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# Impending Media Review

## Editorial

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Mark A Gregory  
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**Abstract:** In the March 2016 issue papers cover a range of topics that include the UK BBC charter review, film and television being affected by Internet clichés and an interesting look at digital currencies. Two historical articles on the bombing of Darwin and radio telephone surveying provide interesting reading about past telecommunications challenges. In Australia the government appears to be taking concerns raised by media organisations seriously and recent reductions in television licence fees point to the government's impending media regulation review being more than just window dressing.

## In This Issue

In this issue the *Journal* contains a range of topics that focus on media, an interesting look at digital currencies and historical challenges facing telecommunications. This is an election year and it is likely that an early double dissolution election on 2 July will help shape the future for telecommunications, the media and the digital economy for the remainder of the decade.

*Cinema and Cyberphobia: Internet Clichés in Film and Television* provides a look at recurring themes in portrayals of the Internet, shedding light on the how, and perhaps most importantly why, the fear of technology is so common.

*The BBC Charter Review* takes a look at the outcomes of the UK Conservative Government's Green Paper on the *BBC Charter Review, July-October 2015*, which broke new ground in terms of the scope of such an enquiry for its level of institutional criticism. It appears it is not just an Australian phenomenon where, in recent decades, those on the right of politics feel that the national broadcasters are biased to the left.

*An ethnography of Bitcoin: Towards a future research agenda* discusses trust, anonymity and consumer protection when digital currencies such as bitcoin become a part of our everyday lives and interactions with Bitcoin as a system and culture will shed light on mundane acts of socio-technical disruption.

*The Bombing of Darwin: Telecommunications in Times of War* describes events that occurred on 19 February 1942 with the first Japanese air raid on Darwin, the capital of Australia's Northern Territory and its gateway to Asia and how the telecommunications infrastructure was affected and rebuilt by the dedicated staff of the Postmaster-General's Department.

*Radio Telephone Surveying – The Traditional Way* provides a look back at how radio telephone surveying was carried out and highlights the challenges faced by the technical and lines personnel conducting propagation measurements for a radio telephone link from Victoria to Tasmania between 1947 and 1949.

## Impending Media Review

The Australian Government's recent decision to reduce television licence fees as part of the 2016 Budget goes some way to addressing concerns raised by media companies, but the impending media review may not provide the lifeline that media companies are seeking primarily due to the lack of change within the industry to address outside competition and consumer demands. The rise of Netflix within the Australian industry demonstrates clearly how Australian media organisations dropped the ball by failing to respond to consumer demands and questions must be asked about the local industries viability and whether or not it should be saved.

It would be wrong for a media review to focus on the economics of the media industry when there is a pressing need to regulate the minimum performance and quality for the delivery of broadcast and streaming media. The local television and streaming media companies have been growing the number of low quality broadcast channels and media streams at a time when consumers are demanding higher quality and improved performance. Australian consumers should not be subject to an environment where media organisations are consistently using misleading statements about what is actually being provided to consumers.

## Looking Forward

In 2016 a student paper prize will be launched with the winner being offered the chance to be join with Telsoc members and key telecommunication industry executives at the Charles Todd Oration held in Sydney annually.

In June 2016 the theme will be the *National Broadband Network (NBN)* and *human computer interaction for the Internet of Things*. Depending on the outcome of the 2016 election there could be a major impact on the NBN with the technology choice being redirected back towards the original mix of fibre, fixed wireless and satellite. How this will occur will



depend on the election outcome but it is timely that the *Journal* focuses on this vital nation building project.

Papers are invited for upcoming issues and with your contributions the *Journal* will continue to provide the readership with exciting and informative papers covering a range of local and international topics. The Editorial Board values input from our readership so please let us know what themes you would like to see in the coming year.

All papers related to telecommunications and the digital economy are welcome and will be considered for publication after a peer-review process.

*Mark A Gregory*

# The Bombing of Darwin

## Telecommunications in Times of War

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Brett Bowden

Western Sydney University

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**Abstract:** 19 February 2017 marks the 75<sup>th</sup> anniversary of the first Japanese air raid on Darwin, the capital of Australia's Northern Territory and its gateway to Asia. The first bombing raid targeted the flotilla of ships in the harbour and key infrastructure such as telecommunications, severing the vulnerable north of Australia from the rest of the country. But the severance was short-lived, thanks to the efforts of dedicated staff of the Postmaster-General's Department who worked tirelessly under arduous conditions to maintain essential communications between the warfront in the north and the rest of the nation to the south.

## Introduction

The ability to communicate over distance is important at the best of times; in times of war it is critical. This was no less the case when the Second World War came to Australian shores on the morning of 19 February, 1942. Just over two months after the Japanese attack on Pearl Harbor, and only days after the Fall of Singapore, Japan launched the first of almost one hundred air raids on the Australian mainland. At least 243 people lost their lives and another 500 were injured when at 9.58 a.m. 188 Japanese fighters, bombers and dive bombers launched the first of its air raids on the Australian mainland. Targeting the town of Darwin in the Northern Territory, the mid-morning bombing raid was the first of 64 launched on the northern outpost and its surroundings; it was also the most devastating.

In the week following the first air raid on Darwin, C. L. A. (Aubrey) Abbott, the Administrator of the Northern Territory, officially wrote to the Secretary of the Department of the Interior informing Canberra of the extent of the damage:

"On the 19<sup>th</sup> instant, at about 10 a.m., Japanese bombers and dive bombers appeared over the town of Darwin. From reports it would appear that 93 planes took part in the attack. The "Alert" was given but bombs were bursting before many of the people could take cover . . .

"Bombs fell near the new Darwin Civil Hospital, damaging a ward and houses in the vicinity owned by the Government. The line of bombs then continued along the Esplanade and one fell on the Post Office. The Postmaster, Mr Bald, his wife and daughter, the female telephone staff and two Postal Officers were all killed instantly. The bomb was a direct hit upon a shelter in the Post Office yard where these people were sheltering. Bombs then fell near the Government Offices and upon the Police Barrack, blowing three Constables out of the building without serious injury. Another bomb, at least 500lbs., fell upon the corner of my office, almost entirely demolishing it. I had just left my office. The damage done to the Government Offices is severe, all windows being shattered, and it will not, in my opinion, be possible to use them again without extensive repairs. Government House is damaged, but this was caused at a later time, when the "Neptuna" blew up at the wharf with a terrific explosion. The attack then continued upon the wharf and shipping in the harbour. A further most intensive raid was made upon the R.A.A.F. station and buildings, including hangers were demolished and transport destroyed.

"The worst effect of the raid was that it entirely interrupted all telephone communications and consequently confusion resulted." ([AWM 68 49 687](#))

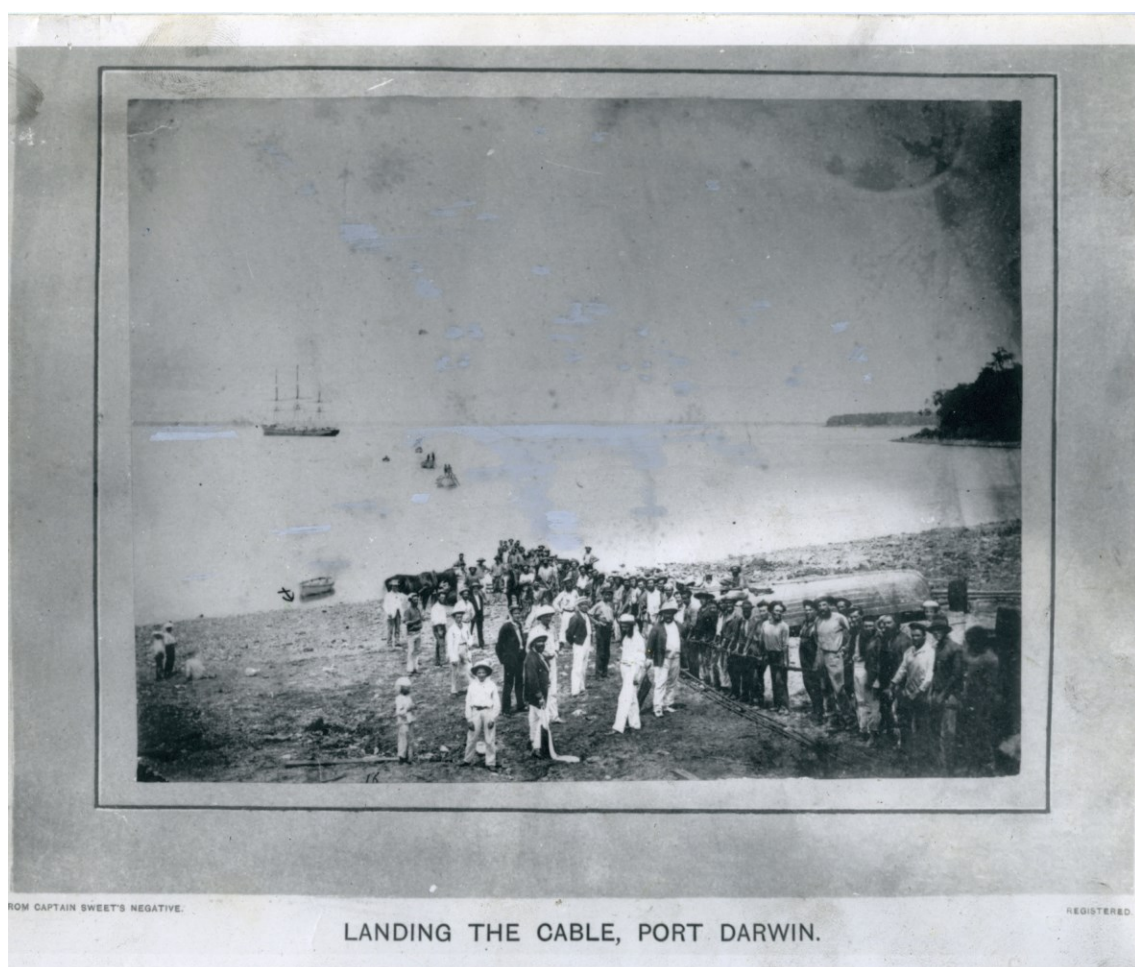
The direct hit on the Darwin Post Office and adjoining Telegraph buildings was a devastating blow not only to Darwin and Australia's lines of communication, it also took a heavy toll on the staff of the Postmaster-General's Department (PMG), killing ten, injuring more than a dozen and leaving many more again in shock and on edge. Those who lost their lives that day were the Postmaster Hurtle Clifford Bald and his wife Alice Louisa Bald; their twenty year-old daughter Iris Enid Bald; four Telephonists, Emily Florence Young, Jennie Freda Stasinowsky and the sisters Eileen Carrig Mullen and Jean Carrig Mullen; a Postal Clerk named Arthur Wellesley Wellington; a Telegraph Supervisor by the name of Archibald Thomas Roy Halls; and Walter Robert Lewis Rowling, a Foreman Mechanic. ([Lowe Commission 1942](#); [Lockwood 1972](#); [National Archives D955, PC 1986/848](#); [Bowden 2016](#).)

Despite the devastation, the PMG staff who survived the raid continued to go about their jobs under the most difficult and harrowing of conditions. There are many stories of bravery, heroism and courage under fire, such as that of Henry Milton Scott. Henry was a Linesman from Clare in the Mid North of South Australia; he was also the nephew of Hurtle and Alice Bald and a cousin to Iris Bald, all of whom were killed in that first air raid. At the time of the raid, Henry happened to be working at the top of a 26 foot high telegraph pole when he saw the Japanese bombers coming in to launch their attack, including the direct hit on the Post Office where his relatives were taking cover. No less courageous were colleagues like Claude

Leonard and Harry Hawke, both engineers, who, along with Telegraph Supervisor W. T. Duke, set about reconnecting Darwin with the rest of the country within hours of the first raid by salvaging what they could from the Post Office bomb site and getting the telegraph system back on the air. ([Croft 2012](#); [National Archives D955, PC 1986/848](#) )

## Why Darwin?

Darwin was barely seventy years old when it came under Japanese attack. One of the reasons why it was so crucial to Australian interests, which also made it vulnerable, is that Darwin was the place where the Overland Telegraph line (completed in 1874) met the undersea cable which linked Australia with the rest of the world.



**Figure 1. Landing the under-sea Telegraph cable, Port Darwin 7 November 1871 – Northern Territory Library PH0238-0407 Peter Spillelt Collection <http://hdl.handle.net/10070/10127>**

The Overland Telegraph was the means by which Australians connected with the rest of the world, and with each other for that matter, until the 1970s. It was also how the rest of Australia found out about the impending Japanese attack on Darwin, and how we found out about the devastating attack after the fact. As the war came ever closer to Australia, it was

decided that, in the event of a Japanese invasion, it would be prudent to cut the international cable linking Australia with the rest of the world. But the line running south remained operational, and on the morning of 19<sup>th</sup> of February, 1942, Telegraph Supervisor Archibald Halls, one of those killed at the Post Office, was busy testing the telegraph circuit to Adelaide when he broke off, 'Sec.', or wait a moment, and then tapped out, 'There's another air raid alarm. I'll see you shortly'. Quickly adding, 'The Japs have found us and their bombs are falling like hailstones ... I'm getting out of here, see you later', which was followed by the laugh signal, three dashes and a dot. Of course, he never did.

Within about an hour of the bombing, having salvaged a Morse key and sounder from the badly damaged store attached to the Post Office, PMG officers Leonard, Hawke and Duke improvised a means of hooking into the Overland Telegraph to tap out the news of the attack:

WE HAVE JUST HAD BOMBING RAID WHICH APPEARED  
CENTRED ON AND NEAR POSTAL BUILDINGS CAUSING  
MUCH DAMAGE AND SEVERAL OFFICERS LIVES LOST  
MANY INJURED DON'T KNOW EXACT PERCENTAGE  
CURSORY INSPECTION REVEALS POST OFFICE AND  
PMS RESIDENCE COMPLETELY WRECKED  
TELEG OFFICE AND PHONE EXCHANGE APPEAR INTACT  
BUT COVERED MUCH DEBRIS ... AFRAID BALD  
FAMILY AND TELEPHONISTS WERE IN THE SHELTER WHICH RECEIVED  
DIRECT HIT. ([National Archives D955, PC 1986/848](#))

This would be the first and most devastating of the 64 bombing raids by the Japanese on the town of Darwin; the next came just two hours later, the last on 12 November, 1943. On the evening of the first two attacks, Prime Minister John Curtin told the nation:

"A severe blow has been struck in this first battle on Australian soil ... We must face with fortitude the first onslaught and remember that whatever the future holds in store for us we are Australians and will fight grimly and victoriously ... Darwin has been bombed, but it has not been conquered".

Concerned that revealing the true extent of the attacks on Darwin would be too great a blow to national morale, Curtin reported that only seventeen people had been killed and another twenty-four injured in the raids of 19 February ([National Archives D955, PC 1986/848](#)). Prime Minister Curtin was right in that Darwin was never conquered, nor was that

necessarily the Japanese intention, but it was severely damaged and greatly diminished as a supply base from which Allied forces could launch counter-attacks.

## Post Office Hit

Thursday 19 February, 1942 was a disastrous day for Darwin and a devastatingly tragic day for the Postmaster-General's Department. Although, despite some tension in the air and the realisation that the enemy was nearby, the day had started out rather optimistically for at least one member of staff. Just before 10 a.m. that morning, someone in the Darwin Post Office was busy conducting a test on the new Trans-Pacific radio hook-up that made Darwin a key news office in the Columbia Broadcasting System's (CBS) Far-East network. 'Hello Frisco: This is Darwin', said the voice over the airwaves, all the way to CBS stations in San Francisco and New York, 'everything is fine here. It is a bright sunny day, with nothing moving. I will call you at the same time tomorrow'. Tragically, that did not happen. What started out as a bright and sunny, albeit nervous kind of day soon became one of the darkest days in Australian war-time history: nine Post Office workers were killed instantly, another suffered mortal wounds, many more were injured and many more again were severely shaken by the day's events. ([National Archives D955, PC 1986/848](#))

In the days after the first Japanese air raids, Police Constable Leo Charles Francis Law, who was stationed in Darwin at the time, prepared the following report, which was later submitted to the Lowe Commission ([Lowe Commission 1942](#); [Australian War Memorial 54, 625/3/1](#)):

"I state that on 19/2/'42 the following bombs were dropped and the following damage and deaths were caused in Darwin due to enemy action ...

Two 500 Kilogram H.E. [High-explosive] bombs or 1,050 lb bombs on Esplanade outside Post Office Quarters.

One 500 Kilogram H.E. bomb or 1,050 lb bomb fell just off Esplanade outside Cable Quarters.

Two 500 Kilogram H.E. bombs or 1,050 lb bombs fell opposite the Postmaster's residence, one of these being near the cliffs.

One 500 Kilogram H.E. bomb or 1,050 lb bomb fell on the Postmaster's residence. This was a direct hit, killing the following nine people: Mr, Mrs, and Miss Bald; Mrs Young; the two Mullens [Mullen] sisters; Mr Walls [Halls]; Miss Stasinowsky; Mr Wellington; The Postmaster's residence is a total loss.



One 500 Kilogram H.E. bomb or 1,050 lb bomb fell in the yard of the Linesmen's Workshop House on corner of Mitchell and Bennett Sts ...

**Damage:**

Postmaster's residence, three Post Office Houses in Esplanade, the Overland Telegraph Quarters, and the Cable Office were all rendered unsafe as dwellings, and were all complete loss."

Lieutenant H. N. Deveson of the Bomb Disposal Squad later reported that 'nineteen 500 kg bombs were dropped in an area of 200 yards square' in the Darwin Post Office precinct.

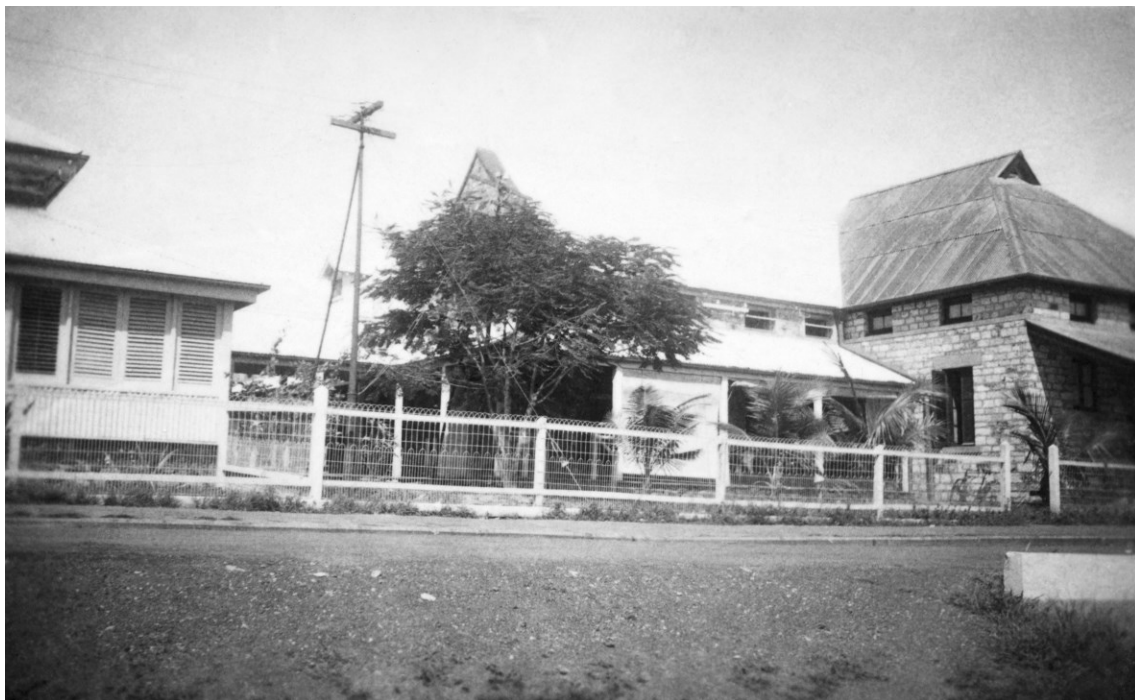


Figure 2. Post Office and Postmaster's residence before the first air raid – ([National Archives: D955, PC1986/848](#))

## Back on the Air

Despite the devastation, the chaos, the injuries and the loss of life inflicted on PMG staff by the Japanese bombing of the Darwin Post Office and adjoining Telegraph buildings and infrastructure, the dust did not have time to settle before staff quickly got on with what they knew had to be done. As noted already, within an hour of the first air raid, news of the attack was promptly passed on to relevant authorities in the south of the country. In a report to the Superintending Engineer, which was written just over a week after the air raids, the Acting Divisional Engineer in North Australia, Harry Hawke, wrote that the 'installation of emergency equipment was at the time of the raid proceeding at the Lands Department Office in Cavanagh Street'. As he emerged from taking cover following the first raid, Claude

Leonard, the Acting Senior Mechanic, looked about and came to the realisation 'that telegraphically we were cut off from Adelaide'. Given the extent of the damage to the buildings and equipment at the Post Office and adjoining Telegraph buildings, he 'decided to make all haste to the Lands Department Office and set up temporary telegraph communication with Adelaide'. ([National Archives D955, PC 1986/848](#))



**Figure 3. Post Office and Postmaster's residence after the first air raid on 19 February 1942 – a Northern Territory Library PH0250-0026/0059 Watts Collection** <http://hdl.handle.net/10070/14071>

In order to do so, Leonard made his way to the Mechanics' Engineers' store where he procured a Morse key and sounder with batteries and a Morse relay. He and a number of colleagues then made their way to the Lands Department Office in the mechanics' van where they found some of the engineering staff, including Hawke, who were already in the process of installing power plant in preparation to establish an emergency Telegraph Office. As Leonard explained in his account of that horrible day, 'the main telegraph lines to Adelaide had already been teed [or joined] into this building', so they quickly set up the Morse equipment and 'connected it to the copper line No. 40.' According to an account of one of the PMG staff present in the Lands Department Office:

"Alice Springs was contacted and the Postmaster was in attendance at the repeaters. He quickly made the necessary adjustments on the duplex repeaters to suit our Morse terminal and put us through to Adelaide Chief Telegraph Office, when I requested that the Deputy Director, Mr. Arnold, be asked to come on the line. Within a few minutes Mr. Arnold was in attendance and with Mr.



Duke operating the key I was able to give a quick account of the happenings to the Darwin Post Office and its staff during the past hour. The raid commenced within a few minutes of 10 a.m. and although I do not remember how time had flown, I was afterwards informed that it was somewhere about 40 to [illegible] minutes afterwards that we were in contact with Adelaide from our emergency station." ([National Archives D955, PC 1986/848](#))



**Figure 4. Bomb damaged Post Office buildings and yard – Northern Territory Library PH0238-0333 Peter Spillett Collection** <http://hdl.handle.net/10070/13278>

Another account of how the news of Japan's first attack on the Australian mainland was broken to the rest of the nation, or at least some of them, has a slightly different twist on it. On the morning of the attack, J. L. Skerrett, a PMG Engineer from the Central Office Transmission Section was working in Alice Springs at the repeater station as part of the concerted effort to complete the telephone circuit linking Adelaide and Darwin. Having lost all contact with Darwin, but not knowing the extent of the problem or precisely why, Skerrett and Norman Lee, the station's Telegraph Supervisor, hooked up some diagnostic equipment and, to their surprise, detected a Morse signal coming along the line – the message being tapped out by Duke.

It is reported that Skerrett promptly phoned PMG headquarters in Melbourne, thanks to a line connection that had just been completed the previous day, and relayed the message he had just received to L. B. Fanning, the Acting Director-General of the PMG. Fanning in turn called the Prime Minister, John Curtin, to break the news of the air raid and its

consequences; he then told Skerrett to destroy the original message and keep the news to himself. It is quite possible that both of these versions of how the news broke were going on at the same time: as the breaking news was being passed on by Hawke and others to the Deputy Director in Adelaide; it was also being relayed by Skerrett to the Director-General in Melbourne. Many have argued that the news of what was happening in Darwin and the extent of the damage done and the loss of life were heavily censored by the Australian government in order to preserve the nation's morale ([Moyal 1984](#); [National Archives D955. PC 1986/848](#)).

## 'Knuckey's Lagoon' Exchange

Having made initial contact with the authorities to the south, it was soon realised that something more sustainable would be required to deal with the growing communication demands in and out of Darwin and its surrounds. The Lands Department Office was housed in a two-storey timber building that wasn't likely to withstand much of a blast should a bomb be dropped in its vicinity; it was nowhere near as sturdy as the Post Office and that had been rendered entirely uninhabitable. The need for a more reliable communications headquarters was further driven home by the fact that the second air raid targeting the RAAF Aerodrome just outside of Darwin had also inflicted severe damage on the telegraph wires running to the base, which again interrupted the connection with Adelaide.

Having advised the Army's Officer Commanding Signals of the second disruption to telegraph communications, it was agreed among senior PMG personnel that a telephone exchange should be re-established further out of harm's way at a second emergency location. The chosen site was a relatively small hut 10 miles south of Darwin on the railway line, which became known as 10-mile camp. All PMG officers that were not required for emergency repairs in Darwin were instructed to relocate to the camp where the Army would arrange for the provision of tents and rations. Claude Leonard reported that not long after arriving at the 'small hut on the railway line known as "the 10 mile" or "Knuckey's Lagoon" we soon had the Morse set connected to the telegraph line and re-established communication with Adelaide'. By this time it was about 3 o'clock in the afternoon and they were 'somewhat disappointed at the fact that nearly four hours had elapsed since we had last been in telegraph contact with the rest of Australia, particularly at such a vital time when so much depended upon maintaining continuous service'. There was little time to reflect, however, for there was soon a regular procession of Army Signals despatch riders arriving at the camp on motor cycles with a steady flow of telegraph traffic for the increasingly busy and increasingly crucial 10-mile telephone exchange.

By late in the afternoon on 19 February, the 10-mile campsite was a relative safe-haven in the bush for as many as fifty to sixty PMG staff. When not working, most were camped in tents that were scattered through the scrub about forty yards apart and no closer than 200 yards or so from the hut that served as the Telegraph Office and, initially at least, the cookhouse. The camp was well served by two cooks who made the best of the bad situation, salvaging what cooking implements they could from their respective Messes at the Post Office and the Telegraph Exchange. Fortunately, one of the things salvaged included a large pot of stew that was being prepared by one of the cooks for the evening meal. After nursing it carefully throughout the 10 mile journey south from Darwin, the cook put the finishing touches to what was a most welcome hot meal.

A batch of scones being prepared for morning tea at 10.30 a.m. in the other Mess was not so fortunate, having fallen victim to a bomb blast that demolished the kitchen. Once a degree of composure had been restored to postal and telecommunications services, from 5 March many PMG staff were relocated further south again to a second camp 22 miles from Darwin where the Department of the Army was erecting a communications hut that could accommodate Telegraph and Signals Headquarters staff.

Back in Darwin town, work was going on day and night to repair the damage done to cables and wires during the air raids. It was thought that further raids were most likely to occur between 10 a.m. and 3 p.m., so whenever possible PMG staff kept away from potential target areas during those times. They commenced their repair work as soon as the sun came up at around 6 a.m. and worked through until about 10 a.m; they then headed back to camp before returning to their tasks at about 3.30 in the afternoon and working until sunset at around 7 p.m. If artificial light was available and it was safe to do so, they continued working into the night. Underground cables lying damaged and exposed in bomb craters near the RAAF Base and the Police Officers' Mess and Quarters were repaired the day after the raid; but fixing the many aerial wires and the poles that supported them, including the stretch of line running along Mitchell Street from around the Hotel Darwin to the shattered Post Office was a much bigger job. The presence of unexploded bombs didn't help matters either, so it was another week before the repairs were completed on the 27<sup>th</sup> of February. ([National Archives D955, PC 1986/848](#) )



**Figure 5. George A. Marvin astride a defused unexploded 250 pound Japanese bomb – Northern Territory Library PH0491-0001 E. J. Braid Collection <http://hdl.handle.net/10070/37402>**

The air raids on Darwin that caused so much damage to the telecommunications infrastructure came two days before the final touches were due on the telephone lines and equipment that would have completed the speaking circuit between Adelaide and Darwin. Needless to say, this was a most unwelcome setback for the venture that had started so many years earlier with the planning and laying of the Overland Telegraph. In the wake of the air raids, a Superintendent Engineer from Adelaide named Tom Henry was sent to Darwin to oversee the completion of the circuit. Lineman Henry Scott was one of those responsible for laying the coated wire along Mitchell Street to what he described as ‘the bombed out exchange where a portable telephone was connected to where the old switchboard stood’. As he later recalled, ‘this happened about a fortnight after the first bombing raid on Darwin, around the first week of March, 1942. As I was the linesman, it was my duty to test the line. It was as clear as a bell when I spoke to the chief in Adelaide. Mr Henry then took over and spoke to the Deputy Director in Adelaide making the historic occasion official’. Despite the trauma he had been through in Darwin, he later reflected on ‘what a privilege it was that my voice was the very first to be speaking down the line to the chief in Adelaide that day’. ([Croft 2012](#))





**Figure 6. Herb Page in a Manhole at the corner of Daly and Mitchell Streets – Northern Territory Library PH0480-0013 Jean Page Collection <http://hdl.handle.net/10070/3947>**

Within a matter of months the relocated Darwin Telegraph Office was operating around the clock and sending in excess of 10,000 words a day in messages, telegrams and cables, with almost as much traffic incoming. The vast majority of these messages were generated by the military and related to the defence of the nation; as Harry Hawke reported, ‘since the raid many requests have been made by both Department of Army and RAAF for additional services to dispersal points at which they have established themselves’, which the PMG endeavoured to meet ‘wherever practicable’.

William Hales, a survivor of the first air raids on Darwin, who came from Coffs Harbour in New South Wales, ably took on the role of Acting Supervisor of the five telegraphists handling all of the traffic, a job that kept him busy from 8.30 in the morning until 11.30 at night. His four colleagues similarly worked about ten to twelve hours a day, seven days a

week to maintain the flow of traffic. Not all of this traffic, however, was official Defence business; quite a bit of it included personal messages from soldiers to friends and families. Among these personal messages were the wedding vows of two American soldiers, Lieutenant William Spitz-Miller and Private Benjamin Vaughan, who made use of the telegraph cable service to wed their loved ones back home in the United States. ([Pratt 1942](#))

## Conclusions

The PMG staff who survived the air raid on Darwin on the morning of the 19 February, 1942 performed a remarkable job in repairing and maintaining essential communications between the warfront in the north and the rest of the nation to the south, under arduous and dangerous conditions

It seems inappropriate to single out one or two people in particular, because all were reported as doing their job admirably in the face of adversity. As the Acting Divisional Engineer, Harry Hawke, later reported, ‘those of the staff who were not injured or were slightly injured have for the most part carried out their duties courageously’. For whatever reason, as a society we are inclined to identify certain people, ‘heroes’ if you like, who are afforded a special mention – and Harry Hawke was no different. He noted that ‘several particular instances of devotion to duty are worthy of mention. Acting Senior Mechanic Leonard has performed particularly meritorious work from the very moment the raid ceased. He immediately commenced wherever possible restoring services, diverting services, and has worked day and night irrespective of danger in order that defence lines shall remain intact’. A Lineman by the name of Herb Page was also identified as having ‘played a conspicuous part in carrying out much cable repair work, alterations, etc. and has assisted Leonard in no small degree’.

Hawke felt that ‘one other officer should be mentioned for the work he did under severe conditions. This is J. C. [Jim] Willsmore [or Wilsmore], Postal Clerk, who was sheltering in the Postmaster’s shelter when the telephonists entered. He immediately left the shelter and returned to the exchange where he continued operating throughout the raid. Later in the day when most members of the Postal Staff had left the precincts of the town, Willsmore remained behind with Messrs. Leonard and Page assisting them where possible in diverting urgent services to the Larrakeyah P.B.X.’

Naturally, Harry Hawke neglected to mention his own crucial role in restoring communications in the immediate aftermath of the first air raid and the leadership he ably demonstrated in coordinating and assigning jobs to his PMG colleagues. For some reason it was his colleague W. T. Duke, the man tapping out the Morse code message that notified the rest of the nation of the Japanese attack on Darwin, whose contribution was formally

acknowledged with the awarding of a B.E.M., the British Empire Medal for Meritorious Service. Tom Mansfield was similarly singled out among the Postal staff and was awarded a B.E.M. for assuming responsibility for postal services under particularly dangerous conditions following the death of Postmaster Hurtle Bald. While the other seventy-odd officers of the Postmaster-General's Department who were based in and around Darwin when it came under Japanese attack might not have received medals from the Crown in recognition of their invaluable service in maintaining essential communications when the Australian nation was at war and under threat, their roles are no less worthy of merit and our appreciation.

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## Radio Telephone Surveying The Traditional Way

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Simon Moorhead

Ericsson Australia & New Zealand

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**Summary:** Radio telephone surveying at the end of World War 2 was physically challenging, as well as technically demanding. The historic paper describes the extraordinary challenges faced by technical and lines personnel conducting propagation measurements for a radio telephone link from Victoria to Tasmania between 1947 and 1949.

### Introduction

The propagation principles of point-to-point radio telecommunications have been long understood; however the environmental effects in new uncharted locations were difficult to quantify without field measurements.

Fast forward to today and modern software design tools, accurate terrain feature and climate databases, as well as years of transmission design experience, have almost eliminated the need for field surveys. Today's equipment also contains features such as adaptive modulation that can reduce the effects of extreme environmental conditions on transmission quality.

The historic paper (Moriarty 1949) describes the need to establish a new radio telephone link to Tasmania to provide diversity from the existing submarine cable laid in 1935, given the back-up radio link from Tanybryn to King Island and then to Stanley had variable quality. A theoretical two-hop path which could provide a more reliable circuit was identified, from Wilsons Promontory to Flinders Island, and then to Launceston.

The field survey had to identify suitable repeater sites with elevations to meet the theoretical design requirements. They then undertook propagation measurements over a period of time to ensure performance was acceptable in a variety of environmental conditions that can cause degradation, for example through ducting and refraction.

The survey party had to cut their own track through thick scrub up to Mt Oberon from the lighthouse track on Wilsons Promontory. They carried their equipment by pack horses (or 4WDs where rough roads existed), then on their backs up to the chosen sites. The party had to rig VHF antennas on long poles and sleep in A-frame army tents in the scrub. On Flinders Island, the site at Walkers Lookout was so windy that the party also had to fabricate a wind break around their tents.



Their perseverance paid off and the survey collected a number of successful recordings which confirmed that the live performance was more than satisfactory and matched the theoretical design. The tests also proved that if two frequencies (58Mhz and 158Mhz) were used for diversity, they would all but eliminate the effects of deep fades. The historic paper provides a number of interesting photographs, path profiles, calculated and measured field strengths, receiver input voltages and copies of receiver chart recordings.

The paper concludes with acknowledgement of the personnel involved, including Mr. A Irving and his lines staff at Foster who cut the track to Mt Oberon and Mr H Ternes and his staff from the Research Labs who manned the equipment in rough conditions in very remote locations.

## References

Moriarty, O.M. 1949. "Projected New Radio-Telephone Link from Mainland to Tasmania – Propagation Measurements". *Telecommunication Journal of Australia*, October 1949, pages 281-299.

## The historical paper

## PROJECTED NEW RADIO-TELEPHONE LINK FROM THE MAINLAND TO TASMANIA — PROPAGATION MEASUREMENTS

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### SUMMARY

During the period 1947-1949 a survey was made of a new route for a radio telephone link between the mainland of Australia and Tasmania, and radio propagation measurements were made over the route selected. The route was from Wilson's Promontory (Victoria) to the lower slopes of Mount Arthur, near Launceston (Tasmania), with a repeater on Flinders Island (Bass Strait). The measurements indicated that a high-grade multi-channel link could probably be provided on a frequency of about 60 Mc/s. It is likely that radio-telephone links over the route selected will be used to provide high grade Melbourne-Launceston circuits fully alternative to the existing route via Stanley.

### INTRODUCTION

A submarine cable (1,2) laid in 1935 was the first telephone link between the mainland of Australia and Tasmania. A little later a radio-telephone link (3) on a frequency of about 40 Mc/s was established to provide emergency communication during periods of cable failure.

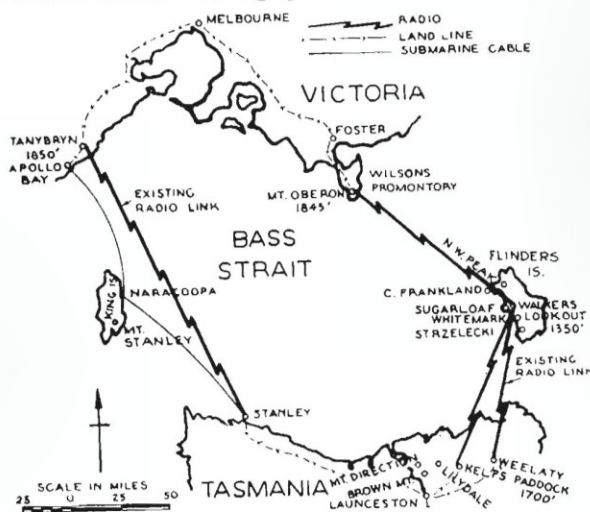


Fig. 1.—Radio paths across Bass Strait.

Fig. 1 shows the route of the first radio-telephone link, which was from Tanybryn (Victoria), at a height of 1850 feet above sea level, to Stanley (Tasmania), at a height of 400 feet above sea level. A profile of the radio path is shown on Fig. 2, where allowance is made for refraction of the radio rays by flattening the earth's surface as though the effective radius of the earth was four-thirds of the actual radius.

It is seen from Fig. 2 that the radio path between Tanybryn and Stanley is well beyond the line-of-sight between the two stations. It is, in fact, 1.9 times the radio-optical range, that

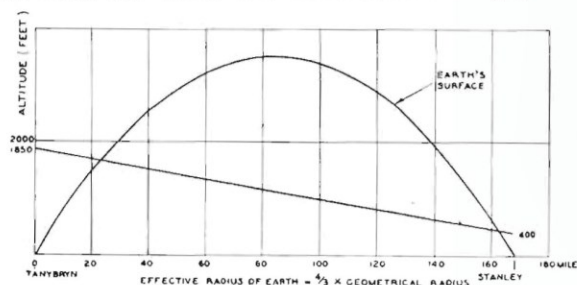


Fig. 2.—Profile of radio path between Tanybryn and Stanley.

is, the radio horizon range allowing for refraction for the heights of the two stations. The length of the radio path is 168 miles. Signals over such a long obstructed path would be expected to be

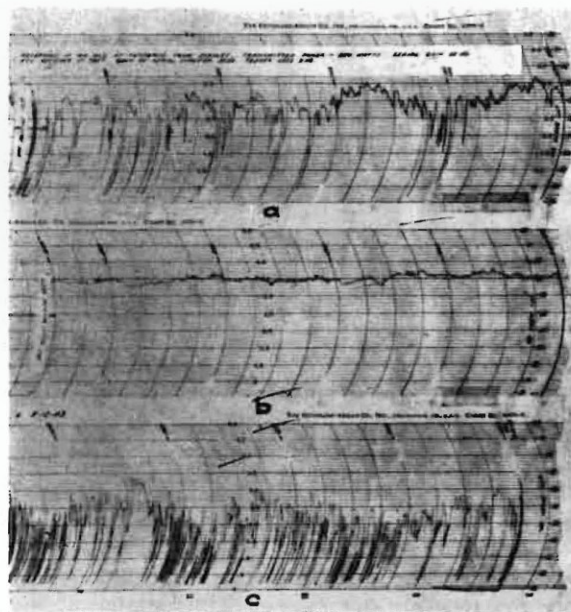


Fig. 3.—Stanley-Tanybryn. Typical recording of received signals.

- (a) Day of high signal with deep fades.
- (b) Day of high signal.
- (c) Day of low signal with deep fades.

very variable, and to fluctuate with atmospheric conditions. This has been found to be so, and Fig. 3 shows typical records of different signal conditions. On days of low signal, the signal to noise ratio on the circuit is often very low, as it is

also for short periods on days of high signal with deep fades. At such times when there is a very low signal the signal-to-noise ratio is often too low for commercial use. Fig. 4 gives typical graphs of signal strength against percentage of

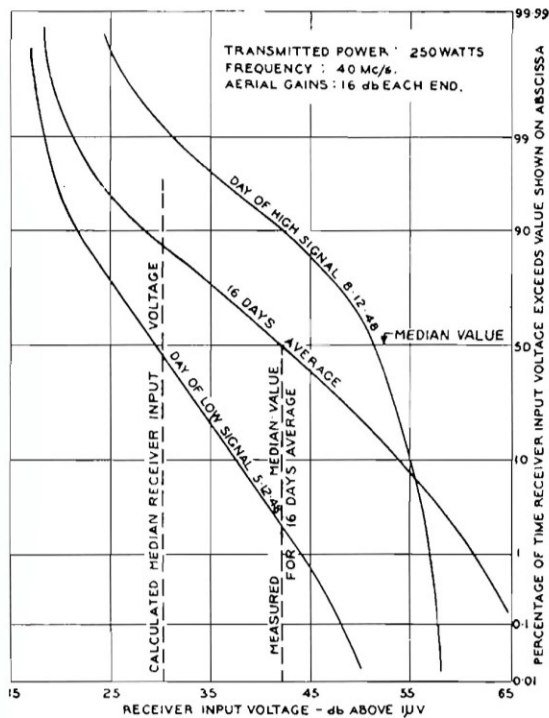


Fig. 4.—Stanley-Tanybryn. Measured receiver input voltage distribution.

the time over which the signal strength is analysed. The days of low signal correspond with weather conditions giving a turbulent well mixed atmosphere with normal radio propagation conditions. Days of prevailing high signal correspond with weather conditions producing the abnormal condition of propagation, which is called super-refraction. Reference to Fig. 4 shows that the calculated value of signal is very close to the median value for days of low signal or normal propagation. The median value is the value obtained for 50% of the time.

To improve the circuit a suggestion was made to put a repeater at King Island. Measurements were made at a low site on King Island, approximately seven miles north of the existing repeater station at Naracoopa. The measurements confirmed a calculated prediction that there would be no improvement from a repeater at such a low site. The highest available site on King Island is at Mount Stanley, 650 ft. above sea level. Calculation showed that a repeater at Mount Stanley would give two paths, one just equal to the radio-optical range, and one 1.3 times the radio-optical range. Calculations showed that a

substantial improvement could be made in the circuit by a repeater at Mount Stanley if a low frequency of about 44 Mc/s, large aerials of gain 16 db, and a transmitter power of 200 watts, were used over the non-optical path.

The calculated improvement in the circuit over the western end of Bass Strait by a repeater at Mount Stanley would not, however, give a circuit as good as one calculated for the eastern end of the Strait, and described below. The latter circuit would have an advantage also in that it could be provided on higher frequencies with smaller aerials and lower power. Further, the path to be described, at the eastern end of the Strait, would end near Launceston, the telephone centre of Tasmania, and give a complete alternative to the submarine cable route. The submarine cable terminals in Victoria and Tasmania are at Apollo Bay and Stanley respectively, and the connecting land line circuits for the cable and radio channels are carried on the same pole routes and affected by the same failures. Stanley is connected to Launceston by a long pole route over difficult terrain and there has been a number of failures of this route, which completely isolated Launceston from the mainland.

#### SELECTION OF SITES AT EASTERN END OF BASS STRAIT

##### Selection of Site in Victoria

A map examination and calculations had indicated that the establishment of a radio circuit over paths at the eastern end of Bass Strait might provide a better service than improvement of the existing service at the western end of the

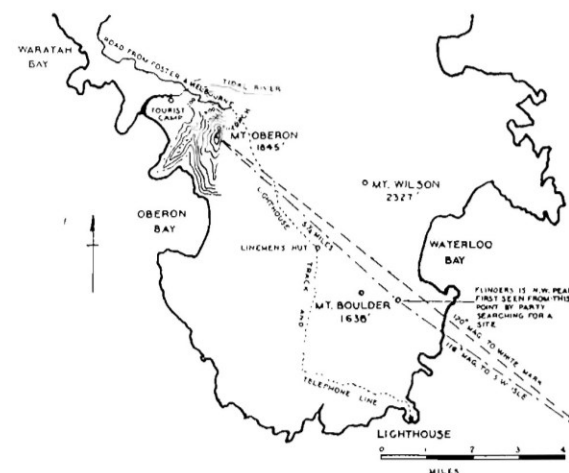


Fig. 5.—Map showing the location of the Mt. Oberon site on Wilson's Promontory.

Strait. Wilson's Promontory was the area selected for a site in Victoria. This is a large, rugged promontory with high mountains and only one road which ends some ten miles back from the



southern extremity of the Promontory. Fig. 5 shows the area adjacent to the end of the road from Foster and Melbourne. Flinders Island is the only easily accessible and suitable repeater location at the eastern end of Bass Strait (see Fig. 1), and the post office and telephone exchange is located at Whitemark, near the centre of the western coast of the island. It was to be determined whether a readily accessible high site could be found on Wilson's Promontory with a clear outlook towards Whitemark.



Fig. 6.—Mountainous country on Wilson's Promontory.

In November, 1947, an expedition was arranged to examine likely sites in Wilson's Promontory. Pack horses were used to transport camping gear, as a map examination and tentative profiles of paths to Flinders Island had shown that any suitable site would lie beyond the end of the road. The country was found to be very rough when off a track on the hillsides. Mount Boulder and



Fig. 7.—Some of the pleasant, low-lying country near Mt. Oberon.

Mount Oberon were investigated as the likely sites and the slopes and summit of both were trackless with tangled scrub. In places the scrub formed a solid roof, and the party had literally

to crawl through in the gloom beneath. Figs. 6 and 7 are typical of some of the conditions of the search for a site. Fig. 8 shows the Lineman's hut used as a headquarters in the search. Mount Boulder had to be dismissed as impractical of access. Mount Oberon was found to be much less densely covered with scrub, and there were



Fig. 8.—The headquarters of the search. Linemen's hut built of local stones and driftwood.

several gradual grades for a track from the end of the road to the summit, and it was selected as the most suitable site. Fig. 9 is a view of the mountain. Fig. 10 is a photo of the summit. Fig. 11 shows a view from the top of the



Fig. 9.—Mt. Oberon seen from Tidal River.

mountain looking in the direction of Melbourne, while Fig. 12 is a view looking over the promontory to the sea, in the direction of Flinders Island. It is fortunate that there is a low gap in the ranges on the eastern side of the Promontory; all points on Flinders Island, as viewed from Mount Oberon, lie within the arc bounded by this gap, so that any possible path is unobstructed at the Wilson's Promontory end.

The only settlement near the road in the Promontory is at Tidal River, at the north-



western base of Mount Oberon. Having decided on a site on the summit of Mount Oberon, an attempt was made by linemen from Foster to cut a track up the north-western slopes. It was found, however, that the slopes near the summit were



Fig. 10.—Summit of Mt. Oberon.

too steep and slippery to permit of equipment being carried up by this route. The aim was to make a track to take up equipment to make radio propagation tests with Flinders Island. A new track was then cut up a long ridge from the end of the road on the eastern side of the mountain.



Fig. 11.—View from Mt. Oberon looking over Tidal River in the direction of Melbourne.

It had been intended that this track be wide enough for the use of a horse and sledge or a pack horse. It was difficult enough, however, to make a narrow foot track, and it was obvious that all equipment would have to be carried by men up the 900 feet of ascent between the end of the road and the summit. As will be described later, the considerable amount of equipment required was carried up the mountain by members of the testing parties assisted by local linemen.

**Visibility of Flinders Island from Mount Oberon.** The north-western side of Flinders

Island is the closest to Wilson's Promontory. While examining the summit of Mount Boulder two high peaks, about one degree apart, were observed on Flinders Island. The same peaks would be in unobstructed range from Mount Oberon, and only about another four miles further away. The bearing from Mount Boulder on the more southerly and more visible peak was  $116^\circ$  which, on the map, passed through North



Fig. 12.—View from Mt. Oberon. Flinders Island lies in the direction of the arrow.

West Peak in Flinders Island. The other visible peak was presumed to be Mount Killecrankie, slightly to the north of North West Peak on Flinders Island.

The distance from Mount Boulder to North West Peak is 93 miles. The height of the peak is given as 1080 feet. The geometrical limit of the horizon between heights of 1650 feet, the height of Mount Boulder, and 1080 feet, the height of North West Peak, is 90 miles, which is less than the distance between the two points. If allowance is made for refraction of optical waves in the atmosphere (see Admiralty Navigation Manual, 1938, Volume III, pages 219-223) the distance to the horizon is 1.08 times the distance to the geometrical horizon. With this allowance a height of 870 feet at North West Peak would reach the horizon from a site at 1650 feet at a distance of 93 miles. With the allowance for visual refraction, therefore, North West Peak should have projected about 210 feet above the horizon, as was observed.

During several series of inspections and measurements it was only on about three occasions that the atmosphere was free enough from haze to allow of visibility from Mount Oberon to Flinders Island.

#### Selection of Site on Flinders Island

An inspection was made of Flinders Island to find an accessible site from which to work to Mount Oberon. The highest sites, namely Strzelecki Peaks, the Sugarloaf, North West Peak and



Mount Killecrankie, were found to be too inaccessible, although they would have given paths within the radio horizon from Mount Oberon. A site at Walker's Lookout, in the Darling Ranges, was finally selected.



Fig. 13.—Walker's Lookout, Flinders Island.

The site at Walker's Lookout is on a clear, grassy hill (see Fig. 13), close to the end of a road from Whitemark, which is the post office centre of the island. The distance from Whitemark is 7 miles, and the grade of the road is gradual. The slope from the site to the end of the road was, however, steep without a road being cut, but it was possible to negotiate it with four-wheel drive vehicles, and this was done during the subsequent measurements.

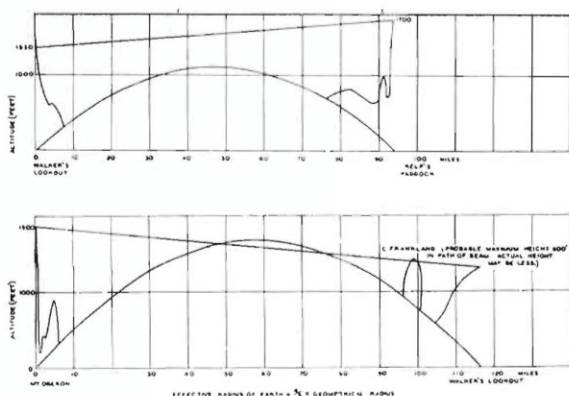


Fig. 14.—Profile of radio paths from Walker's Lookout to Kelp's Paddock, and from Mt. Oberon to Walker's Lookout.

The height of the site at Walker's Lookout is 1350 feet above sea level. A profile of the path to Mount Oberon is shown in Fig. 14. The path length is 1.03 times the radio-optical range for the heights of the sites. There might be an additional slight obstruction in the path at Cape Frankland, about 17 miles from Walker's Lookout. It was difficult to obtain the height of this

obstruction, but the maximum height was estimated to be 600 feet.

#### Selection of Site in Tasmania

A number of sites in the vicinity of Launceston were investigated for the Tasmanian end of the circuit. The sites examined were:—

- Mount Barrow which was rejected because of the nature of the road leading to the summit. In some weather conditions this road would be very unsafe and could lead to a fatality among maintenance staff.
- Brown Mountain, near Lilydale, which had no road to the possible site.
- Mount Direction, which is not readily accessible, and is remote from power.
- Weelaty, the existing terminal of a link from Flinders Island. This site is farther from Launceston and more remote from power supply than the site finally selected.
- A site on the lower slopes of Mount Arthur, at what is known as Kelp's Paddock. This site was considered suitable.

The site at Kelp's Paddock is at a height of 1700 feet above sea level. It is  $2\frac{1}{2}$  miles from the township of Lilydale, and about 14 miles from the outskirts of Launceston. The road to the site was good and low tension power supply was being extended along the road from Lilydale towards the site.

A profile of the path between Kelp's Paddock and Walker's Lookout is shown in Fig. 14, where the path is seen to be well within the radio-optical range for the heights of the sites.

#### CALCULATION OF SIGNAL STRENGTH AND SIGNAL-TO-NOISE RATIO

##### Reference Radio System

The strength of the received signals over the paths selected was calculated early in 1948 for several frequencies. The calculated signal strengths were then used to estimate the signal-to-noise ratio, which would be obtained with a multi-channel radio-telephone system.

An actual radio system which was developed and proven for long paths is that operated by the British Post Office between England and the Channel Islands, and is known as the Guernsey-Chaldon Link (4). This link is of length 85 miles, and its length is 1.51 times the radio-optical range for the heights of the sites. The system used on this link is taken as a reference for performance of a system over the Bass Strait paths.

Six channels are operated with modulating frequencies between 60 and 85 kc/s. The carrier frequencies are about 45 Mc/s, and frequency modulation with a maximum deviation of 300 kc/s is used. The deviation per channel is about 20% of the maximum deviation.

For a check on the methods of calculating the signal-to-noise ratio for the Bass Strait paths,



the signal-to-noise ratio of the Guernsey-Chaldon link was calculated by the same methods to be 56 db. The performance analysis of the circuit published by the British Post Office (4) shows that the median value of signal-to-noise ratio for days of low signal is 54 db, and for an average over 8 weeks the median value is 59 db. The methods of calculation were, therefore, considered to be sufficiently accurate for the present purpose. The evidence of all the measurements which were made on the long paths across Bass Strait was that the calculated value of signal corresponded

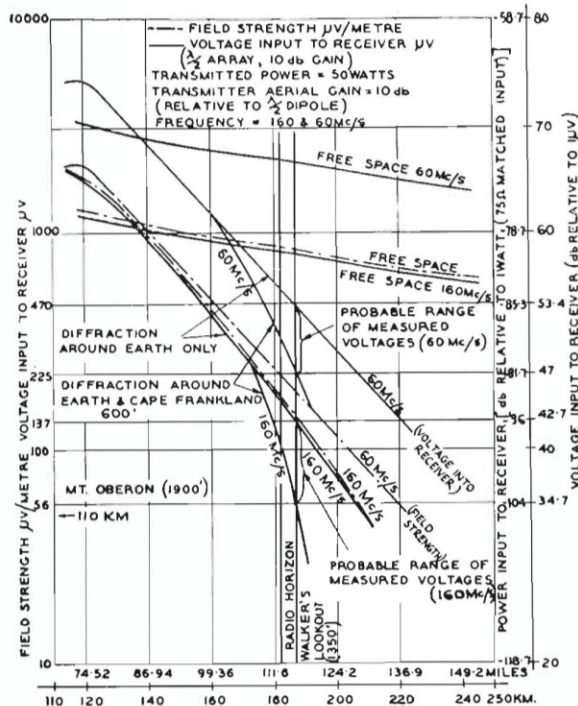


Fig. 15.—Calculated median field strengths at Walker's Lookout from transmitters at Mt. Oberon.

closely with the median value on days of low signal, which are taken to be days of normal propagation in a well-mixed atmosphere. The days of high signal are considered to be days on which there is abnormal propagation produced by a strong bending downwards of the radio rays, this condition being known as super-refraction. Apparently on the Guernsey-Chaldon link also the calculated value of signal is the median value on days of low signal, while days of high signal correspond to super-refraction conditions.

It is of interest to note that for 99% of the time on the Guernsey-Chaldon link, when signal strengths were averaged over eight weeks, the signal-to-noise ratio was not more than 18.5 db below the value calculated here, and for not more than 1% of the time was the signal-to-noise ratio more than 10 db above the value calculated here.

### Calculation of Signal Strength Paths, Wilson's Promontory-Flinders Island-Tasmania

As the Bass Strait paths were within, or close to, the radio-optical range, it was decided to measure with and plan for the use of the highest frequencies with which a high-grade signal-to-noise ratio could be obtained. The Mount Oberon-Walker's Lookout path was the one which would give the lowest signal strength and calculations were made for frequencies of 160 Mc/s and 60 Mc/s. Measurements were made on frequencies within 2 Mc/s of those used in the calculations. The use of the highest possible frequency had the advantage that the size of aerials would be smaller for the same gain.

Horizontal polarization of the radiation was assumed because reflected components from the sea would be less and because the aerials would be easier to mount. The method of calculation of signal strength used was that due to Domb and Pryce (5), which is simpler than other methods in common use. The method of allowing for the diffraction loss of obstructions in the path was taken from the work of McPetrie and Ford (6). The method of calculation of signal-to-noise ratio was one devised by the author (7, 8). The calculations were made for the channel having the highest modulating frequency, which would give the lowest signal-to-noise ratio.

For the Mount Oberon-Walker's Lookout route calculations of signal strength were made with and without allowing for diffraction over Cape

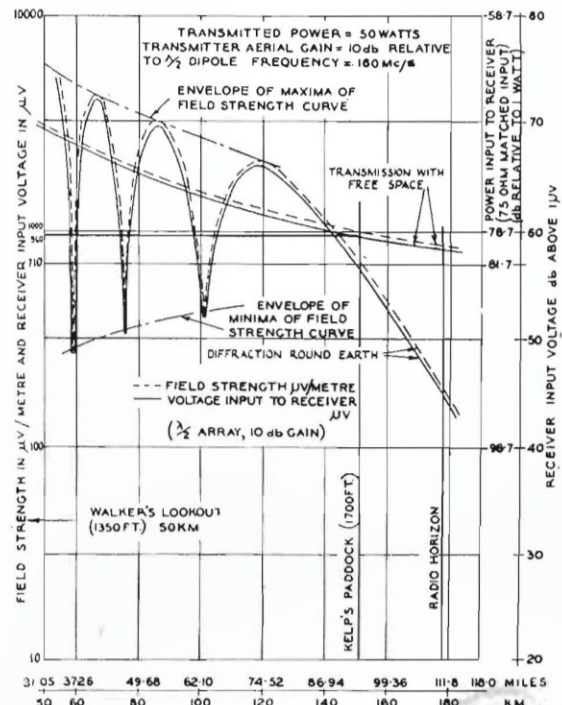


Fig. 16.—Calculated field strength at Kelp's Paddock from transmitter at Walker's Lookout—160 Mc/s.



Frankland. The results of the calculations are shown in Fig. 15. It is obvious from Fig. 15 that the diffraction loss at 160 Mc/s, due either to the approach to the radio-horizon or to the probable effect of the obstruction of Cape Frankland, is appreciably greater than at 60 Mc/s. The probable ranges of measured voltages shown in Fig. 15 referred to variations of mean signal due to diffraction with and without an obstacle at Cape Frankland and not to fluctuations due to variable refraction.

As the path from Walker's Lookout to Kelp's Paddock is clear of the earth's surface, there is no diffraction loss except that due to the approach to the radio-horizon. The results of the calculations on 160 Mc/s and 60 Mc/s are shown in Figs. 16 and 17 respectively.

### Calculated Signal-to-Noise Ratio on Bass Strait Paths

In order to indicate the likelihood of a multi-channel V.H.F. radio system being satisfactory on this route an estimate of the probable overall performance was made, based on current English (British Post Office) designs. Using the calcu-

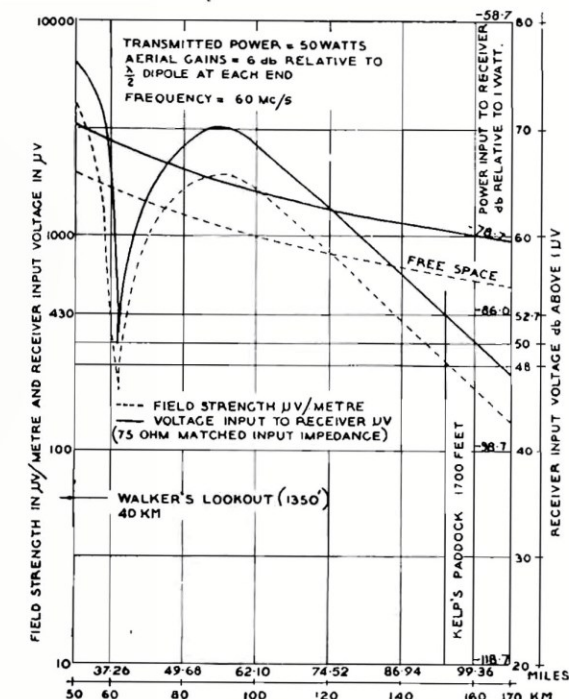


Fig. 17.—Calculated field strength at Kelp's Paddock from transmitter at Walker's Lookout—60 Mc/s.

lated field strengths obtained in the foregoing, the values given below of calculated signal-to-noise ratio were assessed for a system similar to the reference British Post Office system described previously, but with aerial gains and transmitted

powers as assumed for the calculations of field strength:

#### (a) Carrier Frequency 60 Mc/s.

##### (i) Mount Oberon-Walker's Lookout.

With the diffraction around the earth and Cape Frankland, and without fading due to variable refraction, the calculated signal-to-noise ratio was 59 db.

##### (ii) Walker's Lookout-Kelp's Paddock.

The aerial gain for which the calculation of field strength was made on this path was 6 db, whereas it was 10 db on the Mount Oberon path. With this aerial gain, and without fading due to variable refraction, the calculated signal-to-noise ratio was 65 db.

#### (b) Carrier Frequency 160 Mc/s.

##### (i) Mount Oberon-Walker's Lookout.

With diffraction around the earth and Cape Frankland, and without fading due to variable refraction, the calculated signal-to-noise ratio was 47 db.

##### (ii) Walker's Lookout-Kelp's Paddock.

With aerial gains of 10 db as on the Mount Oberon-Walker's Lookout path, and without fading due to variable refraction, the calculated signal-to-noise ratio was 70 db.

From these calculations it was decided that propagation measurements should be made on 60 and 160 Mc/s to verify the calculated median received signal strengths and to permit an estimate of probable fading to be made. With this information it would be possible to carry out a detailed design of the radio equipment aspects of the complete system. The criterion for a satisfactory circuit was one that would give a signal-to-noise ratio above at least 50 db.

### ESTABLISHMENT OF TESTING STATIONS

#### Testing Station at Mount Oberon

Severe physical difficulties faced the parties setting up and maintaining the test site at Mount Oberon. The linemen from Foster had cut a foot-track up the eastern ridge of the mountain from the end of the road (see Fig. 5). This track was very steep in places, and climbed 900 feet in a little more than a mile, which was the distance to the summit from the end of the road. The grade of the ridge was suitable for the formation of a road but, as Wilson's Promontory is a National Park, permission was not likely to be given for a wide track to be cleared unless the case for establishing a station were proved.

It was necessary to carry all the testing gear by manpower to the summit. It is a great tribute to an enthusiastic staff that the gear was carried and a substantial test station was set up. Figs. 18 and 19 show some of the gear being carried up in the more open parts of the track at the be-



ginning and end of the ascent. The last one hundred feet of the ascent to the summit was up a rock wall, and one part of this climb was usually negotiated with the help of a rope.

**First Test Station at Mount Oberon.** The first test station on Mount Oberon was on the highest point of the mountain, with the equipment

housed in tents. Figs. 20 and 21 show this station, which was for testing on 160 Mc/s only. Recordings for seven days were made at this site

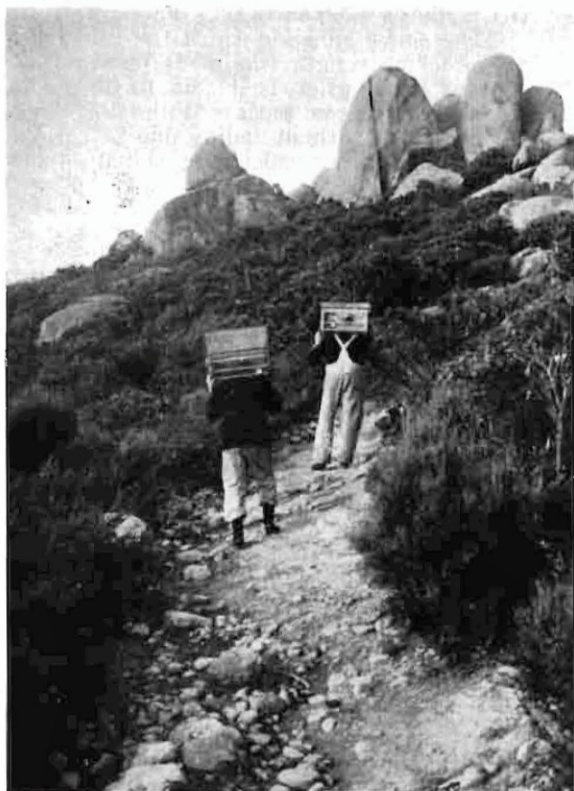


Fig. 18.—Carrying a receiver and power supply on the lighthouse track before turning off on new track to the summit of Mt. Oberon.



Fig. 19.—Petrol electric generating set weighing 120 lbs. being carried near the summit of Mt. Oberon.



Fig. 20.—First test station on Mt. Oberon—August, 1948.



Fig. 21.—Tent protection for equipment—first test station on Mt. Oberon.

and then the aerial mast and tents were blown over in a heavy gale. The radio gear was salvaged and carried down the mountain to the accommodation centre in the tourist camp below.

**Second and Final Test Station at Mount Oberon.** A second series of measurements was planned for November-December, 1948. Experience had shown that the summit of Mount Oberon was too difficult of access and too exposed. It was esti-

to the top of Mount Oberon for the second and final test station. Figs. 22 to 26 show the final test station, which was probably unique for the difficult conditions in which it was set up. Fig. 22 shows the 60 Mc/s aerial, a 3-element Yagi,



Fig. 22.—Final test station on Mt. Oberon—60 Mc/s aerial is shown pointing to Flinders Island.



Fig. 23.—160 Mc/s aerial at final test site, Mt. Oberon.

mated that there would be no serious loss of signal if the aerials were erected a little below the summit. Aerials were erected both on the summit and about 70 feet below it. Both sets were connected by concentric cables to receivers about 100 feet below the summit. The difference in signal level between the two sets of aerials appeared to be accounted for chiefly by the different lengths of cable connecting them to the receivers, the lower aerials giving the higher signals. The upper aerials were then dismantled and re-erected lower down, to serve in an emergency as spare aerials. Although there was now a rock wall some thirty feet behind the aerials, no evidence of troublesome reflections could be found.

As tents had been shown by experience to give insufficient protection to the radio equipment, light huts had been made up with a covering of composition board. These huts were in small sections which bolted and hinged together when erected. The floor space was about 6 feet by 3 feet. One of these huts was carried in sections

pointing through the gap in the ranges to Waterloo Bay and Flinders Island. Fig. 23 shows a 160 Mc/s aerial, a six-element Yagi. Fig. 24 shows a communication aerial which was a six-



Fig. 24.—A communication aerial at final test site, Mt. Oberon.



element Yagi on 104 Mc/s. Fig. 25 shows the location of three of the six aerials which were erected on one or two pieces of 3 by 2 inch soft-wood bolted together if two were used, each piece being twenty feet long. Fig. 26 shows



Fig. 25.—Three of the six aerial masts at final test site, Mt. Oberon.

the location of the test station, this being also the recommended location for the terminal of the projected new radio link. The hut is shown in Figs. 22 to 26 with a tarpaulin draped over it



Fig. 26.—View of final test site at Mt. Oberon. Recommended site for terminal of a link to Tasmania.

for additional protection in wet weather, particularly for the opened doorways.

Because of the difficulty of carrying the gear up Mount Oberon it was used as a receiving station. When completed it had receivers for 60 Mc/s and 160 Mc/s and a spare for each, a

calibrating signal generator for each of these two frequencies, a transceiver for communication, an electronic voltage stabiliser, three petrol generator sets of 250 watt, 230 volt output, and six aerials. For ventilation purposes the petrol-electric sets were operated in a large tent.

Even when the test station was completed the difficulties of the staff were not over, for each day of the tests they had to make the long climb from their quarters at Tidal River up the steep and often slippery track, carrying with them food and water and the daily supply of petrol for the generating sets.

#### Test Station at Walker's Lookout

The obstacle to access to the site at Walker's Lookout was the last steep climb up the grassy hill. This was overcome by shipping into the island a small four-wheel-drive vehicle. As shipping to the island is spasmodic by small vessels, there was much trouble in getting this vehicle shipped. The vehicle is shown in Fig. 27 arriving on the site with timber with which to erect a



Fig. 27.—Four-wheel drive vehicle on the site at Walker's Lookout, Flinders Island. The arrow shows the direction to Kelp's Paddock site in Tasmania.



Fig. 28.—Site at Walker's Lookout. Testing installation in early stages. A brushwood windbreak was required as protection against strong winds.

breakwind. The wind on the exposed site was often so strong that tents could not be held up without a breakwind. Fig. 28 shows the breakwind sheltering the station. Two tents for the equipment were supplemented by a sectional hut bolted together, similar to the one on Mount Oberon.

The equipment at Flinders Island came near to being lost in a bushfire which burnt the surrounding country during a week-end. When it reached the station it stopped at the places where the grass had been trampled down and the earth dug in establishing the breakwind.

### Test Station at Kelp's Paddock

The testing site at Kelp's Paddock was in a large clear area beside the road from Launceston. A sectional hut similar to that at the other stations was used for the equipment, and a tent for the petrol generating sets.

## MEASUREMENTS AND RESULTS

### Measurements at Western End of Bass Strait

In January and February, 1948, measurements were made between Tanybryn and the site seven miles north of Naracoopa, and from the latter to Stanley, in Tasmania. The former path was 1.15 times the radio-optical range and the latter 1.9 times the radio-optical range. King Island was the receiving station in both cases.

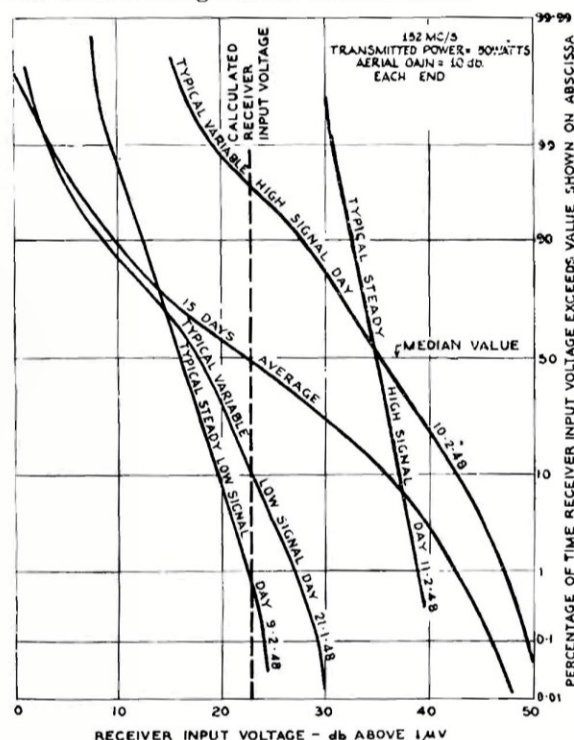


Fig. 29.—Tanybryn-King Island (site seven miles north of Naracoopa). Measured receiver input voltage distribution.

The measurements from Tanybryn were made on 152 Mc/s with a transmitter power of 50 watts and aerial gains of 10 db at each end. The transmission from Stanley was on 44 Mc/s, with 200 watts into an aerial of gain 11 db. The receiving aerial had a gain of 5 db. Both paths had slight obstructions over that of spherical earth, and an allowance for diffraction over these obstructions was made in the calculations of received field strength. Figs. 29 and 30 show the results of

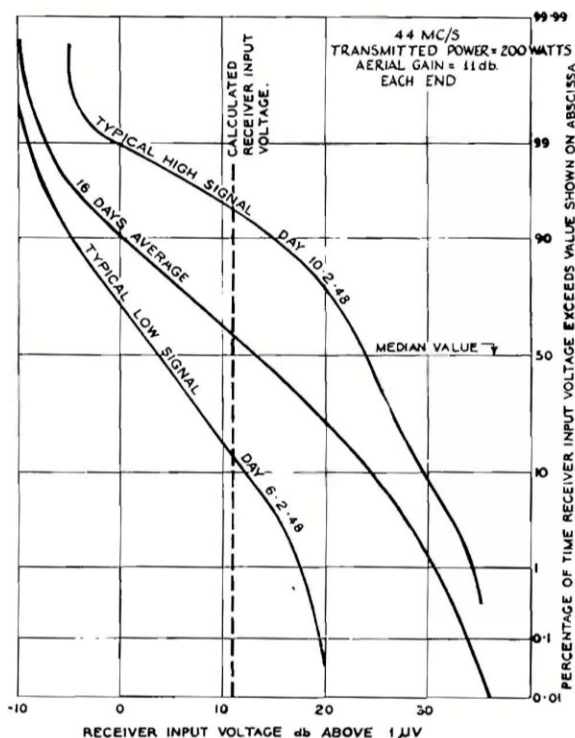


Fig. 30.—Stanley-King Island (site seven miles north of Naracoopa). Measured receiver input voltage distribution.

the measurements, and in each case there is close agreement between the calculated and median value of the measurements when the median value is taken over a period of about a fortnight. This was found to be a general result for all the series of measurements.

As previously stated calculations of signal-to-noise ratio for paths at the western end of Bass Strait showed that these paths were inferior to those at the eastern end of the Strait.

### Measurements at Eastern End of Bass Strait

**First Series of Measurements.** The first measurements between Mount Oberon and Walker's Lookout and Kelp's Paddock and Walker's Lookout were made in August, 1948, on 160 Mc/s. It was found that signals were variable, but there was good agreement between the calculated value



of signal strength on both paths. The calculated value with which agreement was obtained on the Mount Oberon-Walker's Lookout path was that with the full allowance for diffraction over Cape Frankland. The types of signals obtained were similar to those obtained in later series of tests and described below.

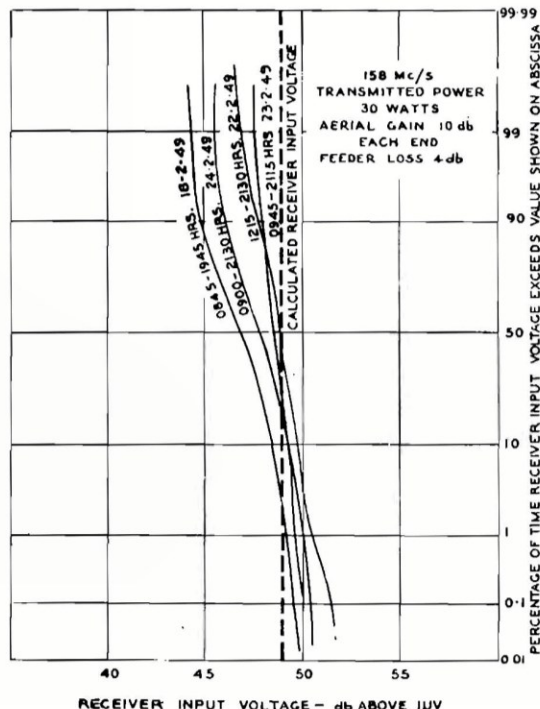


Fig. 31.—Walker's Lookout-Kelp's Paddock. Measured receiver input voltage distribution—158 Mc/s.

**Second and Third Series of Measurements.** The second series of measurements were made between 26th November and 15th December, 1948. The third series of measurements were made for

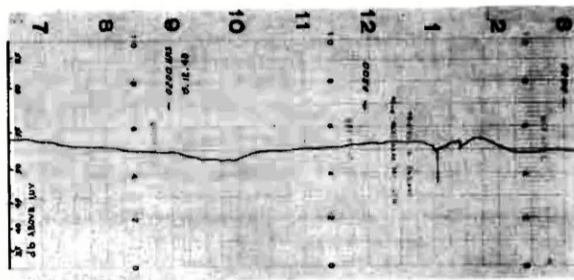


Fig. 32.—Walker's Lookout-Kelp's Paddock. Typical recording of reception on 158 Mc/s.

eight days in February, 1949, on both paths from Walker's Lookout, and on 12 days in March on the Walker's Lookout-Mount Oberon path only:

(a) **Results on 158 Mc/s on Kelp's Paddock Path.** Fig. 31 shows graphs of an analysis of the records for some representative days of recording on

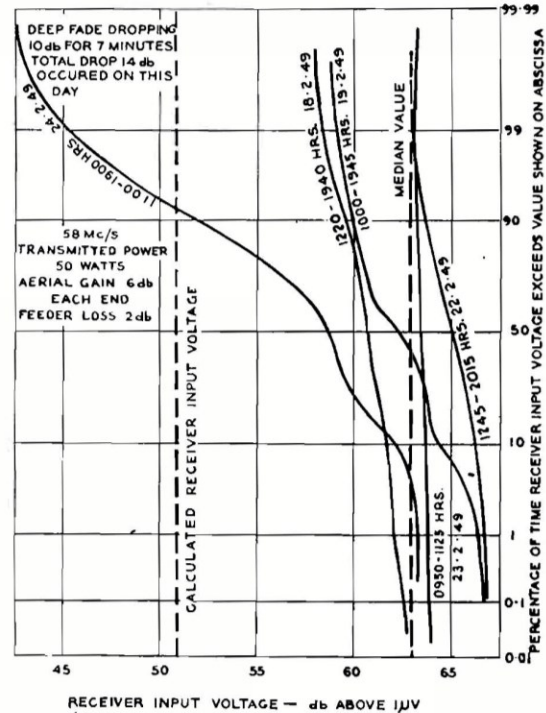


Fig. 33.—Walker's Lookout-Kelp's Paddock. Measured receiver input voltage distribution—58 Mc/s.

158 Mc/s on the Kelp's Paddock path. From that figure it is seen that the variations of input voltage to the receiver extended over about 8 db only, and were distributed close to the calculated value. Fig. 32 is a copy of a typical recording of reception of 158 Mc/s on this path.

Only one very deep fade was recorded on 158 Mc/s on the Kelp's Paddock path. A copy of the recording is shown on Fig. 35 and it is described later.

(b) **Results on 58 Mc/s on Kelp's Paddock Path.** Fig. 33 shows graphs of an analysis of the recording of 58 Mc/s on typical days, and Fig. 34 is a copy of a typical recording, except for one unusual fade of about 20 db depth from the estimated median value.

From Fig. 33 it will be seen that the median value of the measurements is some 12 db above the calculated value. This was found to be due to the signal generator used for calibration being faulty and giving a low output, thus apparently making the readings of received signal seem about 10 db high.

The only very deep fade recorded on 58 Mc/s on the Kelp's Paddock path is shown on a copy

of a recording on Fig. 35. This was during the second series of tests, and throughout that series the median value of received signal on 58 Mc/s was about 10 db below the calculated value due

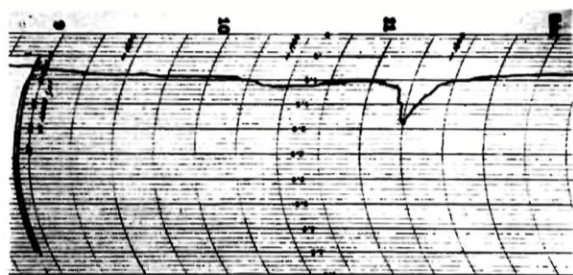


Fig. 34.—Walker's Lookout-Kelp's Paddock. Typical recording of reception on 58 Mc/s.

to a lower transmitted power being used than assumed in the calculations.

(c) **Deep Fade on 158 Mc/s and 58 Mc/s on the Kelp's Paddock Path.** A copy of the recording is shown in Fig. 35 of a deep fade occurring at about the same time on 158 Mc/s and 58 Mc/s on the Kelp's Paddock path on 13th December, 1948.

10 and 8 db below the level at 1305 hours, when a sudden sharp drop occurred at 1400 hours. This drop in signal was at least 30 db below the signal level at 1305 hours, and it may have been as much as 60 db. As such deep fades had not been expected on this path, the recorder had not been set to measure fades deeper than 20 db. The signal rose sharply about six minutes later to the same level as at 1400 hours, and thereafter rose slowly over an hour and a half by some 5 db to a value a little higher than the median value for the path.

On 58 Mc/s the signal began to drop slowly at about 1320 hours, and had dropped about 7 db at 1400 hours. It then began to drop more rapidly and had dropped 11 db at about the time the 158 Mc/s signal had recovered from its sharp drop. The 58 Mc/s signal then dropped at least 20 db in five minutes. By 1412 hours the drop may have been as much as 40 db, but the recorder had not been set up to measure fades of more than 20 db. By 1420 hours the signal had risen sharply to a value about 12 db below the value at 1320 hours. The signal then rose slowly over an hour and a half to a value a little greater than the median value for the path.

As the fades on the two frequencies were not

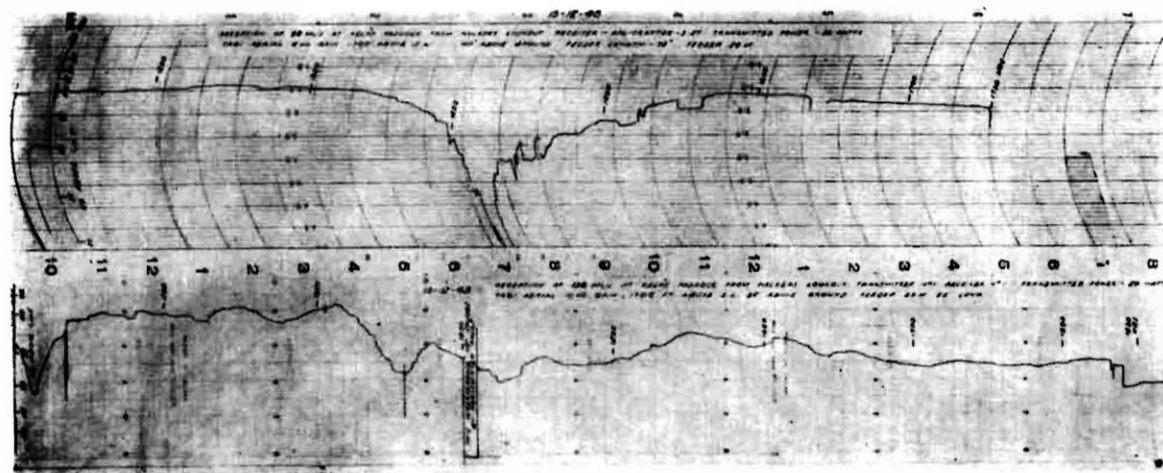


Fig. 35.—Walker's Lookout-Kelp's Paddock. Recording of reception on 58 and 158 Mc/s, showing a deep fade.

The signal level was high before the fades occurred shortly after 1300 hours. The weather was fine over Tasmania to the south of the path, except for a thick bank of nimbus cloud at a height of several thousand feet, which was moving northwards towards the path. When the boundary of this bank of cloud came near the path, the fade occurred.

On 158 Mc/s the signal began to drop at about 1305 hours, and was oscillating at levels between

simultaneous, but the fades on 58 Mc/s followed that on 158 Mc/s, it is reasonable to conclude that it was due to reflection at the boundary of a moving air mass. A calculation was made of the distances which would be needed between the direct path and the reflecting boundary to bring about a reduction of the direct received signal by reflected signals.

The result of the calculation was that a boundary of a layer in the atmosphere would cause



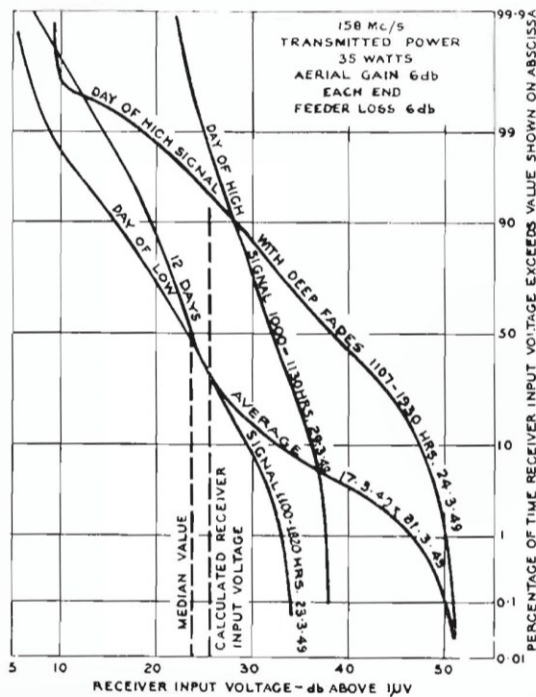


Fig. 36.—Mt. Oberon-Walker's Lookout. Measured receiver input voltage distribution—158 Mc/s.

reflections in phase opposition with the direct signal if the height of the boundary above the earth were 2120 feet for 158 Mc/s and 2550 feet for 58 Mc/s. These figures would be apparently in accordance with the observation of the height

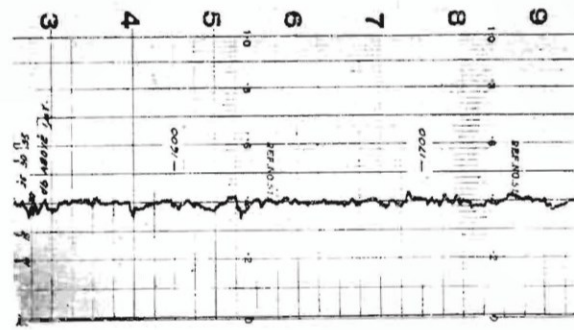


Fig. 37.—Mt. Oberon-Walker's Lookout. Typical recording of reception on 158 Mc/s. Day of normal signal.

of the nimbus cloud and could fit in with the interval of six to twelve minutes by which the fade on 58 Mc/s followed that on 158 Mc/s. The distance from the receiver to the reflective point was

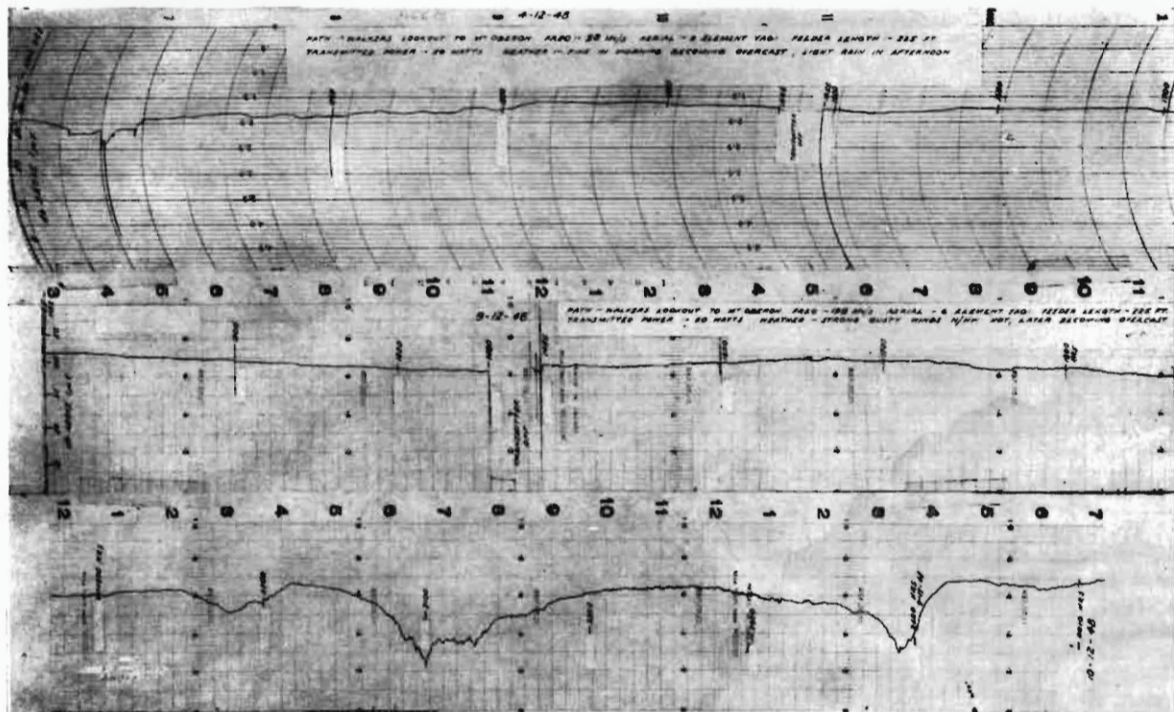


Fig. 38.—Mt. Oberon-Walker's Lookout. Typical recording of reception on 58 and 158 Mc/s. Day of high signal.

found to be 2.6 miles for 58 Mc/s and 8.6 miles for 158 Mc/s.

From the unique conditions found for the height and distance of the boundary required to give a signal causing cancellation, it is expected that such deep fades will be rare. A similar fade was not experienced on the Mount Oberon path on this day.

level. During the night time the level began to drop and slow fading occurred.

Fig. 39 shows a record of a day of high signal strength, with several sharp deep fades of depth about 20 db and duration less than two minutes at the greatest depth. As the fades were from a comparatively high level, the lowest signal

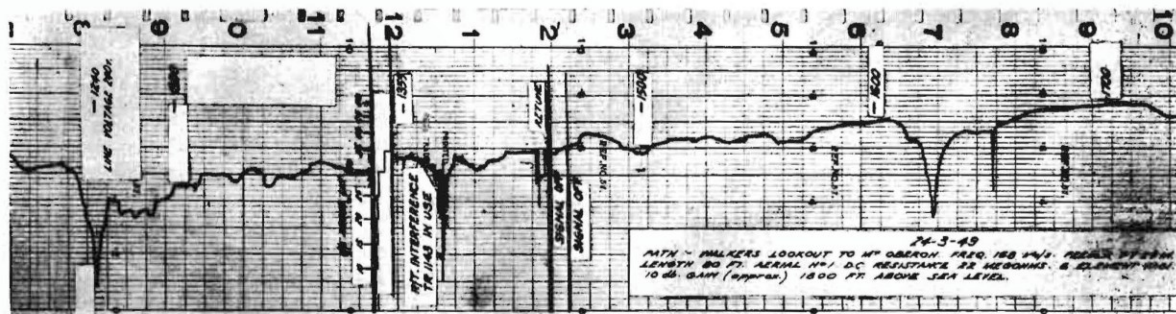


Fig. 39.—Mt. Oberon-Walker's Lookout. Typical recording of reception on 158 Mc/s. Day of high signal with several sharp deep fades.

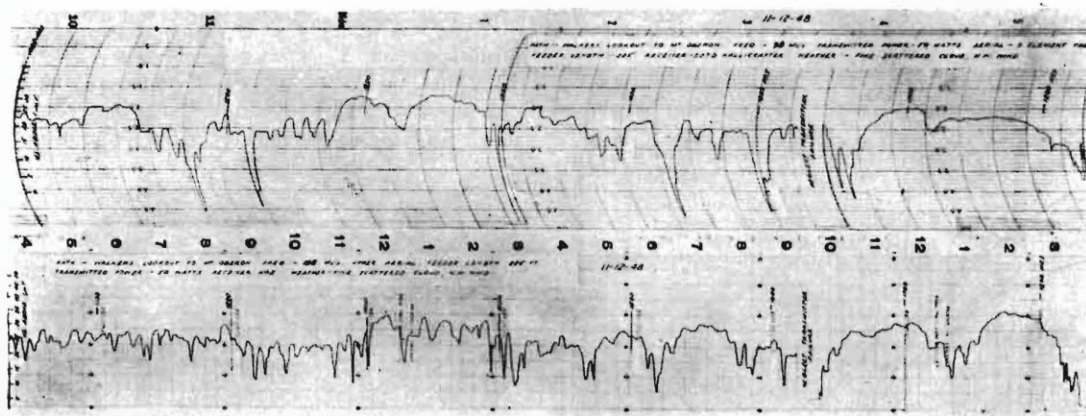


Fig. 40.—Mt. Oberon-Walker's Lookout. Typical recording of reception on 58 and 158 Mc/s. Day of low signal.

#### (d) Results of 158 Mc/s on Mount Oberon Path.

Fig. 36 shows typical graphs of the distribution in time of received signals on 158 Mc/s on the Mount Oberon path. Figs. 37, 38, 39, 40 and 41 show copies of records for typical days.

Fig. 37 shows a record on a day of normal signal, when the variations from the median or calculated values did not exceed a few decibels throughout the day.

Fig. 38 shows a day of high signal, the general level being more than 15 db above the normal

recorded on this day was not more than about 15 db below the median or calculated value for the path. The signal on this day rose as high as 25 db above the median value for the whole period of measurements.

Fig. 40 is a copy of the record for the day on which low signal strength was obtained for the greatest percentage of the time during the tests. This applied to 58 Mc/s as well as 158 Mc/s. The record is further described later.

Fig. 41 is a record of deep fading on both 158 and 58 Mc/s, and is further described later.



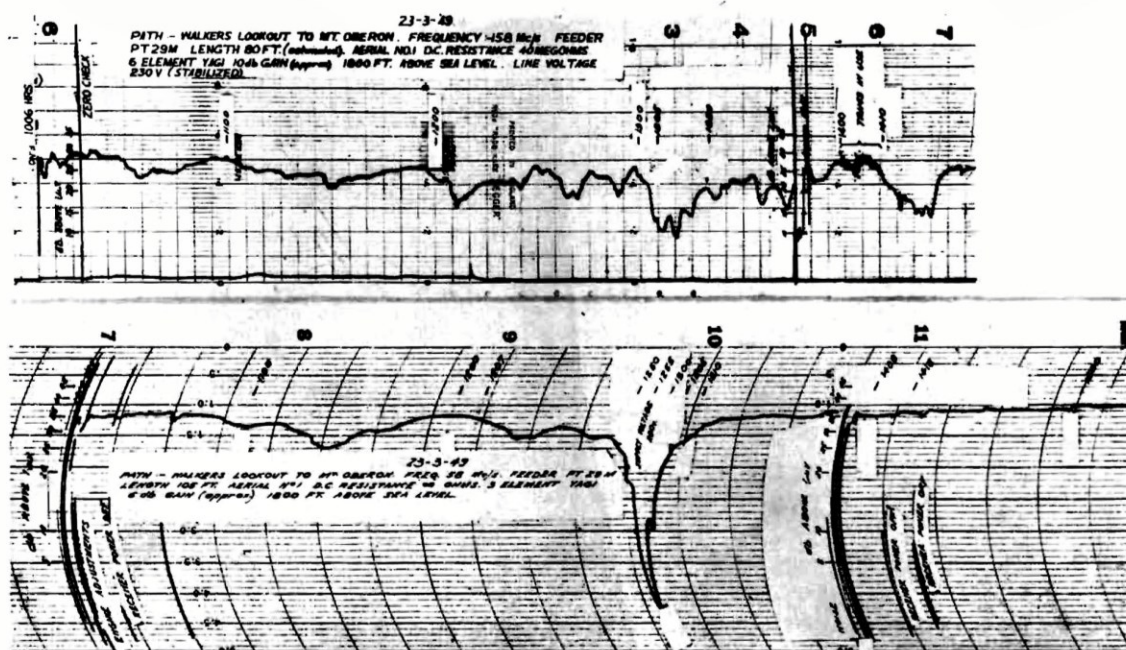


Fig. 41.—Mt. Oberon-Walker's Lookout. Typical recording of reception on 58 and 158 Mc/s. Deep fading.

(e) Results on 58 Mc/s on Mount Oberon Path. Graphs are shown on Fig. 42 of an analysis of the distribution in time of the values of received

signal on 58 Mc/s on the Mount Oberon path. For the period of 11 days analysed on Fig. 42 the median value of the average of each day's recording was very close to the calculated value.

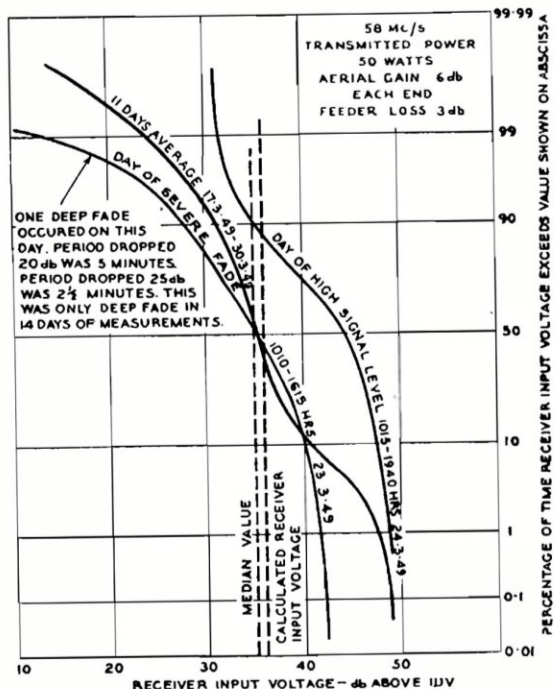


Fig. 42.—Mt. Oberon-Walker's Lookout. Measured receiver input voltage distribution—58 Mc/s.

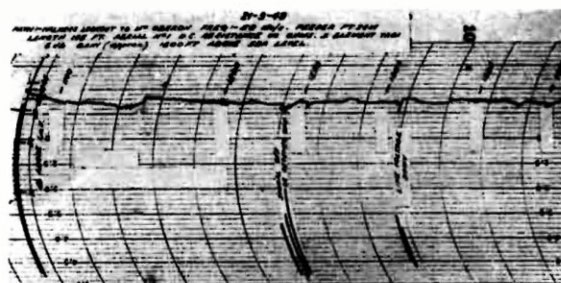


Fig. 43.—Mt. Oberon-Walker's Lookout. Typical recording of reception on 58 Mc/s. Steady normal signal.

Fig. 43 is a copy of a recording on a day of steady normal signal, which was usually a day with cold, disturbed weather conditions. As shown in Fig. 37, the recording on 158 Mc/s was also steady on this day.

Fig. 38 shows a record of a day of high signal on 58 Mc/s. The level on this day rose to about 15 db above the median value for the second series of tests of which this record formed part. For this series of tests the median value

was about 10 db below the calculated value due to the transmitted power being lower than assumed in the calculations.

Fig. 44 shows a record of a day on which the 58 Mc/s signal remained fairly steady at values 10 to 15 db above the median value, while the 158 Mc/s signal (see Fig. 39) was also generally high, but subject to deep fades.

phone system over this path would give almost 100% service if the signal-to-noise ratio obtained for the median or calculated value of signal strength was about 20 db above the minimum acceptable ratio.

(g) **Deep Fades on 58 and 158 Mc/s on Mount Oberon Path, Diversity Reception.** Fig. 41 is a record of the deepest fade measured on 58 Mc/s

TABLE I  
Duration of Periods of Low Signal at Mount Oberon on 11th December, 1948  
Period of Recording, 7 hrs. 50 minutes

Time hrs.	58 Mc/s Duration of drop in signal		158 Mc/s Duration of drop in signal	
	No. of minutes 17 db below median value	No. of minutes 22 db below median value	No. of minutes 14 db below calculated value	No. of minutes 19 db below calculated value
1143	4	2		
1210	3	2½	1½	
1225			½	
1246			½	
1254			½	
1359	½	¼		
1401			½	
1406			2½	
1438			½	
1442			½	
1511			3	
1518	4	2½		½
1553			3	
1600	7	1	1	
1634	1½			
1638	3½			
1720			1½	
Total	23½ minutes	8½ minutes	15½ minutes	½ minute

(f) **Day of Lowest Average Signal Strength on Mount Oberon path.** A copy of the recordings for the day of lowest average signal strength, 11th December, 1948, is shown on Fig. 40. The 23 largest falls in signal strength were of short duration, of the order of a half minute to two and half minutes, but they were separated by considerable intervals. Table 1 above is an analysis of the periods of low signals.

Reference to Table 1 shows that a radio-tele-

on the Mount Oberon path. This fade occurred at 1250 hours, and was of depth about 33 db below the calculated value of the path. It lasted almost two minutes at its greatest depth and about ten minutes at a depth of 15 db. At about 1303 hours, when the 58 Mc/s signal had almost recovered from the fade, the signal on 158 Mc/s, also shown in Fig. 41, faded sharply and reached a lowest level of about 15 db below the calculated

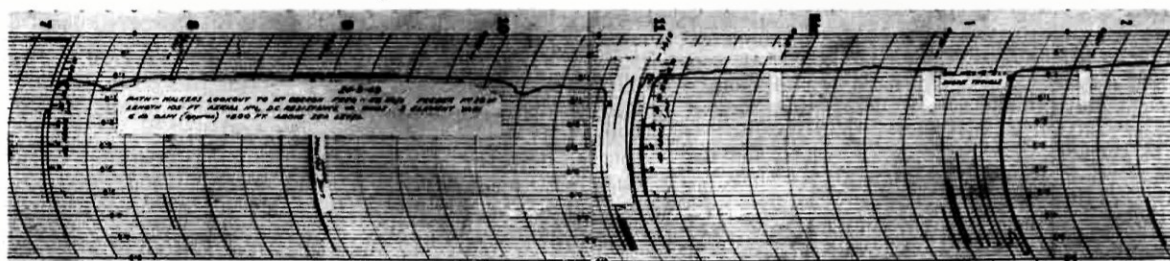


Fig. 44.—Mt. Oberon-Walker's Lookout. Typical recording of reception on 58 Mc/s. Day of high signal.



value. The signal then took about thirty minutes to recover from this fade.

The similarity between these fades and those shown on Fig. 35 for the Kelp's Paddock path is evident, and it is seen that a radio system using diversity reception from two transmitters on different frequencies could correct for these deep fades.

#### COMMUNICATION OVER TEST PATHS

In the first two series of tests communication between the transmitting and receiving stations was carried out on Transceivers, Type SCR522, with 10 watts output on about 154 Mc/s, and with aerials of some 6 db gain at each end. Communication on the Kelp's Paddock path was satisfactory, but on the Mount Oberon path communication was good only when the recorded signal strength on 158 Mc/s was high. When the recorded signal strength on 158 Mc/s was normal or low, communication over the Mount Oberon path was not possible.

It was calculated that by using Transceivers, Type TR1143, with 7 watts output on 104 Mc/s, and aerials of 10 db gain, it should be possible to communicate at all times over the Mount Oberon path. This installation was made for the third series of tests and, in spite of the noticeable noise level, the communication was practicable at all times, the volume control having to be turned right down for comfortable hearing on days of high signal on 58 or 158 Mc/s.

#### CONCLUSION

Calculations have been made of the median values of the attenuation at 60 and 160 Mc/s on paths across Bass Strait at the eastern and western ends. These showed that paths at the eastern end, namely Wilson's Promontory-Flinders Island-Lilydale, were superior to those at the western end, namely Tanybryn-King Island-Stanley. Propagation measurements, made at appropriate frequencies during several seasons, showed the choice of paths to be correct; the median value of the received signals indicated that in most cases the path attenuations were within a few db of the calculated values. In addition the measurements enabled the fading ranges to be estimated. By way of illustration, some figures are given to indicate, in broad terms, the signal-to-noise ratio which might be obtained when a frequency division multiplex system is used on radio bearers on the eastern path.

The measurements have shown that, when frequency diversity is not used, an allowance of 20 db for fading will cover all likely fades except a deep fade which occurs on the average less than once a fortnight and lasts for a period of about two to five minutes at a depth greater than 20 db. A further allowance of 20 db would probably be sufficient to account also for the very deep fades except for momentary periods.

If, therefore, a circuit over these paths were required to have a minimum acceptable signal-to-

noise ratio of, say, 40 db, the circuit should give 60 db signal-to-noise with the calculated (median) value of signal to allow for all but the occasional very deep fades, and it should give 80 db to allow probably for the deepest fades.

To attain something like these allowances, the operating conditions used in the foregoing in this paper would have to be varied in some instances by the use of greater aerial gain or greater power. In this way the following calculated values of signal-to-noise ratio are obtained for the highest frequency channel of a 6-channel system similar to the British Post Office system used between Guernsey and Chaldon, but with a power of 50 watts and a receiver noise factor of 9 db:—

#### Mount Oberon-Walker's Lookout

- (a) Carrier Frequency 60 Mc/s. With aerial gains of 16 db each end, and aerial feeder losses of 2 db, the signal-to-noise ratio is 69 db.
- (b) Carrier Frequency 160 Mc/s. With aerial gains of 16 db each end and aerial feeder losses of 4 db, the signal-to-noise ratio will be 55 db.

#### Walker's Lookout-Kelp's Paddock

- (c) Carrier Frequency 160 Mc/s. With aerial gains of 16 db each end and aerial feeder losses of 4 db, the signal-to-noise ratio will be 78 db.
- (d) Carrier Frequency 60 Mc/s. With aerial gains of 16 db each end and aerial feeder losses of 2 db, the signal-to-noise ratio will be 83 db.

The above results are those without the allowance for fading. As stated in the foregoing, this allowance should be at least 20 db and 40 db if possible. As it is possible to get a higher signal-to-noise ratio with a frequency in the vicinity of 60 Mc/s than it is with a frequency in the vicinity of 160 Mc/s, and, as the higher ratio of signal-to-noise is required at times of fading to keep a high grade circuit, it was recommended that the lower order of frequency be used. This applies particularly to the Mount Oberon path, which is the critical one.

The tests indicated that a high grade multi-channel radio-telephone circuit could be established between Wilson's Promontory and Tasmania with a repeater at Flinders Island.

#### Acknowledgments

The investigation described was carried out as part of the programme of the Research Laboratories, Chief Engineer's Branch, Postmaster-General's Department, Australia.

Some special acknowledgments are due to the staff who carried out the project in difficult and unusual conditions. Of the staff of the Research Laboratories, Mr. C. Rollan was in charge of the provision and construction of the special equipment used for the measurements, and took an active part in all the field work, Mr. H. Hyamson

made most of the calculations and analyses reported in this paper, and took part in the field work. Arduous work in establishing the stations at Mount Oberon fell on Mr. A. Irving, Line Foreman at Foster, and his staff. The hardest part of the assignment fell on the technicians of the Research Laboratories, who manned the stations, and of these Mr. H. Ternes, Senior Technician, was on the project throughout.

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[Note: In a subsequent issue of the Journal a further article will deal with the radio equipment aspects of this project.]

# Cinema and Cyberphobia

## Internet Tropes in Film and Television

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**Abstract:** Despite the widespread embrace of the Internet and the second-nature way we each turn to Google for information, to social media to interact with our friends, to netporn and Netflix for recreation, film and television tells a very different story. On screen, a character dating online, gaming online or shopping online invariably serves as a clue that they're somewhat troubled: they may be a socially excluded nerd at one end of the spectrum, through to being a paedophile or homicidal maniac seeking prey at the other. On screen, the Internet is frequently presented as a clue, a risk factor and a rationale for a character's deviance or danger. While the Internet has come to play a significant role in screen narratives, an undercurrent in many depictions – in varying degrees of fervour – is that the Web is complicated, elusive and potentially even hazardous. This paper focuses on some of the persistent negative frames used in portrayals of the Internet and examines how, and why, they recur. This paper focuses on four technophobic frames including dehumanisation, the Internet as a badlands, the Web as possessing inherent vulnerabilities and the cyberbogyman. Explanations for the popularity of these frames – notably as grounded in the mandates of filmmaking – are also proposed.

## Introduction

Despite the widespread embrace of the Internet and the second-nature way we each turn to Google for information, to social media to interact with our friends, to netporn and Netflix for recreation ([Katz & Rice 2002](#); [Rosewarne 2016a](#); [Rosewarne 2016b](#)), film and television tells a very different story. On screen, showing a character dating online, gaming online or shopping online invariably serves as a clue that they're somewhat troubled: they may be a socially-excluded nerd at one end of the spectrum, through to being a paedophile or homicidal maniac seeking prey at the other. On screen, the Internet is frequently presented as a clue, a risk factor and a rationale for a character's deviance or danger. While the Internet has come to play a significant role in screen narratives, an undercurrent of many depictions



– in varying degrees of fervour – is that the Web is complicated, elusive and potentially even hazardous. This paper focuses on some of the persistent negative frames used in portrayals, examining why *fear* of the technology is such a common undercurrent.

More specific than technophobia and its general fear and loathing of all things new, *cyberphobia* zeroes in on the Internet, as the economist Joel Mokyr explains:

“Cyberphobia” is in part based on the futuristic fear that impersonal and inhuman machines could eventually govern society, and that the differences between people and machines would eventually become hazy ([Mokyr 2002](#): p. 247).

On a cursory level, cyberphobia is effortlessly identifiable in titles where a film – before the narrative even unfolds – links the Web with fear, for example *Killer Net* (1998), *The Cyberstalking* (1999), *FearDotCom* (2002), *Cyber Seduction: His Secret Life* (2005), *Dot.Kill* (2005), *Murder Dot Com* (2008), *Satsujin Douga Sit (Death Tube: Broadcast Murder Show)* (2010), *The Craigslist Killer* (2011), *Cyberbully* (2011), *Cyberstalker* (2012), *UWantMe2KillHim?* (2013) and *Cyberbully* (2015). As these examples indicate, ominous titles are not something exclusively timed with the earliest days of the Web – when the technology was new and perhaps predictably scary – but they continue to haunt modern tech-themed storylines too. While titles alluding to a dark side of technology provide an easy hint to cyberphobia, this idea is more commonly conveyed through narrative: through storylines that default to some well-worn tropes of technology being the harbinger of doom. In the sections that follow, four frames common in negative portrayals of the Internet are explored including dehumanisation, the Internet as a badlands, the Web as possessing inherent vulnerabilities and the foreboding caricature of the cyberbogyman. Explanations for the popularity of these frames – notably as grounded in the mandates of filmmaking – are also proposed.

## Technology and Dehumanisation

In the sci-fi drama *Transcendence* (2014), protagonist Will’s (Johnny Depp) consciousness is uploaded to a server allowing him to continue “interacting” after his death. Discussing Will’s new existence, his colleague Max (Paul Bettany) remarks, “Maybe it was all inevitable. An unavoidable collision between mankind and technology.” The same uploaded-consciousness idea was used over a decade earlier in the television sci-fi film *Netforce* (1999), and is a theme common in contemporary artificial intelligence narratives like *Ex-Machina* (2015). While occasionally an uploaded-consciousness story is presented positively, as in the animated *Big Hero 6* (2014), but more commonly, the presentation is linked to questions about what it means to be human. The idea that technology can compromise humanity is key

in both techno-and cyberphobia definitions (like Mokyr's) and notably in screen depictions. A relatively subtle way that dehumanisation enters a narrative is by the framing of Internet users as somehow different from "normal" people and as too closely connected to technology. While sometimes this transpires with characters being spoken of as being different – for example the hacker Lisbeth (Mara Rooney) is described as "different . . . in every way" by her employer in the drama *The Girl With the Dragon Tattoo* (2011) – more commonly the Internet dehumanises characters by framing them as too closely aligned with computers and suffering socially, if not also psychologically, as a result. In a scene from the pilot of the sitcom *Betas* (2013–2014), a bar is populated by male computer programmers. One of the programmers, Trey (Joe Dinicol), approaches an attractive woman, Lisa (Margo Harshman). He tries to make an advance but is quickly stopped:

**Lisa:** I thought putting my bag on the stool would be a pretty clear sign I'm not looking to get hit on by every Aspy in the joint. Oh, but that's the thing about you guys, isn't it, you're not exactly aces when it comes to reading people.

Here, Lisa verbalises the popular screen connection between computer programmers and personality quirks, and more specifically, Asperger's Syndrome. In his book *American Nerd*, Ben Nugent observed: "if you line up the traits of people and fictional characters who are nerds with the traits that comprise Asperger's, the overlap is hard to ignore" (Nugent 2008: p. 124). In literary scholar Jordynn Jack's discussion of autism, she made a similar point, identifying that Asperger's characters "are usually depicted as a professionally successful yet socially inept geek or nerd" (Jack 2014: p. 29). On screen, there is a common coupling of Internet users with Asperger's-like qualities. I use *Asperger's-like* here because while the screen does sometimes portray *formally* diagnosed characters – for example Max Braverman (Max Burkholder) in the drama *Parenthood* (2010–2014) or Jerry Espenson (Christian Clemenson) in the legal-drama *Boston Legal* (2004–2008) – more common are socially awkward, obsessive, and often machine-like characters who are left *undiagnosed* and whom the audience is left to analyse.<sup>1</sup> Such Asperger's-speculation is also commonly conducted by commentators and academics. Many characters, for example, have been informally diagnosed by academics and commentators as having Asperger's, even when the narrative completely eschews the label, for example, the aforementioned Lisbeth in *The Girl With the Dragon Tattoo* (Schell 2011; Burstein et al 2011; Martin & Simms 2012; Thompson 2013), the physicist Sheldon (Jim Parsons) in the sitcom *The Big Bang Theory* (2007–) (Hardman et al 2011; Beahm 2011; Clifton 2012; Jack 2014), the IT worker Maurice (Richard Ayoade) in the sitcom *The IT Crowd* (2006–2013) (Burns 2013), Facebook pioneer Mark Zuckerberg (Jesse Eisenberg) in the biopic *The Social Network* (2010) (Kiss 2010), the

hacker Jesse (Ashley Zukerman) in the crime-drama series *The Code* (2014–) ([Blundell 2014](#)), Noah (Josh Gad) in the comedy-drama *Wish I Was Here* (2014) ([Kozak 2014](#)) and Elliot (Rami Malek) in the drama *Mr. Robot* (2015–) ([Zetter 2015](#)).

The link between Asperger's, computer use and dehumanisation is a topic specifically addressed by Nugent:

The form of social awkwardness that Asperger's engenders is machinelike... it means that their social awkwardness is created by difficulty in reading the kind of human communication that machines also find difficult to read (facial expression, eyes, tone of voice) ([Nugent 2008](#): p. 145).

While an assumed lack of emotions is a common screen hint to Asperger's – in “The Proton Transmogrification” episode of *The Big Bang Theory* for example, Howard (Simon Helberg) says to Sheldon, following the death of Sheldon's mentor, “You're being so quiet. Are you upset or are you just rebooting?” – more commonly this idea is presented via a lack of emotionality in speech. In research on the syndrome, often mentioned is vocal flat-affect ([Attwood 1998](#)). A computer user on screen often *sounds* different, sounds monotonous, to those around them: speech patterns are a way to establish that a character is different while also framing them as specifically *machinelike*, or even *computerlike*, thus at least partly *dehumanised*. In other narratives, dehumanisation is taken to more extreme ends. Mary Shelley's 1818 book *Frankenstein* is often considered the reference point for technology-out-of-control narratives; the book in fact, gets name-checked in modern Internet era narratives including *The Cyberstalking* and *Ex-Machina* to hint to the danger apparent when humans and technology blurs. The thriller *Virtuosity* (1995) for example, imagined a dystopia where personality attributes – notably those of *serial killers* – could be uploaded into cyberspace and then get downloaded into a single, real-life homicidal maniac. Virtual reality presentations provide another means for the man-machine blur to play out. In *The Cyberstalking* for example, the software begins to adapt and write its own code leading to physical crimes playing out in cyberspace. In the much earlier narrative, *The Lawnmower Man* (1992), via the use of virtual reality software, a rape is facilitated within the “game”: seemingly, people act differently – and, notably, more *criminally* – when the technology enables it.

The fear of dehumanisation is a paranoia that has haunted each new technology – from production lines ([Jordan 1968](#)) and television ([Mittell 2010](#)) through to supermarket self check-outs ([Stephens 2013](#)) – the moment they get launched. While dehumanisation is a concern in portrayals of the Internet because it muddies understandings and enthusiasm about new technologies and helps to perpetuate unflattering stereotypes of users ([Rosewarne 2016a](#)), the *why* of the endurance of this fear is worth examining. For a narrative to be scary,

a threat needs to exist, commonly a threat to personhood. While the action, thriller, horror and crime genres put the body in peril constantly, to do so in a technology-themed narrative is often more challenging given that PCs alone aren't generally particularly frightening. While, as discussed in this paper, personhood can indeed be threatened by forces connected to, or merely assumed as connected to the Internet, dehumanisation provides a very specific kind of threat useful in a narrative. By presenting technology as able to somehow fuse with humanity, two plausible threats are created: one, that in becoming less human, we lose our rights, our authority and our status thus potentially become a subordinate species; and two, that humans may becoming threatened by a *new* species that is smarter and stronger than us. All narratives make use of well-established storytelling devices. For those with the Internet as a key theme, the Internet has to be shaped as creating some kind of believable threat: connecting it to dehumanisation in one example.

Another way cyberphobia plays out on screen is via the framing of the Internet as both a geographic place and, notably, a badlands.

## The Badlands of the Internet

In the romantic-comedy *Can't Hardly Wait* (1998), a brief exchange transpires between two teenage nerds, Geoff (Joel Michaelly) and Murphy (Jay Paulson):

**Geoff:** Isn't this the weekend that you're supposed to meet your girlfriend from the Internet?

**Murphy:** Yeah, but she has some photo shoot in Fiji . . . for a catalog or something.

**Geoff:** Oh, man. That sucks.

**Murphy:** Yeah. I guess that's just the price you pay for dating Christie Turlington.

Here, the notion of a person being *from the Internet* is verbalised, an idea that gets repeated widely on screen. In the "Hammerhead Sharks" episode of the legal-drama *The Practice* (1997–2004), the sister (Dreya Weber) of a murder victim remarks, "Well, I can't believe she would go off and meet up with some stranger from the Internet." In the "Four to Tango" episode of the drama series *Dawson's Creek* (1998–2003), a teacher (Gloria Crist) quipped, "You know, I dated a guy from the Internet once. Hideous." In the opening scene of *NetForce*, the "cybercop" Steve Day (Kris Kristofferson), sought a warrant from a judge: "He's in there," Steve said, referring to the Internet. In the gay-themed comedy *Eating Out 3: All You Can Eat* (2009), Zack (Chris Salvatore) introduces his new acquaintance: "this is Ryan from the Internet." In a scene from *The Social Network*, Sean (Justin Timberlake)

loftily pronounced, “We lived on farms and then we lived in cities and now we’re going to live on the Internet.” In the “Amen” episode of the drama *The Newsroom* (2012–2014), MacKenzie (Emily Mortimer) alleged that her colleague Neal (Dev Patel), “live[s] on the Internet.” In each of these examples, the Internet is framed as a location where somebody could be *from* or a place where they can *go*. While such remarks can simply be construed as shorthand for describing a relationship initiated or carried out online, as related to this discussion these comments also hint to the Internet being conceived of as a place; an idea discussed by digital ethics researcher Annette Markham:

Many users and researchers conceptualize the Internet as a place as well as a tool. From this perspective, the Internet describes not only the network that structures interactions but also the cultural spaces in which meaningful human interactions occur... ([Markham 2011](#): p. 99).

Long before Markham’s work of course, spatial metaphors have been popular in computer science discussions: in writings on software, for example, metaphors of *cathedrals* and *bazaars* were presented, as in [Eric Raymond’s \(1999\)](#) work; equally, the *walled garden* persists as a *spatial* way to think about efforts by companies like AOL in the 1990s and more recently by Apple and Facebook to keep online use conducted within their structured, finite and mediated spaces ([Quiggin 2013](#)). The endurance of William Gibson’s term *cyberspace* decades on from its first use in the novel *Neuromancer* (1984), continues to reflect our enthusiasm to make the technology more mentally manageable.

More than just being *any* place, on screen the Internet continues to be framed as a site where people are more likely to be different, creepy or completely dangerous. Just as thinking about the Internet as a place is not new, neither is thinking of it – or framing it on screen – as dangerous. Since the earliest days of the Web, discussions have used the metaphor of the “Wild West” ([Rosewarne 2016a](#)). While this idea can describe a new and exciting electronic “frontier”, more commonly the metaphor is deployed to reference lawlessness. In his 1990 essay on cyberspace for example, John Perry Barlow described a world that would later constitute a popular screen portrayal: “the actual natives [of cyberspace] are solitary and independent, sometimes to the point of sociopathy. It is of course a perfect breeding ground for outlaws and new ideas about liberty” ([Barlow 1990](#): p. 45). In 1997, cultural theorists John Arquilla and David Ronfeldt went so far as to identify a series of parallels between the Internet and the actual Wild West, including, “In the Wild West almost anything could occur. There was no one to enforce overall law and order, only isolated packets of local law. The same is true in cyberspace” ([Arquilla & Ronfeldt 1997](#): p. 242). The Wild West metaphor of the Internet frequently plays out on screen: the technology is presented as a place that breeds cyberpredators as well as a *where* that victims are found.



Akin to the endurance of dehumanisation as a narrative theme, the idea of the Internet as a geographic badlands helps fuel misunderstandings about technology and encourages stereotyping of the industry and its users. Perhaps more interesting however, is the why of the endurance of scary spatial metaphors. Most obviously, such metaphors help to make abstract concepts more comprehensible, something discussed by Alexander Tokar in his book *Metaphors of the Web 2.0*:

[M]etaphorical pluralism often emerges when, as a consequence of a technological innovation, language users need to verbalize (i.e., find expressions that can be used to refer to) a new, highly complex concrete concept such as, for example, the Internet... [T]he Internet is also often referred to as *agora*, *electronic frontier*, *cyberspace*, *global village*, *empyrean realm*, *information superhighway*, *ocean of information*, *container*, *prosthesis for the senses or limbs*, *city* etc (Tokar 2009: p. 1).

In film, the Internet can be presented as a physical space through dialogue (as in the examples discussed earlier), or visually as a physical site as in *The Matrix* (1999) or *The Cyberstalking*. Given, as discussed elsewhere (Rosewarne 2016a), that *showing* a computer activity like hacking in film is notoriously difficult – and often is depicted particularly farcically as in the fellatio/hack scene in *Swordfish* (2001), or the two colleagues typing on the one keyboard to stop the hack in the “The Bone Yard” episode of the crime-drama NCIS (2003–) – film is a visual medium and portraying the Internet on screen is something significantly aided by metaphors with a visual (and spatial) component; an idea discussed by Tokar, who draws on the work of Eva Gehring (2004): “the Internet is a space because the Internet is not a space. That is, the Internet lacks space, but since the concept of space is so important for language users, spatial metaphors linguistically compensate the lack of space” (Tokar 2009: p. 19). Depicting the Internet as a place a person can be from, or go to, helps give a something *without* space a physical form, an essential component in filmmaking. Of course, more than just *any* place, the place is commonly depicted as notably scary and unknowable, in turn creating necessary threat and tension in a narrative.

A third negative frame common in portrayals of the Internet is that the technology makes its users vulnerable; that the nature of Internet use makes it a dangerous place.

## The Inherent Vulnerabilities

Another kind of geographic presentation of the Internet is the technology somehow existing exclusively inside a computer or cell phone, alternatively that predatory behaviour transpires exclusively “in there” and thus can be *contained* there; something depicted widely on screen through dialogue and in action. In the romantic-comedy *You’ve Got Mail* (1998) for example,

when “NY152”/Joe (Tom Hanks) first suggested via email to “Shopgirl”/Kathleen (Meg Ryan) that they meet up in person, Kathleen quickly closed the lid of her laptop: by doing so, seemingly, her new online relationship – one which she already felt was bordering on infidelity – could be “contained”. In the “A League of their Own” episode of the sitcom *Ugly Betty* (2006–2010), while on an online dating site, Christina (Ashley Jensen) “bumped into” her husband. She quickly shut her laptop as though doing so could *shut down* her discomfort. In the final scene of the drama *Cyberbully* (2015), the teen protagonist Casey (Maisie Williams), asked the anonymous cyberbully who had been harassing her throughout the narrative: “What are you when I stop talking to you?” Casey then closed the lid of her laptop before waiting for an answer. In the thriller *Copycat* (1995), Helen (Sigourney Weaver) received a photo via email of a serial killer’s new victim. In response, she frantically unplugged her computer: “It’s an open window. He can crawl in anytime he likes.” In the mini-series *Killer Net*, after an online stalking game leads to a real-life murder, Scott (Tam Williams) hurls his computer out the window. In each of these examples, characters attempt to physically manage a threatening world by treating online interactions as something that can be contained within a fixed geographic space and through controlling one single piece of hardware.

While in some screen examples attempts are made to somehow physically limit a digital problem, in others there is a spoken recognition that the Internet actually makes doing so impossible. Helen in *Copycat* noted that predators can use the Internet to “crawl in anytime”, and this is an idea verbalised in numerous examples. In the “P911” episode of the crime-drama *Criminal Minds* (2005–), the profiler Katie Cole (Mary Page Keller) discussed cyberpaedophiles and remarked, “All the security in the world can’t stop them coming through our doors.” In the “Chat Room” episode of the crime-drama *Law & Order: Special Victims Unit* (1999–), Detective Elliot Stabler (Christopher Meloni) and his wife, Kathy (Isabel Gillies) discussed this same idea:

- Kathy:** It scares me.
- Elliot:** Honey, it scares me too. But I can’t just walk into a room and restrain the guy.
- Kathy:** Why not?
- Elliot:** I mean, these predators. You tell me where they are. I can’t hear them, I can’t see them.
- Kathy:** But they’re out there.
- Elliot:** Honey, they’re in here <gestures to the computer>

Later in the episode Elliot tells his daughter, “You know how I lock up all the doors and windows? Now they’re coming in through there”; again he points to the computer. In the made-for-television drama *The Craigslist Killer*, Detective Bennett (William Baldwin) verbalises a similar concern, “Used to be able to see who the bad guys were, right? Now it’s all text and emails and websites. Creeps are hiding in our houses and we don’t even know who they are.”

A key element that enables the Internet to be perceived as possessing inherent vulnerabilities is anonymity: that the possibility of deception makes crime online unique. In one of the final scenes of the thriller *Perfect Stranger* (2007), the journalist Rowena (Halle Berry) wrote in an article, “[The Internet] is a world, you think, where actions have no consequences, where guilt is cloaked by anonymity, where there are no fingerprints.” While in some narratives, as discussed earlier, the Internet is presented as though it’s a definable geographic place, in others however, the portrayal is as a kind of unreal space where an individual doesn’t always feel the same level of connection to, ownership of, accountability for, or even embarrassment over their interactions. This idea has been extensively analysed by psychologist Sherry Turkle in realms such as gaming ([Turkle 1984](#); [Turkle 1995](#)), as well as by a range of psychologists in the context of cyberbullying: as Robin Kowalski, Sue Limber, and Patricia Agatston identified, “Without the threat of punishment or disapproval, people may carry their actions much further than they normally would” ([Kowalski et al 2012](#): p. 86).

Framing the Internet on screen as dangerous is primarily a way to ratchet up tension. Crime has long had an important role in screen fiction ([Miller 2012](#)) and for filmmakers, the Internet is just another place/space for crime stories to be set. The production of the television series *CSI: Cyber* (2015–), is a particularly good illustration of this. The series’ predecessors *CSI* (2000–2015), *CSI: NY* (2004–2013) and *CSI: Miami* (2002–2012) were each set around physical crimes like rape and murder transpiring in physical cities including Las Vegas, New York and Miami. *CSI: Cyber* makes the physical city much less important than *cyberspace*: in this series the location and nature of crime is completely reconceptualised.

The badlands of the Internet and the inherent vulnerabilities within commonly lead to the screen inclusion of a speculative foreboding figure that I dub the *cyberbogyman* ([Rosewarne 2016a](#)): the fourth and final frame examined in this paper.

## The Cyberbogyman

*Bogyman* commonly conjures thoughts of a nightmarish figure that frightens children. In the context of cyberspace however, this imaginary creature can just as readily terrify adults.

The bogeyman personifies fears of the unknown and serves as an embodiment of transgression and punishment.

During the earliest days of the Web the technology was scarcely understood and thus the Internet itself was popularly conceived as a generalised kind of bogeyman ([Rosewarne 2016a](#)). In Internet-themed screen narratives this idea is identifiable in numerous films produced in the 1990s. A classic example is the thriller *The Net* (1995), which centred on the efforts of computer programmer Angela (Sandra Bullock) to untangle herself from a cyberconspiracy involving hacking and identity theft. In his discussion of the film, cultural theorist Aaron Tucker identified: “Even the title *The Net* recalls monster films such as *The Blob* [1958] . . . and *The Fly* [1958] . . . with creatures and transformations that produced grotesque and inexplicable consequences” ([Tucker 2014](#): p. 43). Tucker spotlights how early narratives portrayed the Internet not merely as a dangerous *place* but more so as a kind of autonomous *thing* – if not an autonomous *creature* – with, presumably, nefarious intent.

By its very nature, the bogeyman is imaginary, and thus, within narratives the cyberbogeyman exists as a primarily *dreamt up* threat. While sometimes Internet-themed crime is indeed portrayed, much more common is the verbalised *presumption* of it. A typical take on this transpires in the “Juliet Takes a Luvvah” episode of the comedy-crime series *Psych* (2006–2014) in a scene where Shawn (James Roday) walked in on his colleague Gus (Dulé Hill) taking selfies:

- Shawn:** Uh, what are you doing?
- Gus:** Look, it’s not what it looks like. I’m just taking additional photos for my soulmateconnect.com online dating profile.
- Shawn:** Phew. I thought there was something truly embarrassing going on in here.
- Gus:** Look, I need to be in love, Shawn. Everyone I’ve gone after over the last year has either been a killer or dating a killer.
- Shawn:** Oh, well, by all means, let’s scour the Internet, the place where everyone knows it’s just decent, normal, sane people looking for true love.

Shawn’s comments reflect a commonly deployed, and often humorous speculation that if a person chooses to go online, notably for dating, they will encounter people who are anything *but* decent, normal, or sane; a theme widely apparent across genres. In the opening of the comedy *EuroTrip* (2004) for example, Scotty (Scott Mechlowicz) was e-mailing his German



pen pal. Watching on, Scotty's friend, Cooper (Jacob Pitts), outlined the perils of meeting people online:

You met a [quote] cool guy [quote] on the [quote] Internet [quote], okay. This is how these sexual predators work. Next thing you know he's going to want to [quote] arrange a meeting [quote] where he will gas you and stuff you in the back of his van and make a wind chime out of your genitals.

In the romance *Meet Prince Charming* (2002), Samantha (Tia Carrere) typed a message to her secret online admirer, Jack (David Charvet), confessing, "I'm a little nervous. What if you're a psycho killer?" In the drama *On\_Line* (2002), Moira (Isabel Gillies) told her friend, Ed (Eric Millegan), about her upcoming online date; Ed, concernedly, asked, "What if he turns out to be a complete psycho or something?" In an unnamed episode of the gay-themed series *Lip Service* (2010–2012), Tess (Fiona Button) was uninterested in Frankie's (Ruta Gedmintas) suggestion of online dating: "No, absolutely not, I'm not that desperate; it's for skanks and psychos." The "Two Bodies in the Lab" episode of the crime-drama series *Bones* (2005–) opened with the protagonist, Temperance (Emily Deschanel), communicating on SensiblePartners.com. Her colleague, Agent Booth (David Boreanaz), asked her, "So what if your computer date's psycho?" In the "Three Men and a Boubier" episode of the sitcom *Super Fun Night* (2013–2014), Kimmie (Rebel Wilson) suggested that she and her roommates sign up for online dating to which Helen-Alice (Liza Lapira), cautioned, "I don't know, Kimmie. There are too many weirdos online." In the *Catfish* (2010) documentary, a waitress provided Nev, the protagonist, her thoughts on online dating, "I know my friend, she actually just met a guy the other day off the Internet and he was a total weirdo." In the "I'm Moving On" episode of the drama *Hart of Dixie* (2011–2015), after Zoe (Rachel Bilson) decided to start dating online, her friend, Wade (Wilson Bethel), warned her, "Gotta be careful. Lots of freaks and weirdos online." In the comedy *Da Kath and Kim Code* (2005), unlucky-in-love Sharon (Magda Szubanski) began Internet dating and her friend Kath (Jane Turner) remarked worriedly, "Gee, Internet dating. I hope Sharon's careful. There's a lot of loonies out there." In the romantic-comedy *Because I Said So* (2007), Daphne (Diane Keaton) used the Internet to search for a partner for her daughter, Milly (Mandy Moore). Daphne's online ad attempted to exclude those she assumed populated cyberspace: "Let me preface this ad by saying if you're a nut job, pervert, or fruit cake, move on." In the "Online Dating" episode of the sitcom *Hot Properties* (2005), Ava (Gail O'Grady) referred to online dating as a "wonderfully efficient way for perverts around the world to check you out." In the comedy-drama *Dogging: A Love Story* (2009), while in a chat room, Laura (Kate Heppell) asked Dan (Luke Treadaway) what he was thinking and he responded, "I was thinking, are you an old pervert?" In each of these examples, assumptions – undoubtedly fuelled, at least

in part, by the screen's persistently negative framing of the Internet – position “Internet people” as somehow inherently different.

The “natural” extension of fears of weirdos, psychos, and perverts is the assumption that people encountered online might actually be *criminals*. In the comedy *Ten Inch Hero* (2007), Jen (Clea DuVall) was falling in love with her online correspondent “Fuzzy22.” Fearing disaster, her colleague, Piper (Elisabeth Harnois) cautioned, “So basically he could be Charles Manson with a laptop?” In the “A League of Their Own” episode of *Ugly Betty*, in the aftermath of Betty’s (America Ferrera) break-up, she discussed her predicament with Christina, in turn revealing her own cyberbogyman fears:

**Christina:** Okay, executive decision – I’m gonna put your profile on Bachelocity.com.

**Betty:** Internet Dating? There are freaks online. Why don’t you just chop me into pieces yourself, and we can cut out the middleman?

In the biopic *One Chance* (2013), Paul (James Corden) was on his first date with his Internet girlfriend, Julz (Alexandra Roach), when Julz got a telephone call: “Oh, it’s just my mum,” she explained, “making sure that I’m still alive and you haven’t murdered me.” In the “In the Mix, on the Books, and in the Freezer” episode of the sitcom *Manhattan Love Story* (2014), Dana (Analeigh Tipton) was worried about her upcoming Tinder date: “Hoping he’s not a serial killer,” she mused. In “The Fall” episode of the comedy-drama series *Grace and Frankie* (2015–), Grace (Jane Fonda) stated her objection to online dating: “I choose not to be murdered by a stranger that I met online.” In the “Do You Wanna Dance?” episode of the legal-drama *Ally McBeal* (1997–2002), the title character (Calista Flockhart) began online dating and her roommate, Renee (Lisa Nicole Carson), cautioned, “You realise this guy’s probably got two heads and a criminal record.” In the television thriller *The Girl He Met Online* (2014), while scanning through profile photos, Gillian (Yvonne Zima) gave a running commentary, “Momma’s boy, no thank you, uggh, you’re like a hundred years old, red neck trailer trash, too young . . . serial killer.” Each of these examples echoes audience suspicions about the *kinds* of people presumed to be populating cyberspace: that they are different and scarier than “normal” people, even if, in most of these examples, the idea is only ever mere speculation.

Another screen presentation of the cyberbogyman is via scenes where online activity is presumed – in the context of an investigation storyline – to have a role in crime but, as above, exists purely as madcap imaginings. In “The Friendly Skies” episode of the crime-drama *Without a Trace* (2002–2009), for example, the murder at the centre of the narrative

was assumed to be linked to the victim's online dating. The explosion in the "Two Bodies in the Lab" episode of *Bones* was quickly assumed to involve the man whom Temperance had met online. In the "Generation of Vipers" episode of the crime-drama *Lewis* (2007–), online dating was assumed to be relevant to a professor's murder. The "New Evidence" and "Hammerhead Sharks" episodes of *The Practice* centred on a murder victim who had been exchanging erotic e-mails with Dennis (Ted Marcoux) prior to her death; Dennis was thus instantly suspected of murder. The title and most of the plot of *Murder Dot Com* explicitly implied that a website had something to do with the crime at the centre of the narrative. In the "Paranoia" episode of crime-drama *Law & Order* (1990–2010), when a girl was found stabbed to death, detectives immediately began pursuing "some kinkoid in cyberspace" who had participated in explicit online discussions. In the "Babes" episode of *Law & Order: Special Victims Unit*, a pregnant teenage girl, Fidelia (Jessica Varley), appeared to have committed suicide after being cyberbullied. Similar speculation played out in the "Knuckle Up" episode of crime-drama *Cold Case* (2003–2010), when an online video of a fight was assumed to be evidence of cyberbullying. In each of these examples, the crimes, in fact, ended up having *nothing* to do with the Internet whatsoever. Each example however, highlighted the simple *assumption* that the Internet is evil and reflected an audience's willingness to believe that cyberbogeymen lurk on every corner.

A central underpinning of the screen's cyberbogeyman is its entrenched existence in social mythology: that film and television reflect the anxieties of our culture. A survey, for example, conducted by the Pew Research Center, found that 66 percent of Internet users thought that online dating was dangerous and, of those who had actually tried it, 43 percent claimed they believed it was risky ([Madden & Lenhart 2006](#)). In sexual health researchers Danielle Couch, Pranee Liamputtong, and Marian Pitts' study on online dating, the authors quoted several participants who articulated their own cyberbogeymen fears: "Estelle," for example, noted, "i think your also hoping that the person isn't like some serial killer" [sic], while "Tommy" claimed, "you never know if you're going to meet an axe murderer." "Clarissa" in the same study said, "I think dating sites are extremely dangerous. They are Psychopaths playgrounds" (in [Couch et al 2012](#): p. 708). The sociologist John Bridges quoted "Joyce" in his book *The Illusion of Intimacy*: the woman had once been a former Match.com user and described her experiences: "They just feed on women and men who are hurting and all they do is provide a tool for perverts" ([Bridges 2012](#): p. 40).

The fears of the bogeyman are part of the long history of concerns about "bad men" and, more specifically, fears of suitors met through anonymous channels. Unlike personal ads and blind dating however, online dating is an enormous industry whereby participation has now become mainstream – so much so, in fact, that as Bridges notes, this method has replaced



many others and is often conceived of as “the only game in town” ([Bridges 2012](#): p. 43). In turn, with more people involved, a greater number of users are feeling apprehensive about meeting a psycho and thus their fears gets normalised. While in the pre-Internet dating age, the idea of meeting a psycho or a pervert through anonymous channels was still a concern, the Internet – both in reality and through its popular media depiction – is the catalyst for epidemic fears of *what if*. In the romance *A Cinderella Story* (2004) for example, during one of Sam (Hilary Duff) and Austin’s (Chad Michael Murray) first in-person meetings they had the following exchange:

**Austin:** You do actually go to North Valley high school, right?

**Sam:** Of course.

**Austin:** Well, I’m just checking, you never know with the Internet.

The *you never know with the Internet* idea was similarly alluded to in the “Body of Evidence” episode of the crime-drama *New Tricks* (2003–), when the police department’s IT expert, Xander (Andy Rush), explained how difficult it is to gauge identity online: “This is the Internet. The cloak of anonymity. Nobody knows who anybody is.” Austin and Xander both reference anonymity. While the exploitation of anonymity is not unique to the Internet ([Harrington 2009](#)), the technology makes it easier, if not even normalising it.

On screen, the cyberbogyman possibilities grounded in anonymous encounters are readily identifiable. In the comedy-drama *Burn After Reading* (2008), Linda (Frances McDormand) discussed her online dating experiences with her colleague Ted (Richard Jenkins). Two of Ted’s cautionary remarks included, “Linda, what do you really know about this guy?” and – in line with the psycho and pervert fears alluded to earlier – “You know, he could be one of these guys who cruises the Internet.” A similar comment was made in the “Pilgrimage” episode of the comedy-drama series *Nurse Jackie* (2009–): Dr. Cooper (Peter Facinelli) had started online dating and his colleague, Dr. Roman (Betty Gilpin), cautioned, “Do you have any idea what kind of women troll those sites?” On one hand, anonymity can simply be construed as a fact of the Internet: that unless one *actively* chooses to divulge identity or to provide accurate photos, the physical separation of individuals means that they are, by default, communicating anonymously. On the surface anonymity isn’t necessarily good or bad, and certainly on screen the concealment of identity boasts positive *and* negative attributes. In terms of positives, as Dr. Hobson (Clare Holman) commented in the “Generation of Vipers” episode of *Lewis*, “Online you can reveal yourself relatively painlessly.” In an early scene in the “Two Bodies in the Lab” episode of *Bones*, when Temperance’s online match suggested an offline meeting, she was initially reluctant: “I’m enjoying the anonymity,” she confessed. More commonly however, the possibility of

anonymity – of *duplicity* – feeds bogeyman fears. (Paradoxically of course: as Nick Paumgarten reminds us in his *New Yorker* article about online dating, “Bars don’t do background checks, either” [[Paumgarten 2011](#)]).

Just as turning the abstract concept of the Internet into a spatial metaphor, the cyberbogeyman functions similarly: to give form – to give *figure* – to generalised fears of the bad men of cyberspace. While in the examples discussed in this chapter, form centres on vague fears of murderers or rapists, the mythology of Slenderman is a popular real-life attempt to give actually physical form – and actual physical descriptions – to the cyberbogeyman ([Dewey 2014](#); [Rosewarne 2016a](#)).

## Conclusion

Ubiquitous Internet use off-screen is a reality largely absent from the screen ([Rosewarne 2016a](#); [Rosewarne 2016b](#)). Instead, film and television tell a tale of the Internet as a thing, a place, a tool, worth fearing; of Internet users as somehow more strange, nefarious and duplicitous than everyone else. While the picture is bleak, I’m not sure we should be too surprised. Fears of new technology have a very long history and more specifically, fears of new things are culturally well-entrenched. With an even longer history than fears of the Internet leading to social decay is the fear that new things are scary things. Such fears are hinged upon ideas that machines change, if not sometimes even *replacing*, the ways things have always been done and thus threaten our concepts of what it means to be human. For those of us from non-tech backgrounds, such technology also exposes our intellectual shortcomings and thus we fear it because it is changing our lives so rapidly and yet our understanding of precisely how is limited. Equally, to justify the inclusion of something as mundane as ordinary Internet use in a screen narrative it needs to lead somewhere: to move a plot forward or, at the very least, to reveal something about a character. The representations of the Internet as discussed throughout this paper are thus skewed towards fear, danger and perversion because such scenes make for much more interesting – more *dramatic* – viewing than an online search for a restaurant location or cheap price on shampoo.

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<sup>1</sup> Such a situation, presumably, means that filmmakers aren't beholden to an "accurate" or "faithful" portrayal of the syndrome, and thus can pick and choose which aspects they utilise for humour. Oktay Ege Kozak discusses this issue in his review of *Wish I Was Here*: "Adding to all of this conflict is a supposedly genius brother (Josh Gad) who seems to have a case of Movie Asperger's (All of the comedic quirks, half of the painful emotional problems), who refuses to see his judgmental father in his deathbed" (Kozak 2014).

## The BBC Charter Review

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### Abstract

Both the British Broadcasting Corporation (BBC) and the Australian Broadcasting Corporation (ABC) are being subjected to close scrutiny, but from different quarters. During the lead up to the British general election in 2015, the Cameron Conservative government issued a Green Paper, *BBC Charter Review, July-October 2015*, which broke new ground in terms of the scope of such an enquiry for its level of institutional criticism. Whilst ostensibly the document only purported to raise options for future change, and invited public submissions for consideration, there has been widespread concern about the possible serious intentions of the government for the Corporation's future. Though the ABC appears to be subject to much less vitriolic attack than its British counterpart, it too faces a range of threats and abuses. Paradoxically, such aggressive scrutiny comes at a time when both broadcasting corporations enjoy record audiences, continuing high levels of public trust, and on-line market leadership as a result their successful development of new digital platforms.

### Introduction

The British government recently launched a substantial review of the British Broadcasting Corporation (BBC), which received extensive attention and a great deal of criticism during the latter months of 2015. Whilst the Australian Broadcasting Corporation (ABC) has also been subject to sustained criticism, from multiple sources, in recent years, it has not had to face a formal wholesale government review comparable to what is widely perceived as an onslaught on the BBC.

John Whittingdale, Britain's Secretary of State for Culture, Media and Sport in David Cameron's Conservative government, released a Green Paper '[BBC Charter Review, July – October 2015](#)'. As the BBC's current charter is due to expire at the end of 2016, the Green Paper has raised many contentious issues about the broadcaster's future. It suggests that 'some hard questions need to be asked if we are to ensure the future success of the BBC':

What should the BBC be trying to achieve in an age where consumer choice is now far more extensive than it has been before? What should its scale and



scope be in the light of those aims and how far it affects others in television, radio and online? And what are the right structures of governance and regulation? ([BBC Charter Review 2015](#): p1)

The opening offers mixed messages. It begins with somewhat patronising high praise of the BBC for being ‘at the very heart of Britain . . . much loved by audiences, a valuable engine of growth and an international benchmark for television, radio, online and journalism.’ ([BBC Charter Review 2015](#): p1) But then it laments that the BBC has ‘fallen short of the high standards we should expect.’ To support this broad assertion what follows is ‘the revelations about Jimmy Saville and other former BBC celebrities brought to light appalling behaviour that went unchecked.’ (Jimmy Saville was found guilty of paedophilia, but the BBC management was subsequently cleared by an enquiry of having any knowledge at the time of abuses that occurred on BBC premises). It then adds blanket criticisms of ‘pay offs’ for BBC senior executives and the growth in the number of senior managers, and the size of their salaries. No comparative data is provided about their counterparts in the private sector or in government, nor is any assessment offered of the overall economic and cultural value of the BBC to Britain.

The paper calls for a review of the six broadly stated ‘public purposes’:

1. Sustaining citizenship and civil society;
2. Promoting education and learning;
3. Stimulating creativity and cultural excellence;
4. Representing the UK, its nations, regions and communities;
5. Bringing the UK to the world and the world to the UK;
6. Delivering to the public the benefit of emerging communications technologies and services.

([BBC Charter Review 2015](#): p4)

It suggests ‘that BBC would benefit from having a clearly defined set of values, establishing through the Charter a set of unique features of the BBC including its independence and impartiality.’

## Government perceived BBC problems

A most unusual aspect of the Green Paper is the categorisation of the ‘negative effects the BBC can have on wider markets’, collectively in ‘Box 4: Market Impacts’ ([Charter Review 2015](#): p25). The term wider markets’ refers to the BBCs alleged impact on other players in a

media market place usually presumed to be open and freely competitive in the British democracy.

The first perceived problem is that ‘the commercial television sector can struggle to compete with freely distributed BBC content.’ But in what sense is the term ‘free’ used here? Unlike in Australia, BBC viewers and listeners currently have to pay the equivalent of \$A 309 as a compulsory licence fee. Is it implied that the BBC should restrict the distribution of its content more so than it does now? If so, why? And if the BBC’s competitors cannot hold their own in the market place, is it a legitimate role of the government’s Secretary of State for Culture, Media and Sport to do something about that?

British commercial broadcasters leapt upon this point with glee in their response to the request for public submissions to the Green Paper. Even more remarkably, a major broadcaster, ITV, called for blanket bans to prevent the BBC from buying US films or comparable shows in any circumstances, arguing that ‘The BBC should not be permitted to acquire content that is already made. . . where another commercial rival is prepared to purchase that content or format’ ([Plunket 2015](#)). And Whittingdale is quoted in the same article as questioning whether it was ‘good use of the licence fee which is taxpayers’ money to buy’ shows he judges it as being ‘way outside of what I call public service broadcasting.’ So is it this minister’s intention to restrict the BBC to niche programs only, thereby threatening to reduce the number of households who will be prepared to continue to pay the licence fee? This is also a surprising call coming from ITV, a company with a commendable track record of defending the principle of freedom of expression for media organisations. Surely this is somewhat Monty Pythonesque – see how well you can survive once we’ve chopped your legs off!

The Green Paper also declares for another BBC medium that ‘there is a *risk* (author’s italics) that the BBC’s radio market share could grow further unless commercial advertising revenues remain robust’ ([BBC Charter Review 2015](#): p25 ). Certainly BBC radio as a whole presents a ‘problem’ to its competitors, given the widely acknowledged diversity and quality of the programs currently offered. At one end of the spectrum there’s the appealing but somewhat frenetic grabs on *Five Live*, ever energetically billing itself as ‘first in breaking news and the best in live sports.’ Radio for the regions have long commanded loyal and appreciative listeners for their distinctiveness. And for documentary lovers there are the more specialist offerings of the established BBC Radio 4 programmes, all available via podcast. Data quoted in *News In Brief* from the research body Radio Joint Audience Research Ltd (RAJAR) shows that three of BBC’s digital only radio stations – Radio 4 Extra, 5 Live Extra, and 6 Music – all posted record audience figures during 2015. This is at a time when there was concern over the future of the BBCs two premier radio channels. However,

the Minister has given Parliament an assurance that neither BBC radio 1 nor 2 will not be closed down in response to speculation that it might happen.

The Whittingdale document also expressed concerns that ‘The BBC has a variety of impacts on online markets . . . (which) has led to suggestions that ‘the scale of BBC’s online offering is impeding the ability of other news outlets to develop profitable business models’ ([BBC Charter Review 2015](#): p25 ). The popularity of BBC News is demonstrated by data provided on its [www.bbc.co.uk](http://www.bbc.co.uk) media centre data showing its web site having an average of 27 million UK weekly browsers and over 65 million worldwide (also quoted at [BBC Charter Review 2015](#): p25) .

Apart from these remarkable intrusions into the affairs of the operations of the BBC, this ministerial criticism comes at a time when so many governments around the world are urgently seeking ways to diversify their economies, sometimes expressed as building a Creative Economy through more innovation. Yet the BBC has established a world-wide reputation for its programming experiments in broadcasting, the reach of its social media offerings, and ‘catch up’ programming. It raises the question of why Britain’s Secretary of State for Culture, Media and Sport apparently wants to ‘shirt front’ the world’s biggest cultural software organisation!

Furthermore, concern is expressed in the Green Paper that ‘The BBC’s ability to cross promote its own services has an impact on the wider market . . . (and) there is a case for arguing that the nature and extent of this cross-promotion needs to be considered (p25). Curiously then on the one hand it is government policy to foster investment in the development of new communications technologies as part of building a national creative economy strategy, but on the other, its own BBC – the world’s biggest and arguably most successful public broadcaster – ought not widely promote its services according to government. It’s a most curious call on the part of the British government to advocate a lessening of public awareness of the BBC’s multiple menus.

## Responses to the review

John Whittingdale did not appear to have anticipated the breadth of condemnation that would follow his call for such a wholesale review of the BBC.

One critic, Westminster’s University’s Steven Barnett, offered a blistering critique soon after the release of the Green Paper in his article ‘BBC Charter Green Paper: Unprecedented threat to BBCs future’.

Today’s Green Paper on BBC Charter Review represents the biggest threat to the BBC’s scale, influence and effectiveness in the Corporation’s history.



Despite its enduring and international reputation, and despite being supported by the vast majority of UK citizens, the tenor of this paper is an unprecedented and full frontal government assault on the BBC's role at the heart of Britain's cultural and democratic life.

By raising the question “whether audience needs are better served by a more narrowly-focused BBC”, and by targeting specific entertainment programmes such as *The Voice*, the government has clearly indicated its preferred direction of travel: a smaller, less popular and more insignificant BBC. Quality popular programmes have been at the heart of the BBC's schedules since its birth, and this government's apparent willingness to emasculate the BBC's freedom to be popular will be damaging both to the nation's creative economy and to the BBC's engagement in British citizens' everyday lives.

Much of the Green Paper's approach appears to be concerned with the BBC's impact on commercial competitors and the notion that “a smaller BBC . . . would also be likely to have a reduced market impact”. The detailed assessment of potential market impact on p25, which purports to lay out the “positive and negative” effect of BBC activities, produced just two desultory positive impacts (raising overall standards and investment in UK content) while detailing five negative impacts almost entirely concerned with assuaging the concerns of BBC competitors.

The idea that BBC online news activities might be scaled back appears to be fueled by intense lobbying from self-interested newspaper publishers – which have been vociferously complaining about the BBC's damaging impact on their businesses through their own columns – despite the absence of any evidence that BBC regional news output damages the viability of local newspapers.

([Barnet 2015](#))

Other critics have focused on Whittingdale's ideological history. Robin Lustig pointed out that Whittingdale had consistently supported the conservative 'big end of town'. Back in 1996 he had voted against his own party's proposed broadcasting bill that would have prevented any newspaper proprietor with a circulation over 20% of the market from also owning a terrestrial television licence. Lustig concluded ‘as everyone recognised at the time there was only one proprietor in the frame’ (*The Conversation* 12.5.15).

*Guardian* journalist Nick Cohen in his article ‘Traduced by all sides, who will defend the BBC?’ described Whittingdale as ‘a Thatcherite politician’ who has been aligned with ‘half the

free market and anti-EU pressure groups of the past 30 years,' in a Britain where many of the same ilk perceive the BBC as decidedly pro the European Union.' He adds:

The Conservative right has long been the most Marxist of all. Whittingdale has already warned the BBC about its coverage of the EU, which he must know will be far more impartial than anything that will appear in the press. The flimsiness of the evidence used against the BBC is in inverse proportion to the level of outrage it generates. In all seriousness, Conservative MPs say that BBC journalists asking business leaders if they think Britain should stay in the EU is evidence of bias. The absurdity of the accusation does not bother the Tory right. It wants to intimidate the BBC into providing slavish coverage during the referendum campaign, then blame it for brainwashing the masses if it loses ([Cohen 2015](#)).

Cohen then offered his advice on how the BBC ought to respond to the Green Paper:

. . . stand up for its independence and appeal to the public over the heads of the politicians. If arguments were settled democratically it would win. The BBC remains one of the most trusted institutions in Britain. The trust has been earned by providing serious, accurate news for generations which almost everyone in Britain turns to when there is a major story ([Cohen 2015](#)).

## The BBC response

Tony Hall, Director-General of the BBC, offered a carefully measured, politically cautious, evidence-based response to these government criticisms. In the BBC's programme *British, Bold, Creative* of September 2015 he offered a case for the defence:

The BBC has a very simple purpose. We're here to make good programmes and services. That's why people love the BBC. That's why they enjoy it. That's why they trust us. That's why they value it. That's what they pay us to do. ([Hall 2015: p5](#)).

He offered an overview of the BBC's overall performance using data based on the work of the Radio Joint Audience Research Ltd (RAJAR) and the Broadcast Audience Research Board (BARB), 2014-15, and also from comScore Mobile Metrix, June 2015:

46 million British citizens use the BBC every day...Our services reach 97% of the UK every week, with an average of around eight and a half hours of TV and over ten hours of Radio per head. Our top 10 apps have been downloaded 80 million times and BBC sites are the third most popular on mobile devices in the

UK, behind only Google and Facebook. Of the top 75 web sites in the world, only the BBC's is British. ([Hall 2015](#): p11).

In terms of the public perceptions the BBC, Hall provided evidence to show that it has clearly enhanced its reputation in recent years:

**Public Perceptions of the BBC (score out of 10)**

	2007-8	2014-15
General impression of the BBC	6.6	7.0
I trust the BBC	5.9	6.3
I'm glad the BBC exists	6.9	7.5
BBC maintains high standards of quality	6.3	7.0
BBC is a great world ambassador	6.5	7.2
BBC helps people understand issues	5.9	6.3

Source: Kantor Media in *British Bold Creative*, BBC, September 2015, p12.

Surely if the BBC were a commercial organisation it would be commended by its board members, and possibly its shareholders, for achieving continuing improvement on its KPIs – key performance indicators – on the basis of the above data.

Yet the BBC is currently being clobbered in its budgets from the government. Hall argues that the BBC faces extraordinary tough financial challenges, having lost 40% of its revenue over the past ten years, and it is now required to save close to another 20% over the next five years! Whittingdale sees the current flat viewer licence fee of 145 pounds 50 pence as 'regressive,' and in need of 'overhaul' to further reduce its budget. Another sleight of hand in cutting it to the bone was when Whittingdale announced, before the release of his charter review, that the corporation would have also to absorb into its own balance sheet the 750 million pound subsidy for the free TV licences previously offered to the over-75-year-olds, currently paid by the Treasury. He is also considering plans to introduce in place of the licence fee a new 'household charge', based on a family's income, which would even further reduce BBC revenues. It is difficult not to come to the judgement from all of the above that this is a highly political exercise designed to emasculate the BBC.

Obviously such budget reductions would have dramatic negative effects on BBC programming, which apparently must be made to suffer following outstanding overall ratings success, especially in television, during 2015. Writing in *TV News*, Battersby points out that the 'Great British Bake Off' was the most watched television programme of the year



across all television channels, and scored 14 million viewers on the final night in October 2015. This topped *The Voice* which had attracted an audience one Saturday night of 8.4 million viewers. But if ITV gets its way, a list of similarly popular programmes can no longer be presented by the BBC.

The sports scene looks even bleaker for the BBC. The intense rights battle between Sky and BT Sport for the hugely popular live football broadcasts means that the BBC has not been able to afford to compete for some time now. It has also reportedly been unsuccessfully trying to re-negotiate its existing rights deal to broadcast Formula One to reduce costs. And the BBC has now lost the rights to the Olympic Games from 2022 to Discovery, owner of Eurosports. Also, the BBC may not be able to compete in the future to securing the rights to broadcast major sporting events, reality TV shows, American films, or popular imported dramas. However, if the BBC finds that its audience base is progressively eroded, more and more viewers will surely stop paying the licence fee.

The BBC is clearly facing a tough battle to survive as an institution as we have known it. The surprise recent election outcome handed majority government to the Conservatives. It's now without Nick Clegg, leader of the Liberal Democrats, who previously reined in some wild government proposals in cabinet. But if Cameron were to move towards some form of BBC privatisation, he would need to act early in his current five year term to clear the inevitable backlash before the next general election in 2020.

Cameron appears to be putting a toe in the water with Channel Four, a commercially self-funded but publicly-owned television broadcaster. Though well known for its respected high rating *Channel Four News* at 7pm, the organisation also has perennial funding problems. Ian Burrell wrote that 'Cameron is still open to Channel 4 privatisation' as he uncovered a 'sensitive government document' which outlines strategies for a sell-off for the broadcaster. He claims (not denied) that this states that 'work should proceed to examine the options of extracting greater public value from the Channel 4 corporation, focussing on privatisation options in particular.'

But could Prime Minister David Cameron look later at some kind of sell off of the BBC? If so he might need to be reminded of one of the lessons that Margaret Thatcher learnt in her policy considerations about the BBC. During the early period of her prime ministership of wholesale privatisations, she flagged the possible privatisation of the BBC to the commercial broadcasters, seeking their support if she moved to privatise the corporation. Their reaction was one of horror as they explained how major advertisers would flock in droves to a privatised BBC. 'Please don't put us completely out of business' they pleaded. She then dropped the idea! It's interesting to note that currently a private member's bill, the BBC

Privatisation Bill 2015-16, as proposed by a Conservative member of parliament, Peter Bone, is scheduled for debate in the House of Commons during March 2016.

However, a more likely future scenario of full or majority privatisation is the continuing emasculation of the BBC's annual budgets, and possibly the implementation of restrictions on certain forms of purchased programming. So the unstated strategy – by Britain's recently elected majority government of the day – may be to reduce the content base to heighten its fears and weaken the great influence of the BBC as a national institution. Perhaps though Whittingdale deserves some credit for at least bringing into the open the fears that commercial broadcasters have of being in the same market place with the BBC. But is the Conservative government's minister actually seeking to find new forms of protectionism for private sector broadcasters in Britain?

In Australia such generic criticisms of the ABC by government are generally more subterranean than those being experienced by the BBC. However, the strength of the vitriolic attacks by various opponents of the BBC should be heeded by Australians. Some of the forms of attacks may be different, but the level of passion is similarly threatening. The ABC's industry competitors, and disgruntled conservatives, have yet to yet spell out their case as openly as Whittingdale has done. But there have been plenty of spasmodic and fragmented attacks on the ABC, centred on multiple forms of its alleged 'left wing' bias, often coupled with personalised criticisms of the professionalism of particular ABC broadcasters, and appeals for programmes such as *Media Watch*, and especially *Q&A*, to be shut down. There has also been curious attacks on the credibility of the ABC's coverage of the Human Rights Commissioner for essentially doing her job in monitoring and criticising the effects of the asylum seeker policies of both major political parties. As well, passionate newspaper editorials have called for their designated culprit, ABC CEO Mark Scott, to resign, appealing for utterly pointless revisions of the charter of the ABC. The principal private sector opponent of the ABC is *The Australian*, which appears to have published more editorials criticising the ABC during 2015 than another subject it could have chosen to cover. Regular columnists Janet Albrechtsen, Gerard Henderson and Chris Kenny have created a new genre of destructive journalism where, on any number of subjects, their column devotes a substantial amount of text to attacking the ABC's coverage before adding some of their own comments.

## Conclusion

There's an odd paradox now in play with some perceptions of the value of public broadcasters. Although both the BBC and the ABC enjoy record audiences, very high levels of public trust, and successful online leadership with their new digital platforms, both

Yet surely we all need strong public broadcasting institutions as much now as ever before. We face extraordinary complex issues in need of informed debate, such as climate change, foreign and military policy in the Middle East, refugee policy, transitioning to a new economy, tax, equality and welfare issues – just to highlight a few. And it's the trusted media institutions that can contribute to unravelling complexity in so many different contexts by facilitating a range of diverse *and* antagonistic views. That's what the BBC and the ABC offer so well. It's not possible, or desirable, to have a value-free broadcasting institution. Surely the strength of the continuity of public broadcasters helps us try to make sense of our world.

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# An ethnography of Bitcoin: Towards a future research agenda

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**Abstract:** Cryptocurrencies such as Bitcoin are a recent socio-technical innovation that seeks to disrupt the existing monetary system. Through mundane uses of this new digital cash, they provide a social critique of the centralised infrastructures of the banking industry. This paper outlines an ethnographic research agenda that considers how the social uptake and use of cryptocurrencies such as Bitcoin represents alternative views towards value exchange and critiques existing financial structures. We begin by arguing that the use of Bitcoin can be seen as an act of social resistance that is intended to bridge socio-economic inequalities within the context of a digital community. We then outline the disruptive nature of borderless, affordable and instantaneous international transfers in the form of remittances within social practice. Finally, we identify the possible permutations of trust that may be found in the technical affordances of Bitcoin technology and how these relate to user (pseudo)anonymity, cybertheft, cyberfraud, and consumer protection. Bringing together these three key areas, we highlight the importance of understanding the ordinary (rather than extra-ordinary) uses of cryptocurrencies such as Bitcoin. We contend that focusing upon users' interactions with Bitcoin as a payments system and community culture will shed light upon mundane acts of socio-technical disruption, acts that critique and provide alternative financial exchange practices to the payments and regulatory financial infrastructures of the banking industry.

## Introduction

This paper identifies three areas of inquiry that would benefit from the ethnographic study of the social uses of cryptocurrencies such as Bitcoin. The first considers the study of Bitcoin use as a methodological and community question that can be informed by ethnographic approaches to the study of a digital community. The second area considers the implications of Bitcoin use to payments systems, particularly as a vehicle for transnational value exchange. This area of inquiry engages with the literature on financial inclusion to consider the human implications of banking, globalisation and money, including digital and mobile currencies. The third research area focuses upon the loci of trust within Bitcoin use, particularly as this relates to themes of identity, privacy and risk. This research direction includes consideration of mechanisms for consumer protection, financial regulation, and currency stability alongside a focus upon the risks that Bitcoin adopters and users experience or anticipate in relation to cybertheft and cyberfraud.

Cryptocurrencies such as Bitcoin are a recent socio-technical innovation designed by their developers to disrupt the existing monetary system. The creation of Bitcoin is attributed to an anonymous group of developers ([Nakamoto 2008](#)), with its social uptake dated from 2009 ([Böhme et al 2015](#)). Anthropologist Bill Maurer and colleagues describe it as an electronic cash system that harnesses decentralised networking technologies to enable irreversible payments. Similar to peer-to-peer (P2P) file sharing sites such as Pirate Bay, Bitcoin's decentralised financial network means that there is no governing body that monitors and maintains its growth and no central server or trusted parties ([Evans-Pughe et al 2014](#), [Jacobs 2011](#)). Consequently, Bitcoin is commonly positioned as circumventing the centralised control of the current fiat system and the mediation of the banking system through its nature as a distributed verification system ([Maurer et al 2013](#)). This distributed verification system is designed to facilitate real-time transfer and transparency through its public access ledger, referred to as the Blockchain. Despite the decentralised, distributed and transparent exchange protocols, recent commentary suggests that Bitcoin has not entirely escaped centralising pressures (*cf.* [Fargo 2015](#)). Nevertheless, ethnographic research conducted by Justin [Fletcher \(2013\)](#) suggests that mundane uses of this new digital cash can be understood as a critique of the centralised infrastructures of the banking industry.

In a similar vein, [De Filippi \(2014\)](#) describes cryptocurrencies as newly emergent digital currencies that rely upon a decentralised and open source cryptographic protocol to regulate the manner in which currency can be created and exchanged. Rather than focusing on the tension between centralisation of the fiat economy and the decentralised protocol of Bitcoin, [Lui Smyth \(2013\)](#) points to a condition highlighted by De Filippi – the creation of the currency – as the quality that defines Bitcoin in comparison to fiat currencies. Smyth suggests that unlike fiat currencies, this cryptocurrency may not be the only instance of its kind given that it is algorithmically generated. As he highlights from his survey findings of Bitcoin users ([Smyth 2014](#)), whilst Bitcoin maintains the largest community base, developer team, market value and network hash power, two-thirds of his respondents had a stake in alternative cryptocurrencies, which numbered over 100 versions at the time of the survey. This feature has become relevant in recent times, with community disputes amongst developers causing a split in the Blockchain. This dispute holds the potential to undermine the coherency and utility of the decentralised verification practices that underpin the Bitcoin currency ([Popper 2016](#)). In light of this, the self-organising nature of the Bitcoin community is driving a proliferation of cryptocurrencies derived from the original technology proposed within the Bitcoin protocols. Such events are noteworthy to the directions of research that can be derived from studying Bitcoin use practices, as they highlight the need for the research to extend beyond a specific focus upon a single cryptocurrency and to acknowledge the permutations and collaborative innovations that are a key feature of cryptocurrencies.

Today, Bitcoin is an accepted form of payment by some major online retailers whilst being commonly recognised as a virtual commodity by regulators rather than as a currency. As an indication of the market share of Bitcoin, [Böhme et al \(2015\)](#) state that since its inception Bitcoin has had over half a million transactions from over a million accounts. Whilst this suggests that a substantial number of accounts are dormant, they estimated that as of March 2015 the total value of Bitcoins in circulation was USD3.5 billion. As [Karlström \(2015\)](#) indicates from a European perspective, we can understand that over a very short period of time, Bitcoin had gone from a proof-of-concept to being traded for about EUR78million. These estimates of value circulation and market share support the idea that, despite its ambiguous legal and monetary status, Bitcoin has a level of uptake that holds the potential to provide alternative payments pathways for existing financial inequalities. More particularly, we point to the capacity of Bitcoin and its derivatives to lower the cost of international remittances because of its lack of friction in exchanging value

across national borders. Consequently we argue that as a disruptive technology, the social uses and applications for the Bitcoin protocol challenge existing practices of financial exchange and value generation through its perceived capacity to act as digital cash with minimal transaction costs.

As noted previously, the majority of existing research into Bitcoin focuses upon the technical and regulatory aspects of the cryptocurrency. The capacity of Bitcoin to act as a decentralised alternative economy whose protocol facilitates pseudo-anonymous transactions has been explored through research into its role within illicit markets ([Böhme et al. 2015](#); [Brezo & Bringas 2012](#); [Bronk et al 2012](#); [Lane 2014](#); [Stokes 2012](#)). A small body of work describes aspects of the community context and value field within which cryptocurrencies such as Bitcoin have been adopted; this includes research using survey analysis ([Bohr & Bashir 2014](#), [Smyth 2014](#)), content analysis of discussion forums ([Barton 2015](#), [Maurer et al. 2013](#)) and an analysis of Google search data ([Yelowitz & Wilson 2015](#)). Additionally, participatory research with the Bitcoin community has been conducted through qualitative interviewing to compare perspectives towards Bitcoin by users and non-users ([Gao et al. 2016](#)) and to understand the culture of the community through interviews, forum monitoring and a survey ([Lustig & Nardi 2015](#)). [Justin Fletcher \(2013\)](#) also carried out ethnographic research with the Bitcoin community in Florida and found that Bitcoin largely represented an economic opportunity for its users in the context of international financial crisis and instability. He highlighted that the community viewed Bitcoin as a means by which individuals could actively and directly shape the global market structure.

With the exception of Fletcher's study, few studies have explored how Bitcoin is actually used on the ground, the scale of its adoption and the social and economic drivers that underpin its use ([Pink et al 2015](#)). We hypothesise that conducting research into the social uptake and applications of Bitcoin technology within its community of users will reveal marginalised practices for social support and exchange that attempt to address inequalities inherent in the regulation, exchange and value-generation practices of current payments systems. In the following sections we introduce three approaches to understanding this new digital frontier of financial exchange through digital currencies. By drawing together these areas of inquiry, we seek to bring into focus the human experience surrounding the mobility of new forms of money. We also seek to understand how self-organising community forms develop through innovations in P2P sharing technologies and give rise to alternative economies.



## Bitcoin, community and ethnographic engagement

Bitcoin is an example of a cryptocurrency that is experiencing adoption within social practice. Consequently, not only is it an alternative digital cash system derived from disruptive technologies, it is also an alternative monetary system that is an expression of emergent community values. [Bill Maurer \(2013: 3\)](#) argues that Bitcoin combines “practical materialism with a politics of community and trust that puts code front and center”. He identifies that the value of Bitcoin for the community of users is situated in the community’s belief that its use acts as an applied critique of current practices within the fiat economy that reduce users’ privacy, encroach upon personal liberty and undermine the flow of money through state and corporate oversight.

Originating from the cypherpunk movement, this self-organising network of people has come together through the development and adoption of the open source cryptocurrency software such as that which underpins Bitcoin ([Barton 2015: 10](#); [Bagozzi & Dholakia 2006](#); [Karlström 2015](#)). The social profile of members, Maurer argues, reflects a combination of monetarist economic views and libertarian politics:

...in the world of Bitcoin, there are goldbugs, hippies, anarchists, cyberpunks, cryptographers, payment systems experts, currency activists, commodity traders, and the curious. ([Maurer et al 2013: 2](#))

This diverse network of people, political stances and vested interests is usually based on a shared value of libertarian politics as suggested by Maurer. [Barton \(2015: 24, 27\)](#) describes a complex cultural sensitivity existing in the community of self-sovereignty and resistance to government repression expressed through shared values of free speech, an emphasis on personal and technological privacy, and a practice of crowd-sourced meritocracy (see [Coleman & Golub 2008](#) for a discussion of the hacker ethos that underpins this). Similarly, Smyth’s 2014 survey of Bitcoin users found a complex value field encompassing both left-wing and right-wing politics. Regardless of this complexity in political orientation and membership profile, we argue that the online-first, self-organising community of users surrounding Bitcoin can be considered a digital community.

The Bitcoin community can be identified as a digital frontier in community experimentation and characterised by a collective vision to act as a site of social resistance to existing financial inequalities through the development and uptake of a user-produced payments system that is digital in its DNA. The coalescence of the Bitcoin user base represents a community that is formed through overlapping foci of

activity ([Feld 1981](#)) that are mediated by technological innovations in social exchange and copresence. We can understand this non-traditional community format as being generated within a niche socio-technical environment rather than as gathered together through an organisation or place-based location. These characteristics of community engagement have been described previously through the re-conceptualisation of digital community ([Maddox 2015](#)) and the characterisation of the emergent and mobile properties of communities forming around cryptomarkets ([Maddox et al 2016](#)). Through this lens, one area of inquiry that we propose is the study of whether the combination of community engagement and P2P financial transactions facilitate new forms of social organisation that harness the emergent and dynamic properties of digital community

In light of this, we argue that the emergent and self-organised socio-technical form of the Bitcoin community is constituted by activist approaches that intend to critique and hack mechanisms for financial inclusion in response to a risky, precarious and individualised economic environment. Through an ethnographic study of the community that has formed around cryptocurrencies such as Bitcoin, we seek to understand the underpinning social conditions and technological environment that support the emergence of alternative payments systems. Consequently this line of inquiry may contribute to a discussion of social mobility and financial inclusion that is uniquely contextualised within the socio-technical engineering of peer-to-peer networks. This area of research inquiry may reveal how new forms of currencies, payments and digital value exchange represent fundamental shifts in the ways in which people think about and seek to leverage money to achieve forms of life security and financial stability.

## Bitcoin, remittances and international transfers

In alignment with the projections of [Fletcher \(2013: 60\)](#), given the continual iterations of Bitcoin-style cryptocurrencies developed by the community, these growing systems of exchange have the capacity to provide insight into new opportunities for transnational human interaction and future conceptualisations of fiat currencies. We argue that one aspect of this transnational practice where a study of Bitcoin use may be most informative is in the area of remittances and international transfers.

The World Bank calculates that the global average cost of sending US\$200 internationally was about 7.7 per cent in the second quarter of 2015. Banks are the most expensive at 11 per cent, compared to money transfer operators at 6.6 per cent

and post offices at 5 per cent of the amount sent. These are average costs, differing across regions, with the highest in Sub-Saharan Africa at 9.7 per cent. Within regions, the average costs of sending US\$200 were highest from Australia to the Pacific Islands at 18 per cent in the second quarter of 2015 ([Ratha et al. 2015](#)). The Sustainable Development Goals articulated in this recent report by the World Bank aim to reduce the cost of remittances to 3 per cent, with no corridor having an average cost greater than 5 per cent. The World Bank calculated that migrants and their families would save US\$20 billion if the average cost of remittances fell from 8 per cent (in the last quarter of 2014) to 3 per cent. In this context of reducing remittance costs to support financial inclusion across international contexts, the development of mobile remittance channels using Bitcoin, such as BitPesa, suggests that a remittance cost of 3 per cent holds promise ([Jackson 2015](#)).

The lower cost and instantaneous transfer of BitPesa offer an immediate benefit. But in 2014 when CGAP assessed BitPesa's usage for remittances from the UK to Kenya, they found that it was used mainly by business entrepreneurs to receive payments from abroad. Consequently, in this instance BitPesa was unlikely to aid financial inclusion as it was observed to be taken up by people who already had accounts ([Mazer 2014](#); [McKay 2014](#)). Whilst BitPesa still faces legal and regulatory challenges, there is little study of its use. Yet stories of Bitcoin's potential for lowering the costs and increasing the efficiency of international remittances are found among start-ups in the Caribbean ([Alpha Point 2015](#)), Australia ([Donnelly 2015](#)) and its use in India ([Bhakta 2015](#)). Regardless of these case studies reporting increased efficacy in disparate first-world and developing contexts, it remains difficult to find studies of people who have used it for remittances; what led to their adoption of Bitcoin; and how they overcame issues of unfamiliarity, lack of consumer protection and trust. Drawing on the work of [Supriya Singh \(2013\)](#) examining banking, globalisation and money, including digital and mobile currencies, and Horst's work examining mobile money in the Caribbean and Pacific (see [Horst 2013](#); [Horst & Taylor 2014](#); [Horst, Kailahi & Singh forthcoming](#); [Taylor & Horst 2013](#)), this study will consider Bitcoin within its context as a nascent alternative digital payments mechanism driven by P2P sharing practices that will drive down the cost of remittances. Consequently, we require further research which seeks to document and explore social adoption in environments where Bitcoin payments involving foreign exchange transfer are faster, anonymous and cheaper than current arrangements, without increasing risk of loss or theft.

## Bitcoin, trust and use

Given the focus of the research upon the user experience of Bitcoin, and its community articulations, the notions of trust, value and exchange are prominent technical, economic and social considerations reflected and critiqued by the social adoption and use of this cryptocurrency. [Maurer et al. \(2013\)](#), citing [Kelty \(2008\)](#), describes the currency as functioning on the basis of the trust that its community of users have placed in the code (a cryptographic algorithm). More accurately, he highlights the observation of a lead Bitcoin programmer, Gavin Andresen, that this can be translated as the trust they place in the ‘wisdom of crowds’ and their collective ability to review, effectively evaluate, and agree as a group to changes to it. [Maurer \(2013\)](#) states that this distributed network of shared trust in the operations of the Bitcoin code reveal a sociality of trust that is alternatively “expressed and obscured” by a practical materialism with two parts: concerns about privacy and concerns about value.

As is apparent in Maurer’s repositioning of trust within the discourse of the Bitcoin community, it becomes both a technical and political construct. In one sense, trust is a technical problem that is solved through cryptographic authentication protocols. In another sense, the technological affordances mediating trust within Bitcoin use are intended by developers to engender a politically motivated discourse. This discourse provokes the user to consider how Bitcoin generation and exchange represents the subversion of state endorsed third parties who control and regulate the circulation and value of money. The technical obviation of trust therefore is aimed at shifting the social narrative towards a consideration of ethical issues surrounding sovereignty and state power (see [Barton 2015](#), 51-54 for further discussion of this). Whilst this observation of the nexus between trust, value and exchange seeded within the cryptographic protocols of Bitcoin is seen through an anthropological lens, its insight resonates across the literature. In particular this is the case for authors considering the structural, political and technical dimensions of Bitcoin, where there is an emphasis upon the generation of trust, privacy and security. Similarly, this resonance can be found in the associated literature discussing the generation of trust within online contexts and through socio-technical innovations ([Ba 2001](#); [Blanchard et al 2011](#); [Brown & Morgan 2006](#); [Cheshire 2011](#); [Ganley & Lampe 2009](#); [Grabner-Kräuter & Kaluscha 2003](#); [Jøsang et al 2007](#); [Marti & Garcia-Molina 2006](#); [Resnick & Zeckhauser 2002](#)) and within recent research and social commentary considering the relationship between privacy and security within the online contexts of Bitcoin and the wider cryptographic movement ([Bauman et al 2014](#); [Biryukov et al 2013](#); [Elias](#)



[2011](#); [Lee 2011](#); [McCoy et al 2008](#); [Reid & Harrigan 2013](#); [Ron & Shamir 2013](#)). This suggests that an ethnographic perspective has a substantial contribution to make to this field of study ([Horst & Miller 2012](#)).

A third area of inquiry will be developed by examining commercial challenges where technology, regulation and services intersect in the context of the Internet. In speaking to this research direction, we seek to understand what Bitcoin users believe about the currency, with a particular focus on the permutations of trust and risk that they associate with its use. From this, we seek to understand the implications these perceptions upon their consumption practices and engagement with the banking system. From a banking and payments perspective we aim to develop insight into the risks that Bitcoin adopters and users experience or consider in relation to cybertheft, cyberfraud, and consumer protection. Specifically, we will seek to understand the belief of users in the functionality of Bitcoin for value storage, transaction reliability, currency stability, privacy, anonymity and legal validity. We will also seek to understand where users actively discount current payments system obligations, such as anti-tax evasion, anti-money laundering, or sanctions compliance. Consequently, we argue that the questions emerging from the nexus of trust, risk and value that Bitcoin raises for ethnographic research, particularly through its translation to social and financial exchange practices, are likely to reveal a very human story that transcends code and critiques the strengths and limitations of our current financial transactional and regulatory environment.

## Conclusions

As we have argued in this article, cryptocurrencies, such as Bitcoin, are a recent socio-technical innovation that has both disruptive and bridging potentials across the voids of risk, trust and real-time exchange between people existing within the fiat economy. Research to date has focused upon Bitcoin as a system of which the political discourse and technological affordances help people imagine an alternative future. Missing from this dialogue is an ethnographic engagement with the human experience and motivations behind the use of Bitcoin in mundane social exchange practices.

Through engaging the community that forms around and innovates upon the Bitcoin exchange platform, we argue that there are three research domains that can be developed. Firstly we argue that the alternative payments system cryptocurrencies introduce incorporates many aspects of social engineering designed to facilitate practices of social resistance within a community of users who share overlapping

values of personal sovereignty and information freedom. This unique community experiment in generating a peer-to-peer payments system that harnesses innovations in digital networked technologies points to an evolving and under-studied digital social frontier. We suggest that the alternative digital economy created through Bitcoin technology and the associated user community is both emergent and mobile. These characteristics speak most strongly to the use of ethnographic techniques, particularly those that encompass both the physical and digital spaces of community. The methodological frameworks developed within these works will provide background context for the politics and socio-technical practices of the communities associated with the use and generation of cryptocurrencies. Given the nature of the community adopting Bitcoin to be dispersed across international contexts and the capacity for Bitcoin to facilitate borderless exchange, the second research direction proposed is to explore social adoption in environments where Bitcoin payments involving foreign exchange transfer are faster, pseudo-anonymous and cheaper than current arrangements. The third domain of research proposed through an ethnographic lens is to consider what Bitcoin users believe about the currency, from a banking and payments perspective. We have argued that this direction is likely to encompass considerations of the risks that Bitcoin adopters and users experience or consider in relation to cybertheft, cyberfraud, and consumer protection.

The three areas of inquiry into Bitcoin use proposed in this paper offer different yet interrelated perspectives into how cryptocurrencies critique and hack the existing payments system. In doing so, we anticipate that conducting an ethnographic study of the cryptocurrency movement more generally will point to socially generated solutions for current financial inequalities both within the local and global contexts.

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