminal texts in the field, however, also acts as a limit, in that it contributes to the naturalisation of instrumentality; thinking and theorising other relations to technology, beyond the instrumental, becomes difficult. Home coders’ provide a contrary example. Their use of early computers was not instrumental: it could not be, as they often did not know

17. Andrew Kerr, email message to author, 15 November, 2007. There is more detail on the plot and execution of Kerr’s role playing game in Swalwell, *Early New Zealand Software Database*, 2007. <http://www.nztronix.org.nz/main.php>. That Kerr provided a mock-up—rather than an image from the actual game, or the game itself, which he writes was “inadvertently lost”—points to the fate of many of the products of home coding. Similarly, when John Perry sold his computer, the “stacks of games” he’d written went with it. As well as collecting information about the range of software writing activity that went on in 1980s and 1990s New Zealand, the aforementioned database endeavours to collect information about such (lost) hobbyist titles, by inviting members of the public to contribute what they know via an online form.

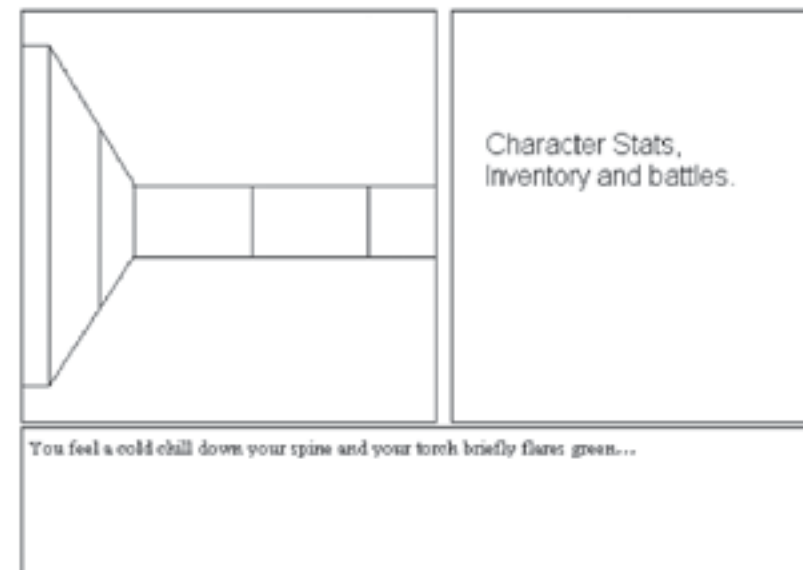
18. De Certeau, “General Introduction,” xx.

19. Brian Sweeney and Kevin Roberts, *NZ Edge: 1998 – 2007*, 2007. <http://nzedge.com>. See also Jan English-Lueck, “Number Eight Fencing Wire: New Zealand Cultural Innovation and the Global Silicon Network,” adaption of a poster presented at the Annual Meeting of the American Anthropological Association, Chicago, November 30, 2003. <http://www.sjsu.edu/depts/anthropology/svcp/pdfs/svcp8wir.pdf>

20. Heidegger, “The Question Concerning Technology,” in *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York and Cambridge: Harper, 1977), 3-35.

what they were doing. Effectively *making it up as they went along*, home coders invented a new relation with the computer. By their own accounts, it didn’t seem all that remarkable at the time, partly because such use was widespread and partly because relations with home computers had not settled into any *one* particular pattern.

Some contemporary digital makers—artists and others—embody an approach to computers that is reminiscent of home coding, an *ethic of experimentation*, in the sense that home coders’ trying and testing, their probing of possibilities, provided a base for invention.²¹ Having little regard for orthodoxy, such an ethic is both pragmatic, and displays a certain daring in following a line of thought to see where it leads and what might happen. The result might be unexpected and is often unlikely. As with home coders, what such acts of *poiesis* do is to bring forth other possibilities, new relations to technology, other modes of revealing.²²



Andrew Kerr, 1988, mock-up screen view of untitled role-playing game for the Sega SC3000.

21. I am not implying that artists do not know what they are doing, though not knowing what one is doing, on occasion, is to exist in a state of grace.

22. I am using *poiesis* here consistent with De Certeau’s quite broad usage, to mean creation, generation, invention rather than Heidegger’s (somewhat narrower) reference to the bringing-forth of the fine arts and poetry. See De Certeau, “General Introduction,” 205 n.2; and Heidegger, “The Question Concerning Technology,” 10.

The Graph as Landscape: Reflections on Making *Packet Garden*

Julian Oliver

A computer with access to the Internet will typically touch hundreds, even thousands of remote computers a day. Even if not in active use, software running on a modern operating system will regularly query other computers for an update, an address or even just a simple ‘are you alive?’. Over the last few years peer-to-peer software, instant messaging, mass-mailers, botnets and multi-player computer games have exponentially increased the amount of Internet traffic. *Packet Garden* maps this network contact, forming an accessible ‘walk-in’ graph, a geography produced through the accumulation of network events.



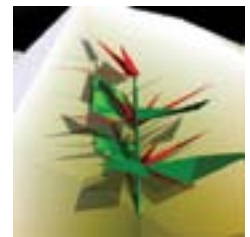
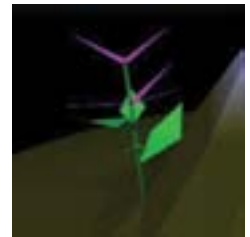
On a personal level, I set out to make *Packet Garden* to learn more about the Internet at the level of network messaging and to explore the metaphor of terrain as graph. Navigation of this terrain is a kind of reading: just as the undulations of the Earth’s surface can be read as records of energetic events below and above the surface, I wanted the landscape to both contain and represent information. The key challenge of this world-as-graph experiment was in the design of a heuristic landscape: which

data informs which element? The primary information I wanted to use in my graph—and so pass on to the user of the *Packet Garden*—was network address (IP), geographical location and a total of the data transferred.

Before design could begin I needed to know which information I could feasibly capture on Linux, OSX and Windows systems using the same base of code. To have access to this information at all I needed to work at a low level, looking at each packet of data going over the network card and dissecting it in turn. To do this I wrote a tiny program to run on the user’s machine that logged what went over the network card and collated the results in a way I could parse to generate a three-dimensional scene. In collecting this data I was stepping into a contentious area. The software I was writing was tracking some of the user’s most sensitive data—their computer’s network footprints.

Once this data was logged it had to be parsed so as to be meaningful within my geographical metaphor. I chose network load as my primary deforming force: uploads would make mountains and downloads valleys. In order to locate these formations and deformations, I needed to design a means to translate Internet addresses (IPs) into a system of three dimensional coordinates. Internet addresses currently use the IPv4 standard; IPs are comprised of four blocks of numbers between 0 and 255, separated by dots (the Aotearoa Digital Arts website has the IP ‘205.196.213.237’, for instance). These numbers form unique numerical addresses for computers, to which we ascribe names known as domains. These domains are made available to querying software such as web browsers by Domain Name Servers. This makes finding data held on a specific

```
while 1:
    try:
        for ts, pkt in p:
            packet = dpkt.ethernet.Ethernet(pkt)
            if type(packet.data) == dpkt.ip.IP:
                source = struct.unpack('4B', packet.data.src)
                dest = struct.unpack('4B', packet.data.dst) # unpack 4 block struct type.
                length = packet.data.len
                source_port = packet.data.data.sport
                dest_port = packet.data.data.dport
            elif type(packet.data.data) == dpkt.ppp.PPP:
                source = struct.unpack('4B', packet.data.data.data.src)
                dest = struct.unpack('4B', packet.data.data.data.data.dst) # unpack 4 block struct type.
                length = packet.data.data.data.len
                dest_port = packet.data.data.data.dport
                source_port = packet.data.data.data.sport
            geo_source = self.geo_ip(source)
            geo_dest = self.geo_ip(dest)
            if type(packet.data.data) in (dpkt.tcp.TCP, dpkt.udp.UDP) or \
                type(packet.data.data.data) in (dpkt.tcp.TCP, dpkt.udp.UDP):
                count += 1
                if source == ip:
                    dir = 'up'
                elif dest == ip:
                    dir = 'down'
                for k, v in self.ports.iteritems():
                    if source_port in v or dest_port in v:
                        proto = k
                        break
                else:
                    proto = 'unknown'
            if (source[0], source[1], source[2]) == (b1, b2, b3) and source != ip:
                pass
            elif (source[0], source[1], source[2]) == (b1, b2, b3) and dest != ip:
                pass
            if source == ip:
                dest_net = str(dest[0]) + "." + str(dest[1]) + "." + str(dest[2]) + "." + str(dest[3])
                try:
                    dict[dest_net] += " " + dir + " " + proto + " " + geo_dest] += length
                except:
                    dict[dest_net] += " " + dir + " " + proto + " " + geo_dest] = length
            else:
                source_net = str(source[0]) + "." + str(source[1]) + "." + str(source[2]) + "." + str(source[3])
                try:
                    dict[source_net] += " " + dir + " " + proto + " " + geo_source] += length
                except:
                    dict[source_net] += " " + dir + " " + proto + " " + geo_source] = length
            if count > 1000:
                count = 0
                current = time.strftime('%d'+ '-' + '%m'+ '-' + '%y')
                t = time.time()
                if current == start:
                    log = gzip.open(os.path.join(PG_DIR, 'Logs', 'pcap' + '_' + hostname + '_' + start + '.log.gz'), 'w')
                    for i in dict.items():
                        log.write(str(i) + '\n')
                    else:
                        dict.clear()
                        start = current
                        log = gzip.open(os.path.join(PG_DIR, 'Logs', 'pcap' + '_' + hostname + '_' + start + '.log.gz'), 'w')
                        log.flush()
                        log.close()
                    total = time.time() - t
                    print "processed ", len(dict), "networks in ", total, "seconds"
                else:
                    pass
            else:
                print "dead packet"
        except:
            pass
```



computer on a wide network like the Internet easier for humans, with the added benefit that each address contains content of its own—information about location, for instance.

The Internet Assigned Numbers Authority (IANA) has been responsible for the allocation of blocks of IP numbers to countries, while guarding certain restricted ranges for corporate and military interests. Several other ranges (such as the 192.168.0-255.0-255 range) are reserved for Local Area Networks. All such proscriptions considered, of the 4,294,967,296 possible unique addresses, around an eighth of the numeric space of the Internet is out of bounds for public use.

The first two blocks of any computer’s IP generally contains enough information to ascertain its geographic region (or that of the computer’s ISP at least). I derived this information from a third-party database

```

000 IANA - Reserved
001 IANA - Reserved
002 IANA - Reserved
003 General Electric Company
004 Bolt Beranek and Newman Inc.
005 IANA - Reserved
006 Army Information Systems Center
007 IANA - Reserved
008 Bolt Beranek and Newman Inc.
009 IBM
010 IANA - Private Use See [RFC1918]
011 DoD Intel Information Systems
012 AT&T Bell Laboratories
013 Xerox Corporation
014 IANA - Public Data Network
015 Hewlett-Packard Company
016 Digital Equipment Corporation
017 Apple Computer Inc.
018 MIT
019 Ford Motor Company
020 Computer Sciences Corporation
021 DDN-RVn
022 Defense Information Systems Agency
023 IANA - Reserved
024 ARIN - Cable Block (Formerly IANA - Jul 95)
025 UK Ministry of Defense (Updated - Jan 06)
026 Defense Information Systems Agency
027 IANA - Reserved
028 DSI-North
029 Defense Information Systems Agency
030 Defense Information Systems Agency
031 IANA - Reserved
032 Norsk Informasjonsteknologi
033 DLA Systems Automation Center
034 Halliburton Company
035 MERIT Computer Network
036 IANA - Reserved (Formerly Stanford University - Apr 93)
037 IANA - Reserved
038 Performance Systems International
039 IANA - Reserved
040 Eli Lilly and Company
041 AfrinIC (Whois.afrinic.net)
042 IANA - Reserved
043 Japan Inet
044 Amateur Radio Digital Communications
045 Interop Show Network
046 Bolt Beranek and Newman Inc.
047 Bell-Northern Research
048 Prudential Securities Inc.
049 Joint Technical Command (Returned to IANA Mar 98)
050 Joint Technical Command (Returned to IANA Mar 98)
051 Department of Social Security of UK
052 E.I. duPont de Nemours and Co., Inc.
053 Cap Debis CCS
054 Merck and Co., Inc.
055 Boeing Computer Services
056 U.S. Postal Service
[...]
```

representing that activity was created. There were plants of different types of activities: mail, gaming, HTTP, FTP. I wrote a file pairing ports with applications, but this was later added to by many users interested in detecting traffic from their favourite application. The positions of the plants fit the newly deformed surface so that each rise or dip would be marked with the kind of transaction responsible for it. Features without a detected protocol—sometimes it's impossible to tell a protocol from a port number—were left unplanted. IANA reserved ranges were represented as green crystals or seed-like forms floating above the terrain and marked as 'Private'. The terrain under these seeds would probably never see traffic unless the specific user had access to such addresses via a government, military or corporate intranet.

Packet Garden allows for users to generate a world whenever they desire, with one garden saved each day. Like a kind of a network diary, the user can compare past worlds with their current traffic. Of particular interest however was that some people were changing their browsing habits to generate different sorts of terrains: users were approaching the project in ways I hadn't anticipated, using the graph to shape the data rather than vice versa.

During the latter stages of development, *Packet Garden* got its first major coverage, in *The Guardian Online*. This exposed *Packet Garden* to a wide public days after my first beta release. Almost immediately

stored locally as part of the *Packet Garden* software installation on the user's machine. I used these first two blocks of each IP as values for my longitude and latitude. Once I had plotted these points onto the 360x360 plane of my graph, I could then map each of them onto the base sphere of my garden. All other values (such as the amount of data collected at that address over the given time) were scaled to a range between 0 and 1. An icosasphere (my featureless terrain) could be then deformed based on these values. Raw traffic proved to be enough to meaningfully produce a simple terrain, but there was still plenty of other data I could incorporate.

As the computer's activity log was parsed, the ports used by each packet of data were collated. If a match was found between the port used and a known application, a plant form

```

for i in self.peak:
    if i[6] == 'home' or (self.peak.index(i)/float(self.peak_len)) > self.filter:
        # progress bar output
        self.eta = 100 - (((self.proc_total - self.count)/float(self.proc_total))*100) \
            # range of progress bar in pg_garden.py
        self.meter._set_value__(self.eta)
        self.count_label.label = "Processing " +str(self.count) + " of " +str(self.proc_total) \
            + " transactions greater than " +self.peak_limit + " megabytes"
        if i[6] != 'home':
            self.stats_label.label = "Country: " +str(i[6] + '\n') \
                + "Address: " +str(i[0] + '\n') \
                + "Protocol: " +str(i[5] + '\n') \
                + "Direction: " +str(i[4] + '\n') \
                + "Transfer amount: " +str(i[3]/1048576.0) + " megabytes" \
                # this data feeds the progress bar
        else:
            pass
    pudding.main_loop.MainLoop(scene).update()
    self.count += 1
    angX, angZ = float(i[1]/256.0), float(i[2]/256.0)
    base_height = self.peak.index(i)/float(self.peak_len) # value created from order in list.
    height = (base_height-self.filter)/(1-self.filter) # re-scale between 0 and 1
    if i[4] == 'up': # switch direction for uploads
        height = height * -1.0
    angX = (2*math.pi) * angX
    angZ = math.pi * angZ
    # spherical coordinate translations
    self.point.set_xyz(radius*(math.cos(angX) * math.sin(angZ)), radius*(math.sin(angX) * \
        math.sin(angZ)), radius*(math.cos(angZ)))
    vec = self.point.position().vector_to(self.world.position()) # vector of self.peak
    for face in self.world:
        for vert in face:
            v = vert.position()
            w = self.world.position()
            dw = v.distance_to(w)
            dv = v.vector_to(w).distance_to(vec)
            p = v.distance_to(self.point.position())
            if dv < .25 and p < radius:
                dist = 0.25 - dv
                vert.add_mul_vector(dist*height, vec) # smoothing
                vecs[dv] = vert
            else:
                vecs[dv] = vert
    v = vert.position() # have to call this again once the vert's moved before colouring it
    dw = v.distance_to(w)
    if dw > 1.6:
        vert.color = (0.6, 0.6, 1.0, 1.0) # mountain tops are blue-white
    elif dw < 1.3:
        vert.color = (0.3, 0.2, 0.0, 1.0) # dirt is brown
    else:
        pass
```

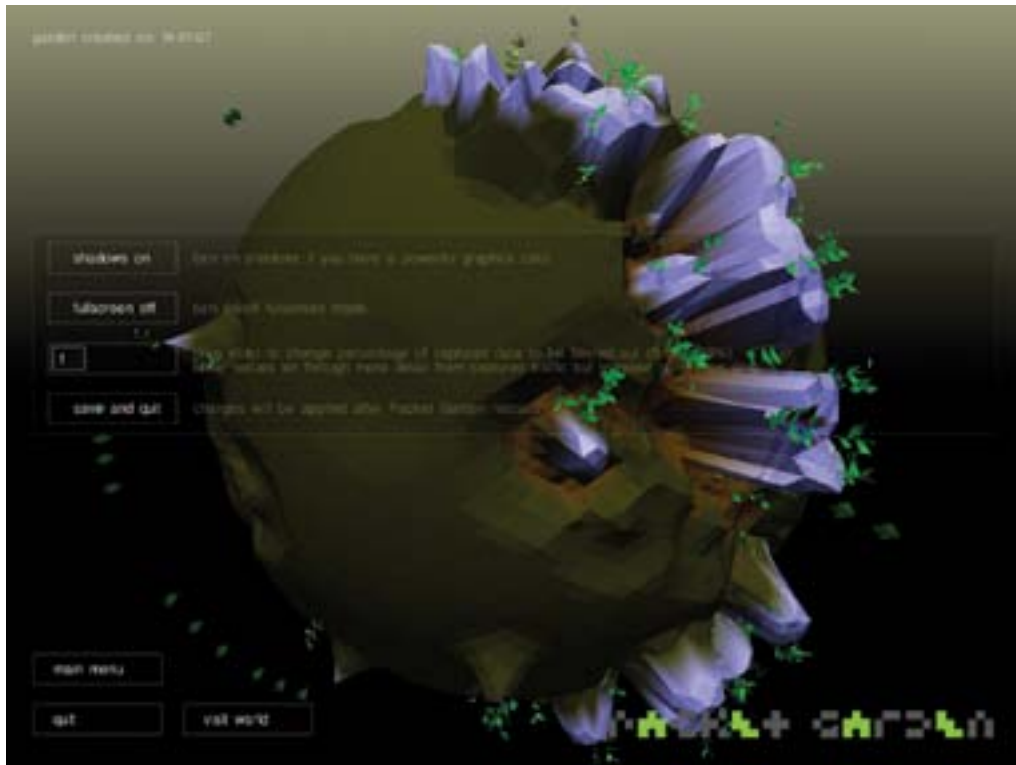
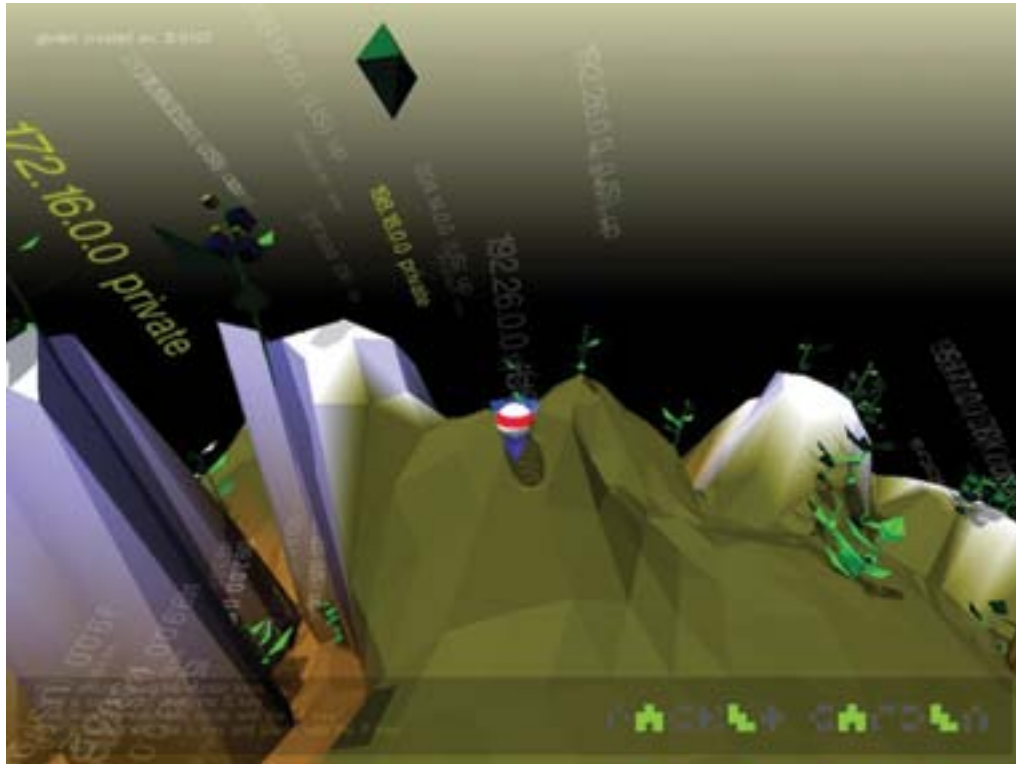
under an open-source license where it could be subjected to such scrutiny proved to be vital to its continued distribution. In spite of this clean bill of health there was some truth to the criticisms: I was writing a kind of perverted spyware—software for the user to spy on their own computer.

As *Packet Garden* was approaching its 100,000th download I saw increasing discussions of the gardens as private worlds, worlds that needed tending and patrolling to protect the sensitive data they contained. More than a raw expression of information, the combination of landscape and personal online history was giving the gardens value as little territories: people wanted to name the worlds and landscape features and to invite friends in. This development of the gardens as places was something I had not anticipated, let alone attempted to produce.

What began for me as way of visualising imperceptible data would emerge as means for creating private places, worlds built from the everyday communications of users' individual machines. Each *Packet Garden* becomes a personalisation of the unseen life of the network.

I had thousands of users not expressly interested in 'Information Visualisation' or 'Software Art' but fascinated by what their computer was doing 'behind their back'. Next came paranoia, something I entirely failed to anticipate. Online discussions emerged characterising *Packet Garden* as new breed of spyware from anti-file-sharing organisations, with one user even suggesting that it was created by the NSA. Others were simply concerned that *Packet Garden* was 'phoning home'—a data harvester disguised as a gimmick or toy.

In response to this discussion, two experienced security auditors took the code, screened it thoroughly and reported back. With their finding that my software wasn't strategically breaching their privacy, downloads picked up steadily. Here releasing the project



Internet; Environment¹

Julian Priest

Line

In 2000 James Stevens and I co-founded a project called Consume with a manifesto.² The first line was:

Define a sustainable *network* development.

The emphasis then was on the network and its self-provision; building it collaboratively and distributing its ownership in accordance with the decentralised design embedded in the Internet protocols to secure its long-term operation by users and in users' interests. This intention is still actively pursued around the world with much success, but now I want to re-state that line with a different emphasis:

Define a *sustainable* network development.

This essay is part of a continuing attempt to explore sustainability and the network, to examine the interdependent interfaces of the Internet and the Environment.

Wire

*As I went under the new telegraph wire, I heard it vibrating like a harp high overhead. It was as the sound of a far-off glorious life, a supernal life, which came down to us, and vibrated the lattice-work of this life of ours.*³

*Cyberspace. A consensual hallucination experienced daily... Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding.*⁴

The Internet has often been characterised as a virtual space—the Cyberspace coined by William Gibson and applied to the Internet by John Perry Barlow. This virtual space of the Internet is a disembodied place where digital information can be experienced and exchanged. It is a space where physical journeys taking hours, days or weeks are replaced with 100 millisecond ping-time round trips.

From the 1990s a generation of computer users dived into this space. They wanted to float free of physical reality, to become telecommuters, netziens. They wanted to live inside the network, within the disembodied collective space of cyberspace, to leave behind the corrupt ways of the physical.

*We will create a civilization of the Mind in Cyberspace. May it be more humane and fair than the world your governments have made before.*⁵

The desire to escape the materiality of the body can be seen in John Perry Barlow's *Declaration of the Independence of Cyberspace*. The old physical control structures can be avoided by de-materialisation; in his libertarian vision of transcendence and immateriality governments are not invited, and should be left in Gibson's 'meat space'.

Thoreau walking in New England in 1851 notices the telegraph wires overhead and hears music coming from the wind playing in them. He is not moved by the chatter of Morse square waves, sending instantaneous information to the

1. License:
Date: 20th September 2007 (last amended 4th February 2008)
License: Copyright © Julian Priest 2007, GNU General Public License, Gnu Public License: <http://www.gnu.org/licenses/old-licenses/gpl-2.0.html>
URL: <http://informal.org.uk/people/julian/publications/internet-environment>
Thanks to:
Aotearoa Digital Arts, Andrew Mathews, Angus Leech, Banff New Media Institute, Bob Horvitz, David Meritt, Eduardo Montoya, Gregers Petersen, James Stevens, John Wilson, Karsten Damstedt, Roger Baig Viñas, Saul Albert, Simon Pope, Stella Brennan, Susan Kennard and Tessa Priest.
2. Julian Priest and James Stevens, *Consume the Net*, 25 July 2000. <http://informal.org.uk/people/julian/resources/consume/text/>
3. Henry Thoreau *The Heart of Thoreau's Journals*, ed. Odell Shepard (New York: Dover Publications, 1961), 57.
4. William Gibson, *Neuromancer: 20th Anniversary Edition* (New York: Ace Books, 2004), 69.
5. John Perry Barlow, *A Declaration of the Independence of Cyberspace*, 8 February 1996. <http://homes.eff.org/~barlow/Declaration-Final.html>

West to enable the expansion of the frontier. He doesn't connect the telegraph wire with a new space of social or political action. He is moved to transcendence by the wires themselves and how they sing with the wind. Let's follow Thoreau's thought and look at the telecommunications and media infrastructures of the Internet from the outside—let's acquaint ourselves with its physicality and examine how it interfaces with and is part of the Environment.

On

As the Internet hit the mainstream so vernacular linguistic habits have changed to reflect people's relationship to it. When most people now say 'the Internet' they mean the World Wide Web as experienced through a web browser on a computer screen. This shows up in daily language with most people saying 'on' the Internet which sounds like a linguistic artefact from the days of TV when we used to say 'I saw it on the TV'. Because access devices are multi-functional, people no longer refer to the device and say 'on the laptop' as we did with TV. We have de-linked our description of media from the physical device. People view the Internet as an immaterial realm, an information channel, or perhaps the sum of all information channels.

The Internet is not just the space of user experience or the disembodied space of potential information exchange. The Internet has a physical side that supports all of this virtuality. There is another sense of 'on' the Internet as in 'on the ground'. The Internet is a supporting structure—an infrastructure—with feet on the ground and head in the informatic clouds.

User

The Internet as a shared universe of symbolic transaction and information exchange lives in, and between its users. Whatever we think of the relationship between mind and body, the first connection between the Internet and the environment is our bodies. The body is still rooted in the environment, even if it is slumped in a now-tatty Aeron chair remaindered from the dot.com era.

We focus intently on the browser for hours, its light playing on the wet screens of our retinas, our bodies willingly co-opted into a cybernetic relation with the computer. Moving down the arms to the fingers, we feel keystrokes become muscle memory and reflex as our interactions with the Human Computer Interface fade from conscious view, until one day we hit carpal tunnel syndrome and permanent numbness.

Laptop

Beyond the body's surface, the neutral coloured laptop is the current emblematic site of Human Computer Interaction, though by no means the only one. The hardware we interact with, the computer screen, keyboard and mouse have also become invisible to us through repetitive use. Coming in from the edge of the screen we cross back into the software-defined world and see the paratext of the Internet framing the browser.⁶ Users perhaps don't notice this as an experience of the web, but our screens are cluttered with the interface's windows, toolbars and scrollbars.

Enabling the visual layer of the Graphical Interface is the Operating System, which talks to the hardware of the laptop. The realm of device drivers marks

6. This theme is explored in Matthew Fuller's discussion of the word processor user interface: Matthew Fuller, *It looks like you're writing a letter*, 7 March 2001. <http://www.heise.de/tp/t4/artikel/7/7073/1.html>

the boundary of the software world and the hardware one. With firmware and software etched into silicon, these instruction sets exist in a grey area between the informational and the physical, a trading zone negotiated daily by engineers, designers and standards bodies.⁷

Network

The World Wide Web of our experience is not the Internet. It is just one application among many that sits on the top layer of the TCP/IP (Transmission Control Protocol/Internet Protocol) network model.⁸ TCP/IP is a conceptual model, dividing different network functions into layers that operate independently of each other. Working down through these layers we pass through a rich engineered structure before reaching the materiality that underpins the Internet.

In the application layer each set of applications is defined by a protocol. The Web is defined by a fairly recent protocol ratified in 1991 called HTTP (Hyper Text Transfer Protocol). Other application layer protocols are DNS (Domain Name Service) which manages Domain Names like www.informal.org.uk, FTP (File Transfer Protocol) used for moving files, SMTP (Simple Mail Transfer Protocol), POP (Post Office Protocol) and IMAP (Internet Message Access Protocol) for email, and SSH (Secure Shell) for securely logging in to remote computers. You can see references to these protocols expressed at the start of URLs (Uniform Resource Locators) like <http://www.informal.org.uk>.

Below this is the Transport layer which deals with the sending and checking of streams of data packets using TCP (Transmission Control Protocol) and UDP (Unified Datagram Protocol).

Further down we come to the Internet layer which deals with moving data between networks. It handles global addressing using IP (Internet Protocol) addresses like 213.239.205.175, number strings converted from linguistically-based Domain Names by Domain Name Servers in the application layer. Routers then determine how packets of information are routed across networks. Under this is the Data Link Layer which provides for local delivery of data within a Local Area Network or between adjacent network nodes. Finally we come to the Physical Layer which defines how data is encoded into a physical signal that travels through a transmission medium, whether it be the specification of how a pulse of light travels down a fibre optic cable, how an electrical signal travels down an Ethernet cable or how a radio signal is sent from a wireless transmitter.

These layers of abstraction are painstakingly constructed by technical design and political negotiation to create the illusion of immateriality that we interpret as Cyberspace. The semantic, semiotic and informational loads that we interact with are borne ultimately by a material layer made up of pulses of light, voltage spikes, fibre optic cables and the mass of hardware that support them.

It is this material layer that connects with 'The Environment'.

Hardware

The material Internet, its physical reality, is made up of lots and lots and lots of bits of hardware. Far beyond the desktops, laptops and mobile phones that provide our everyday user experience are tons of electronics, cables and supporting devices. There are switches and hubs, wireless access points, microwave links, copper and fibre local loops, intercity links, and trans-continental and sub-sea

7. Trading Zone in the anthropological sense of Peter Galison. See Peter Galison, *How Experiments End* (Chicago: University of Chicago Press, 1987).

8. For a full discussion of TCP/IP layer model see: *Wikipedia* "TCP/IP model," 2007. http://en.wikipedia.org/wiki/TCP/IP_model

cables. All this cabling and networking equipment is housed in civil engineering, in conduits and ducting, in trenches dug in the roads, wires slung overhead and repeaters placed on masts. There are buildings housing racks of air-conditioned servers and switches to run all the services we use. Each has its own environmental footprint.

These are the feet on the ground of the material Internet.

Unwired

We can explore this materiality using the technique of voluntary poverty or simple living that was so eloquently advocated by Thoreau.⁹ By simplifying some aspect of life removing it from our daily practice, we can begin to see what it is that we are doing.

What happens when we cut the wire that connects us to the Internet?

The network connection drops, web pages are no longer accessible, ping packets no longer reach their destinations; we are off line.

Ping trace recorded during Ethernet cable cutting:

```
64 bytes from one.server1.org (213.239.205.175): icmp_seq=18 ttl=50
time=396 ms
64 bytes from one.server1.org (213.239.205.175): icmp_seq=19 ttl=50
time=382 ms
64 bytes from one.server1.org (213.239.205.175): icmp_seq=20 ttl=50
time=380 ms
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
```

Far from being a virtual space, our connection to the Internet is completely dependant on the physical. From here in New Zealand my wired connection with my mail server leaves my laptop through an E1000 Ethernet network interface, travels down an Ethernet cable, into a router, then into an ADSL (Asymmetric Digital Subscriber Line) modem, down a telephone line to a DSLAM (Digital Subscriber Line Access Multiplexer) in an exchange, through several routers to a local cable head end, along an intercity fibre cable to Auckland, through several other routers to the Southern Cross cable which leaves the shore at Takapuna, travels along the sea bed under the Pacific to San Diego in a woven armoured cable loom, into the US fibre network, across the States, under the Atlantic, to land in the UK before heading onto continental Europe and eventually to a server in a rack in Nürnberg Germany.

Traceroute showing network hops from New Zealand to a server in Germany:

HOST:	Loss%	Snt	Last	Avg	Best	Wrst	StDev
1. 192.168.1.45	0.0%	10	7.1	5.8	2.6	11.0	3.3
2. 192.168.1.1	0.0%	10	4.7	6.3	3.7	12.6	3.1
3. 210-55-64-64.adsl.netgate.ne	0.0%	10	55.7	57.3	51.7	68.5	4.7
4. MDR-IP03e-3-1-0.akbr3.global	0.0%	10	129.6	113.3	63.4	167.2	32.0
5. 202.50.232.205	0.0%	10	68.6	64.1	60.3	70.2	3.3
6. so-0-1-0-0-sjbr2.global-gate	0.0%	10	244.0	243.4	237.1	249.4	3.4
7. so-0-0-0-pabr4.global-gatwa	0.0%	10	242.7	243.9	239.9	251.5	3.8
8. sl-st20-pa-0-0-6.sprintlink.	0.0%	10	223.6	221.7	216.7	227.9	4.1
9. sl-bb25-sj-11-0.sprintlink.	0.0%	10	224.2	221.3	215.5	226.5	3.8
10. sl-st20-sj-12-0.sprintlink.n	0.0%	10	223.1	221.0	217.3	225.0	2.6
11. sl-tisca1-36701-0.sprintlink	0.0%	10	217.7	221.5	217.2	227.9	3.8
12. xe-1-0-0.fra20.ip.tiscali.ne	10.0%	10	393.0	383.4	375.7	401.8	9.1
13. hetzner-gw.ip.tiscali.net	10.0%	10	397.4	393.6	392.0	397.4	1.9
14. hos-bb1.juniper1.rz4.hetzner	10.0%	10	393.7	394.9	390.9	399.1	3.0
15. et.2.16.rs3k7.rz4.hetzner.de	10.0%	10	402.4	395.1	390.8	402.4	4.4
16. one.server1.org	10.0%	10	394.3	395.6	390.9	400.5	2.8

9. Henry Thoreau, *Walden*, Project Gutenberg, 1 January 1995. <http://www.gutenberg.org/etext/205>

The Internet was designed to be resilient to failure. Network design manages multiple routes between destinations. In practice much data flows down similar routes, for geographical reasons or because of commercial peering arrangements between network providers. In New Zealand for instance, there is a bottle-neck because there is only one connection across the Pacific—the Southern Cross cable loop.

The colonial projection of maritime power focused on the physical constrictions of straits and capes. The control-points in the Internet are the trans-oceanic cables. Leveraging the debt necessary to construct these links is out of reach for all but the largest corporations. Physical control has been replaced by immaterial financial control.

Cutting any single cable can never bring down the Internet as a whole, but individual hosts or even whole countries or regions sometimes rely on single links. Physical control is most often exercised at the small scale of individual servers, as a threat to Internet Service Providers to take down particular web sites, with legal notices served to the operators of servers in data centres.

Unwireless

Even with the Ethernet cable cut I still have other options for connecting. My laptop is still on-line via a small local wireless mesh network.

Output from Wavemon wireless signal strength monitor:

```
Interface
eth1 (IEEE 802.11b), ESSID: "green-bench", nick: "ipw2100"
Levels
Link quality: 100/100
=====
signal level: -47 dBm (0.02 uW)
=====
noise level: -256 dBm (0.00 uW)
=====
signal-to-noise ratio: +209 dB
=====
Statistics
RX: 59505 (33261171), TX: 58096 (6796840), inv: 0 nwid, 0 key, 0 misc
Info
frequency: 2.42 GHz, sensitivity: n/a, TX power: 16 dBm (39.81 mW)
mode: Ad-hoc,
bitrate: 11 Mbit/s, RTS thr: off, frag thr: off
encryption: n/a
power management: off
Network
if: eth1, hwaddr: 02:CA:FF:EB:AB:EE
addr: 10.0.1.45, netmask: 255.255.255.240, bcast: 10.0.1.47
```

Wireless allows the Internet to extend beyond the limits of cable connections. It allows information to be exchanged without having to get permission to run a wire across a neighbour's garden, or to dig the streets across town to lay cable. It allows people to change physical relationships and reconfigure space in the local area. The ability of wireless to collapse physical distance in the local area and to literally dematerialise the transmission medium of the network parallels the way in which the Internet collapses physical distance globally. Both are part of the same cultural trajectory, to escape the physical and create an immaterial sphere.

While being massless, wireless radio transmissions do have a physicality. They exist as showers of photons at different frequencies bathing the environment, the space around the transmitter in temporary unseen energy structures. We don't have receptors to perceive this information directly, as we do with visible light, but these structures are interpreted as information by correctly configured devices. Data spills out from our antennas in a sea of packets.

For the most part, the new generations of wireless devices emit far less power than the old TV and radio broadcasts, relying for their clarity of transmission on signal processing and polite protocols rather than raw power. At the same time there are health concerns over the impact of our increasing use of radio at ever higher frequencies.¹⁰ These concerns are vigorously debated in public as well as within the scientific community, with no clear evidence on the long term effects yet. Nevertheless there is a huge public appetite for wireless data and the ability to transmit is being taken up very rapidly in the population at large.

We can block the signal by wrapping our laptops in tinfoil—try it—it’s harder than you might think. Wireless makes the material Internet slippery, a more difficult genie to put back into the bottle.

Unplugged

The laptop’s last connection is the power cable.

From the laptop the wire passes to the transformer, where the voltage shifts up from say 16 to 240 Volts and from direct to alternating current, then across the wiring in the house: through the ring main, through the fuse box or trip switch, and on to the slowly spinning meter. Following a single phase out to the street, the wire goes out to a local distribution network supplying anything from a few houses to a whole neighbourhood. The wires connect up through a series of transformers in the kilovolt range to urban high tension transmission levels at 44 kilovolts, and then on to the intercity power lines rated in the hundreds of kilovolts. Power is supplied to this grid by large scale gas, oil, nuclear or hydro-electric power generating plants. With its plentiful hydro electric power, New Zealand has an atypical electricity production profile, being third in the world in terms of generation from renewable resources after Iceland (geothermal) and Denmark (wind).¹¹

All of our electronic devices consume electricity from the moment they are switched on, many still drawing significant power when they have been switched off and are on standby. A laptop uses around 25 watts, a desktop around 200 watts. The servers which we rely on for hosting web sites and email use more. In a data centre the racks of machines generate excess heat which has to be removed. As a rule of thumb, every watt of power used by a server requires a watt of air conditioning for cooling.

Google, who have vast server farms, are installing solar panels on the roof of their campus, which provides around one third of the power they require.¹² They are also building a new data centre in Dalles, Oregon, reportedly motivated by cheap electricity coming from the Dalles dam on the Columbia river. Yahoo and Microsoft are also reportedly setting up data centres in the area upriver at Grand Coulee.¹³ Even network cabling requires power; sub-sea links have cables woven into the loom to power their repeaters and other network equipment.

Let’s unplug the power cable, remove the battery, shutdown.

The hard disk spins down, the screen fades, the fan’s gentle whirr ceases.

Carcass

Now we have unplugged the power cable and removed our laptop from the power grid we have a dead computer, and no Internet connection. What have we got left? Trash, the physical stuff of devices: plastic, metal and electronics.

The Internet is made of millions of devices, not just laptops but servers, routers, phones and appliances. Our disposable electronic culture and supposedly virtual digital life has a material side and an environmental cost. It is projected that 97 million laptops alone will be sold worldwide in 2007.¹⁴ That’s approximately 200 million kilos, 200,000 tons, or an oil tanker-full of laptops.

The raw materials in each one have had a long journey to arrive on your lap. The plastic case started life as zooplankton and algae laid down millions of years ago on the sea beds of, let’s say, the Taranaki coast. Slowly compressed over ages of geological time into oil, it is drilled, shipped, refined and polymerised into plastic. The metals have perhaps been extracted from an open cast mine in Western Australia and refined in Southland.

Each laptop will have a useful life of about three years, and if the market for laptops remains flat, each year will see 200,000 tons of these laptops end up in landfill. This is not much compared to the tonnes of other waste we generate everyday, but electronics are made of dangerous materials. There is mercury in laptop screens, lead in solder as well as cadmium and other heavy metals in batteries. In landfill sites these materials can leach into the earth to contaminate ground water and soil.¹⁵ As an example of technology’s potential for waste generation, with the shift from Cathode Ray Tubes to Liquid Crystal flat-screen televisions, we are in the process of a replacement drive of 1.33 million TV sets in New Zealand alone.¹⁶

In many jurisdictions, recycling and de-manufacture of electronic waste is being attempted, including product stewardship campaigns in which producers take back products at the end of their useful life. Regulation is most advanced in the European Union, where manufacturers must comply with legislation limiting the use of the most harmful manufacturing processes and setting out conditions for use of hazardous substances in electronic equipment.¹⁷

We might think that a laptop is a clean piece of technology, but it is probably manufactured far from the eyes of the strict pollution controls of the OECD countries. The heavy metals we worry about leaching into our rivers present daily hazards in countries such as China. The hardware manufacture of the Internet may seem virtual, but is really only out of sight, far from the point of sale.

Apart from the pollution created in disposal of electronics, energy is consumed during their manufacture. This can be described through the concept of Embodied Energy. A shiny Macbook Pro weighs around 2.5 Kilograms. Perhaps 200 grams of this is the aluminium of the casing. Aluminium is produced by New Zealand Aluminium Smelters (formerly Comalco) at the Tiwai Point smelter in Southland.¹⁸ The production of aluminium at the plant takes 72.4 gigajoules per tonne so 200 grammes would take 14.4 megajoules to smelt. The embodied energy in the casing is therefore equivalent to boiling a 1.8 kilowatt kettle for over two hours or running the laptop itself for 160 hours. It is possible to add up the embodied energy of all the other components to get an idea of how much energy is stored in the laptop.

When you take into account the costs of delivery, and even the air miles of the laptop itself as two and a half kilos of excess baggage, you can begin to get a picture of how much energy it represents.

Gartner Research calculate that the IT industry, through both direct energy consumption and the energy embodied in its products, is responsible

10. Powerwatch, *Welcome to Powerwatch*, 2008. <http://www.powerwatch.org.uk/>

11. *Energy Statistics New Zealand*, 2005. <http://www.stats.govt.nz/products-and-services/nz-in-the-oecd/energy.htm>

12. Google.com, *Google Solar Panel Project*, 18 June 2007. <http://www.google.com/corporate/solarpanels/home>

13. Daniel Terdiman, “Jostling to get inside Google’s Oregon Outpost,” *Cnet News.com*, 29 June 2006. http://www.news.com/Jostling-to-get-inside-Google-Oregon-outpost/2100-1030_3-6089518.html

14. DisplaySearch Reports. “Final Notebook PC Results, Acer and HP Continue to Gain Market Share,” 2006. <http://www.displaysearch.com/press/?id=1323>. 19.03.2007

15. Ralph Horne and John Gertsakis, *A Literature Review on the Environmental and Health Impacts of Waste Electrical and Electronic Equipment*, RMIT University, 2006. <http://www.mfe.govt.nz/publications/waste/weee-literature-review-jun06/weee-literature-review-jun06.pdf>

16. Organisation for Economic Cooperation and Development, *OECD Communications Outlook*, 2007, 186. <http://213.253.134.43/oecd/pdfs/browseit/9307021E.PDF>

17. B-Lands Consulting, *RoHS Compliance in the EU—WEEE/REACH legislation*, 20 September 2007. <http://rohs.eu>

18. Comalco, *NZAS 2006 Sustainability Report*, 2006, 12. http://www.comalco.com/documents/FINAL_NZAS_Sustainable_Development_report.pdf

for approximately 2% of global carbon emissions. This estimate includes network infrastructure, but excludes consumer electronics. It puts Information Technology on a par with the aviation industry in terms of carbon emissions.¹⁹

Smelter

The aluminium smelter at Tiwai Point, formerly owned by Comalco, has been a key example of energy politics since the 1960's:

*While you put up with power cuts COMALCO gets continuous power.*²⁰

*Tiwai Point was chosen as the location for the smelter... [because of] the availability of continuous, substantial quantities of hydro electricity from the Manapouri Power Scheme, which is part of New Zealand's national electricity grid.*²¹

The battle over the construction of the Manapouri Dam marked one of the beginnings of the modern environmental movement in New Zealand and controversy has raged on and off ever since over the discounted electricity that the smelter buys from the grid. In 1975 the Comalco plant used approximately 10% of New Zealand's total power output. While the figure is currently more like 2.3% its impact is such that in 2006 production was scaled back to provide more energy to the grid, needed as a result of low rainfall and falling hydro lake levels around the country.²² Within the aluminium industry, however, Tiwai Point is viewed as one of the most sustainable plants in the world as two-thirds of its energy comes from hydro.

We can see the shift from material to immaterial economy clearly from the construction of Comalco's aluminium smelter and the development of Google's hydro-powered server farm. In the 1960s the high-tech aerospace industry was searching out cheap renewable power to produce lightweight aluminium; the world's most successful on-line company searches it out today for its server farms. With Comalco's contract up for renewal in 2012 one could perhaps imagine a Google server farm at Tiwai point.

The shift visible here is economic: from material to immaterial labour, not from materiality to immateriality. The virtual turns out to be wholly dependent on the same energy infrastructure as the physical.

Travel

Digital industry is often characterised as green and environmentally friendly, but information technology enables social practices with their own environmental impacts. We must surely be saving trees by sending email instead of post, and fuel by telecommuting instead of commuting. It is true that the Internet allows us to work collaboratively and internationally, but as someone who has been working in this way for the last few years, this methodology has increased the amount of travelling I do. Instead of being local, my working partners now span the globe. I am able to maintain professional, social and family relationships through the Internet. But the medium is limited. All the successful projects I have done have involved physical meetings, often involving air travel. Similarly, web shopping has greatly increased international purchasing, mail order and air freight.

Growth in air travel continues, with monthly Revenue Passenger Kilometres hitting a monthly record of 220 billion in July 2007.²³ There is a clear

correspondence between the growth of the Internet, the expansion of air travel and of air freight and container traffic.

Consequences

There is growing consensus on the negative impacts of burning fossil fuels to meet these energy needs. Global energy use is rapidly increasing as large countries such as India and China shift from rural economies to industrial ones, mirroring OECD energy-use in the process. Climate change has been recognised by both the scientific community and mainstream politics as being a major concern. Violent weather events such as hurricane Katrina in the United States have brought this message forcefully home. Energy security issues have come to the fore, with increasingly bitter and intractable wars being fought for dominance of the oil supplies of the Middle East. Peak oil production, after many false alarms, looks as if it has or will shortly occur. Oil quality is beginning to decline, as less than optimal grades are extracted. Around the world governments and energy companies alike are scrabbling to secure rights to sea-bed oil reserves and to develop increasingly marginal resources in order to stave off fundamental reconstruction of the multi-trillion dollar energy infrastructure.

Environmental issues are being main-streamed by pressing need. One political drive behind this impulse to sustainability after years of foot dragging is undoubtedly the last six years of failure to deliver energy security using military means. It also coincides with the re-emergence of China as a superpower and looks to some like goal-post moving by OECD governments in an attempt to limit China's economic development. But even if there is the political will, does anyone have the first idea how to go about really changing our deeply-embedded patterns of energy use?

Now

We have cut the network cable, unplugged the power and taken the laptop in for recycling. We have traced the supply lines back from the screen to the factories of the Far East and the oil fields of the Middle East. We find ourselves in voluntary simplicity without a computer, without digital media and without the Internet.

Where are we? Or more importantly, *when* are we?

An unpopular war, environmental issues to the fore, concerns about energy production, fears for the sustainable future, doubts about our consumerist lifestyles...

Doesn't this sound familiar?

Then

Let's rewind a little, to just after the 1973 oil crisis when OPEC hiked oil prices and the postwar boom abruptly ended. I was a child and can remember people queuing at petrol stations. In New Zealand there were carless days. Cultural responses to the crisis dominated the 70's.

*Can you use a plough?*²⁴

But on inspection, 1973 isn't the significant date. The movement of young people leaving urban centres seeking 'the good life' peaked in the US in 1971 and 72. Here in New Zealand, James K Baxter's archetypal commune was founded in Jerusalem in 1969. By 1974 the Kirk government established the Ohu Scheme

19. Gartner, Inc. *Gartner Estimates ICT Industry Accounts for 2 Percent of Global CO₂ Emissions*, 26 April 2007. <http://www.gartner.com/it/page.jsp?id=503867> 20. Alister Taylor, *The 2nd New Zealand Whole Earth Catalogue* (Wellington: Alister Taylor, 1975), 208.

21. Rio Tinto Aluminium, *Living in Tiwai Point*, 2007. <http://sales.riotintoaluminium.com/freedom.aspx?pid=537>

22. *Energy Statistics New Zealand*. <http://www.stats.govt.nz/products-and-services/nz-in-the-oecd/energy.htm>; *NZAS 2006 Sustainability Report*, 2006, 12. http://www.comalco.com/documents/FINAL_NZAS_Sustainable_Development_report.pdf

23. *IATA Monthly Traffic Analysis July 2007*, 2007. http://iata.org/NR/rdonlyres/D5EB1CD5-EDA2-4AAE-9DC7-22131A78A498/o/MIS_Note_Jul07.pdf

24. James Burke, *Connections, Episode 1: The Trigger Effect*. [broadcast] (London: BBC, 1978).

(named after the Māori term for a voluntary work party) to provide Crown Land to groups wanting to form co-operative rural communities.²⁵

Going back a bit further we get to 1968. There were no personal computers, no digital media and no Internet. (Arpanet appeared in 1969). The Vietnam War was in full swing, students were rioting in Paris, a generation got mobilised, so the story goes, and went back to the land to build something new. They were driven in part by dissatisfaction with mainstream society and consumerism, and in part by a growing environmental consciousness. One of the key texts of this movement was *The Whole Earth Catalog* and its sister publication, *The New Zealand Whole Earth Catalogue*.²⁶

Catalogue

The Whole Earth Catalog was a bible for self-provision, filled with hints and tips for how to build yourself a new simple life. Subtitled ‘access to tools’, it contained reviews and how-tos for all the things needed to build an alternative lifestyle, ‘a good life’ outside of consumerist culture, perhaps in a log cabin in rural Canada with some friends, or up the Whanganui River valley. Spurred by cheap printing technology, it disseminated environmental and counter-cultural ideas. It was an emblem of the new free press while containing some strange paradoxes. It was a manual for simple living and an escape from consumerism, but also a catalogue promoting products. It had user-contributed content and reviews, with a global reach promoting decentralisation and DIY culture. In many ways one is reminded of browsing the web when reading it. Steve Jobs called it the conceptual model of a search engine.²⁷

Its editor Stewart Brand wrote:

PURPOSE

*We are as gods and might as well get good at it. So far, remotely done power and glory—as via government, big business, formal education, church—has succeeded to the point where gross defects obscure actual gains. In response to this dilemma and to these gains a realm of intimate, personal power is developing—power of the individual to conduct his own education, find his own inspiration, shape his own environment, and share his adventure with whoever is interested. Tools that aid this process are sought and promoted by the WHOLE EARTH CATALOG.*²⁸

In the mid 70’s the back to the land movement petered out in the US. People found that the countryside was not as pristine as they had imagined. They found that completely rebuilding all life’s infrastructure was really hard and doing so in a commune even harder. Learning the forgotten skills of close living proved too much and the US edition of 1972 was titled the Last Whole Earth Catalog, although it continued under different guises.

*The arrival of children (three sons and now two grandsons) made commune living impossible and I retreated to suburbia and became a concrete contractor.*²⁹

In New Zealand the back to the land movement continued later than in the US and a third edition of the Whole Earth catalogue was published in 1977. The Ohu scheme continued to operate into the late 70’s though new registrations petered out due to lack of political support. People continued to live at the Ahu Ahu Ohu on the Whanganui river right up until 1996.³⁰

25. Eco-Village and Cohousing Association of New Zealand, *Ohu: Utopias in a Paradise Lost?*, n/d. <http://www.converge.org.nz/evcnz/resources/ohu.htm>

26. Taylor, *The 2nd New Zealand Whole Earth Catalogue*.

27. Steve Jobs, *Text of Steve Jobs’ Commencement address*, 2005. <http://news-service.stanford.edu/news/2005/june15/jobs-061505.html>; Was it a coincidence that the Apple II version of ‘ls’ was ‘CATALOG’?

28. Stewart Brand, ed., *Last Whole Earth Catalog—Access to Tools* (New York: Random House, 1971).

29. Tim Shadbolt, ex-editor of The New Zealand Whole Earth Catalogue, now Mayor of Invercargill. Tim Shadbolt, *Mayor of Two Cities*, 2007. <http://www.anewnz.org.nz/vision.asp?id=297>.

30. Julian Priest, Interview with John Milne (Ahu Ahu Ohu member), December 2007.

Diaspora

1968 was also significant year in the world of computing. Douglas Engelbart’s so-called ‘Mother of all Demos’ was in San Francisco in November.³¹ The demonstration featured the first computer mouse, video conferencing, teleconferencing, email, hypertext and a networked environment. These were the first inklings of digital media and the Internet. Helping with the presentation was Stewart Brand.

It turns out that the editorial staff of the WEC and the social networks around them ended up being key players in the promotion of the Internet as a cultural force—part of California’s strange continuum from military cybernetics and systems theory to counter culture, through cyber culture into the mainstream.³² One of the editors of *The Catalog* was Kevin Kelley, who went on to be editor of techno-boosterish *Wired* magazine; in the pages of *The Catalog* you can excavate references such as a review of an early book by Nicholas Negroponte, who went on to head the MIT Media Lab. Stewart Brand himself later co-founded the Well (the Whole Earth ‘Lectronic Link), one of the most influential early virtual communities. Its membership was a catalogue of proponents of cyber culture, including Howard Rheingold and John Perry Barlow.³³

In this light it’s not surprising that the ideas of the back to the land movement and cyber culture feel similar—the cultural actors were the same people. Stewart Brand, for instance went on to write a key sustainability text ‘How Buildings Learn’ and is president of the Long Now foundation which promotes long term, sustainable thinking.

Hinge

Reading environmental literature from the late 60’s and early 70’s from both counter-cultural sources and the mainstream, one can see that the current environmental issues are the same now as they were then.

*In short the two worlds of man [sic]—the biosphere of our inheritance, the technosphere of our creation—are out of balance, indeed potentially in deep conflict. And man is in the middle. This is the hinge of history at which we stand, the door of the future opening on to a crisis more sudden, more global, more inescapable and more bewildering than any ever encountered by the human species and one which will take decisive shape within the life span of children who are already born.*³⁴

The baby boom generation correctly identified environmental, climatic and resource issues a generation ago. As they assume positions of power, why is that we find ourselves standing once more at the same hinge of history?

Compare the differing fortunes of cyber culture and the environmental movement. While having many successes, the environmental movement that came out of the 60s polarised into media-oriented Greenpeace-style activism at one end of the spectrum, and endless policy wrangling, culminating in the 1992 Earth Summit and the Kyoto Protocol at the other.

By contrast, cyber culture became a mass-market phenomenon and the Internet transformed telecommunications and media infrastructures in just 20 years. Cyber culture has been easily adopted because it supported hyper-industrial production and worked within it, helping morph the industrial into the post industrial, material into immaterial labour. Despite its official adoption

31. Doug Engelbart, Doug Engelbart: The Demo, 1968. <http://video.google.com/videoplay?docid=8734787622017763097&q=engelbart>

32. Fred Turner, *From Counter Culture to Cyber Culture: Stewart Brand, the Whole Earth Network and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006). See also Robert Horvitz, “Whole Earth Culture,” reprint of paper written for Wilderness as a Phenomenon of Integral Culture (Divočina jako fenomén integrální kultury), a conference in Klenová, Czech Republic, 4-5 May 2002, which was part of a multi-museum exhibition entitled Divočina—Příroda, Duše, Jazyk (Wilderness—Nature, Soul, Language), curated by Jiří Zemánek. <http://www.volny.cz/rhorvitz/whole-earth.html>

33. Howard Rheingold, *The Virtual Community: Homesteading on the Electronic Frontier* (Cambridge MA: MIT Press, 1993).

34. Barbara Ward and Rene Dubos, *Only One Earth: An Unofficial Report on the UN Conference on the Human Environment* (London: Penguin Books, 1972).

by governments, the environmental movement sought to limit industrial and 'economic growth' and has until now encountered strong resistance.

System

A.G. Tansley coined the term 'ecosystem' in 1935 to specifically include humankind and its products as biotic actors within and supported by 'nature', rather than separate from it.³⁵ However in cyber-culture we can see a continuation of dualist tendencies alienating humankind from 'nature'; a desire to escape to the frontier of cyberspace where "the technosphere of our creation" was imagined as pristine and separate from nature. Underlying the back to the land movement we can perhaps see a similar split expressed in the nostalgic desire of young city dwellers to escape to an unsullied past; a pioneers' frontier where the biosphere of our inheritance was imagined as a pristine space separate from humankind. Neither movement sought to act in the sullied mainstream present.

Strong parallels are often drawn between biological systems and the Internet, and its design is itself a model of interdependence and interconnectedness with an ecosystem-like complexity. But the characterisation of the Internet by cyber-culture as a virtual space and its painstaking abstraction from the material world by the language and protocols of engineering create an illusion of immateriality. Massively multi-player role playing games such as World of Warcraft and Second Life are the immersive end-points of this cultural trajectory. This total separation from 'nature', works directly against any deeper understanding of the Internet as an integral part of an interconnected global ecosystem.

If the notion of 'nature' as ecosystem has evaded cyber-culture, it is deeply embedded in mainstream environmental discourse. David Frank argues that it is precisely this view of nature that, since the early 70s, has driven the formation of international treaties and organisations concerned with "the environment".³⁶ Further, he suggests that the idea of a global ecosystem forms a major justification for establishing international governance structures. When the actions of motorists in one part of the world cause droughts for farmers in the other, a response is to create binding linkages between their governments, between representatives of each national polity.

By contrast the rhetoric of cyber culture presents a competing view of a global community, opposed to governmental control, concerned with individuals and the interconnections between them. The Internet as a communications medium has widened access to tools for global co-ordination and organisation and has created an enormous public sphere in the process. It has allowed individuals and groups to interact with each other cheaply and globally, to create direct links between members of each polity.

This has allowed the development of new modes of production, such as those employed in Free and Open Source Software, user contributed media and Free Networks. These characterise the emerging digital sphere as a commons with strong affinities with the discourse of commons-based management of traditional resources such as fisheries and forestry.³⁷

The Internet also presents opportunities for coordinated global political activity that are beginning to interact with the intra-governmental politics of 'The Environment'. This was seen recently at the 2008 Bali climate conference.³⁸ Faced with US/Canadian obstruction of the emerging international consensus

35. Arthur G Tansley, "The Use and Abuse of Vegetational Concepts and Terms," *Ecology* 16, no.3 (July 1935): 284-307, reprinted at <http://www.lancs.ac.uk/depts/philosophy/resources%20rtf%20files/tansley.rtf>

36. D. J. Frank, "Science, Nature, and the Globalization of the Environment, 1870-1990," *Social Forces* 76, no.22 (1997): 409-437.

37. Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press, 1990).

38. Avaaz.org, *Bali: People Power Confronts Climate Change, 2007*. http://www.avaaz.org/en/bali_report_back/6.php.

to work towards a post-Kyoto climate change treaty, [avaaz.org](http://www.avaaz.org) used its on-line network to quickly mobilise a campaign gathering 2.6 million signatures to a petition and mobilising financial support for a press campaign in Canada in just a few days. Faced with strong opposition, Canada and the US climbed down and joined the international consensus.

Lattice

As the most recent example of a global infrastructural change, there is much to be learned from the development of the Internet when considering the needed changes in our energy infrastructure. As a communications tool the Internet can enable this process of change, and its emerging modes of production may provide models for reimagining physical infrastructures. But before any of these avenues can be explored, the reality of the Internet as material construction, located within the environment and as part of an ecosystem must be absorbed and understood.

Thoreau listening to the singing telegraph wires sees them vibrating the world and thus feels an inextricable connection between 'nature' and humankind and its constructions. As we grapple with issues of sustainability will people continue to suspend disbelief and take up virtual second lives 'on' the Internet? ³⁹ Will the next generation find itself standing once more at the same hinge of history? Or can this generation take the first steps on the path of infrastructural change by recognising the interconnected material nature of this lattice-work life of ours?



Photo: Julian Priest.

Following pages: Aaron and Hannah Beehre, Postcards for Garland Briggs, 2007, digital print on linen, LCD projection, gilt frame. Aaron and Hannah Beehre give us an image of a haunted forest clearing layered with clues, mystery and nervous fireflies. As the Log Lady explains in David Lynch's Twin Peaks: "There are clues everywhere, all around us. But the puzzle maker is clever. The clues, although surrounding us, are somehow mistaken for something else. And the something else, the wrong interpretation of the clues, we call our world. Our world is a magical smoke screen. How should we interpret the happy song of the meadowlark or the robust flavour of a wild strawberry?" (<http://www.glastonburygrove.net/text/>). Not quite a velvet painting and certainly not a screensaver, Postcards for Garland Briggs introduces us to the virtualised world found in the spaces between the screen and the canvas. Like us, Garland Briggs, Twin Peaks' secretive Airforce Officer, would be determined to find the source of the exotic flickering beauty inhabiting the dense forests of Fiordland." (Su Ballard)

39. What is Second Life? <http://secondlife.com/whatis/>



Glossary of Māori Words

Aotearoa: Land of the Long White Cloud, the Māori term for New Zealand as a whole used since European contact. The Māori names now used for the main islands of New Zealand are Te Ika ā Māui (North Island) and Te Wai Pounamu (South Island)	koauau: flute	Papatuanuku: Earth Mother	Toi Rerehiko: a term coined by Rachel Rakena to encompass moving image and digital arts, see Janine Randerson's essay in this book
atua: a deity, an ancestor with continuing influence or supernatural being	kokako: Callaeas cinerea, the wattled crow, an endangered native bird	patu: stone club	Toi Whakairo: carving
hapu: extended family	kowhaiwhai: painted scroll ornamentation commonly used on rafters and walls of the meeting house	pounamu: jade	Te Tiriti o Waitangi / The Treaty of Waitangi: A treaty signed in 1840 by representatives of the British crown and of Māori iwi and hapu. Now considered the founding legal document of New Zealand
harakeke: Phormium tenax, New Zealand flax, an important plant for weaving	Kupe: Polynesian discoverer of Aotearoa	Ruaumoko: god of earthquakes	takatapu: Māori who are gay, lesbian, bisexual or transgendered
heke: rafters	Kurungaituku: mythological bird woman from Te Arawa tradition	takatapui: god of the forest	tangata whenua: local people, people of the land
iarere: communication across vast distances	manakitanga: hospitality	Tane Mahuta: god of the forest	tāniko: border of a cloak made by finger weaving
Ipurangi: Internet	manawa whenua: connection to the land	taonga tuku iho: treasures handed down	taonga: knowledge and/or treasure
ira atua: immortal state	manu: bird	taonga: knowledge and/or treasure	tapu: restricted (in a sacred sense)
ira tangata: mortal state	manuhiri: visitor, guest	tautoko: support, backing	te po: the night
iwi: tribe	Māori: indigenous New Zealander (literally meaning 'normal')	Te Ao Māori: the Māori world	Te Rauparaha: Ngāti Toa Chief (c.1768 – 1849) whose haka "Ka Mate" is performed by the All Black Rugby team before international games
Kai Tahu / Ngai Tahu: South Island tribe	māoritanga: Māori 'way of being'	te kore: the void, the realm of potential being	Te Reo Māori: The Māori language
kaitaka: cloak	marae: meeting place	Te Papa Tongarewa / Te Papa: The Museum of New Zealand, Wellington	tikanga / tikanga Māori: Māori customs and values
kaitiakitanga: guardianship, care	mauri: essence or life force	Te Papa: The Museum of New Zealand, Wellington	tipuna: ancestors
kapa haka: a Māori cultural performance group	mua: the past (the way we face), also meaning front	Te Papa: The Museum of New Zealand, Wellington	Toi Māori: Māori art
karakia: a prayer, grace or ritual chant	muri: the future, also meaning behind	Te Papa: The Museum of New Zealand, Wellington	Toi Raranga: weaving
karanga: a welcome call from women	Nga Puhī: a North Island tribe	Te Papa: The Museum of New Zealand, Wellington	
kaumatua: respected elders	Ngāti: prefix denoting a tribal group, usually written as a separate word, e.g. Ngāti Maniapoto, Ngāti Awa	Te Papa: The Museum of New Zealand, Wellington	
kete: basket	noa: unrestricted (in a sacred sense)	Te Papa: The Museum of New Zealand, Wellington	
kiekie: Freycinetia banksii, a plant used for food and fibre	Pākehā: New Zealander of European descent	Te Papa: The Museum of New Zealand, Wellington	

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