

Mobile Devices of Resistance: Victorian Inventors, Women Cyclists, and Convertible Cycle Wear

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While middle- and upper-class Victorians were quick to embrace the bicycle, cycling proved materially and ideologically challenging for women. Conventional women's fashions were vastly inappropriate for cycling: materials caught in wheels and tangled in pedals. Yet, looking too much like a cyclist in some contexts challenged established gender norms about how and in what ways women should move in and through public, to the point where cycling women suffered verbal and sometimes even physical abuse. This essay explores how some Victorians responded to challenges to women's freedom of movement by patenting

“convertible” cycle wear. These material interventions enabled women to resist social and physical limitations on their mobile bodies and identities. Drawing on feminist science and technology studies, archival research, and patents, this essay critically explores these unique garments as heterogeneous human and non-human devices and discusses how they operated as creative socio-technical mobile devices of resistance.

The craze for bicycling has made a complete revolution in the needs of dress, and there are almost as many inventions for this special amusement as days in the year. Every week at least a patent is either taken out or applied for touching on bicycle clothes. Happily there is a variety of opinion as to the requirements of this particular amusement.

The Queen: The Lady's Newspaper, 1895

This essay explores the socio-technical conditions for intervention from a historical perspective. My research is located in Victorian Britain from 1890 to 1899, which was a decade of radical social, technical, and cultural change. The Victorians are renowned for engineering and patenting, a combination of which boomed in the mid-1890s in response to the cycling craze that swept the nation. The nineteenth century brought with it mass industrialization, a plethora of new inventions, and opportunities to travel and see new worlds, which catalyzed radical ideas about what it meant to be a modern citizen. Amongst other things,

out of this century came the bicycle, sewing machine, and new mass media. This essay is part of a larger project about how the Victorians responded to social, political, and technical restrictions on mobile women's bodies in public spaces. Here I discuss patented cycle wear as a creative socio-technical mobile device of resistance.

It may seem strange to readers to focus on a case study set a century before the advent of digital cultures recognizable in contemporary life. The feminist archival turn in the social sciences has opened up different ways to engage with the past in order to understand the present. Cultural studies scholar Kate Eichhorn explains how this move "has made it commonplace to understand the archive as something that is by no means bound by its traditional definition as a repository for documents" (2013, 2). Archives are a place to start, not finish, and irrespective of the time between viewer and viewed, these repositories speak to the present as much as the past. I aim to argue that there is much to learn from historic accounts of interventions, not only because past socio-technical conditions are in many ways not so different to our own, but also because they operate as useful reminders of the value of identifying and studying small, seemingly marginal, examples.

I approach the study of interventions via science and technology studies (STS). In particular I draw on actor-network theory, more commonly known as ANT, which provides a useful lens for thinking about interventions in the context of socio-technical networks. ANT emerged from early science studies in recognition of the role played by non-humans as well as humans in complex socio-technical heterogeneous networks (Law and Hassard 1999; Latour 2005). Many, including its inventors, have critiqued network theory over the years, with feminist STS scholars in particular questioning the stabilization of networks (Star 1991, 1995, 1999; Wajcman 2014). Susan Leigh Star (1991), for instance, focuses specifically on interruptions in seemingly fixed and smooth systems and processes. Her famous essay on "being

126 allergic to onions” explores experiences that do not fit collective understandings of the world. She writes about how asking for “no onions” radically interrupted McDonald’s standardized processes, resulting in a 45-minute delay to her “fast food.” Simple issues like this cast heterogeneous systems in fresh light. The non-onion eating “deviant” body intervenes in the system. In doing so, it renders visible larger socio-technical systems in place, often hidden behind the scenes, that produce the standardized burger and with it the idea of a universalized consumer. These kinds of norms, Star argues, collectively “insist on annihilating our personal experience” (1991, 48). Her work reminds us that experiences, bodies, and relations to technology are much richer, more complex, and messier than this. Interventions help us see and know things differently.

Gaining these kinds of unique insights into socio-technical systems and practices, however, is not easy. Sometimes, as indicated with Star’s example, it requires something to break or rupture in order to glimpse “the forgotten, the background, the frozen in place” (Star 1991, 379). They can also seem uninteresting at first. Star (1995; 1999) has done much to advocate the study of seemingly “boring” things, by pointing out that it is rarely the thing itself that is boring, but how we tend to approach it. In fact, STS scholars have argued that the more mundane and trivialized something is, the more important its role probably is in daily life. Star provides an illustrative example of how to approach the study of infrastructures, which is an often overlooked and undervalued subject of study:

The ecology of the distributed high-tech workplace, home, or school is profoundly impacted by the relatively unstudied infrastructure that permeates all its functions. Study a city and neglect its sewers and power supplies (as many have) and you miss essential aspects of distributional justice and planning power Study an information system and neglect its standards, wires and settings and you miss equally essential aspects of aesthetics, justice, and change. Perhaps

if we stopped thinking of computers as information highways and began to think of them more modestly as symbolic sewers, this realm would open up a bit. (1999, 379) 127

This kind of scholarship provides ways for researchers to enter the “black box” of socio-technical systems and practices. Black boxes are ideas, systems or things that appear firm and fixed after they have been in place for a while. They become familiar and invisible; we tend to forget how they came about, what choices were made, and which materials and processes were accepted or rejected. Finding new ways into the black box is to ask critical questions about their cultural, gendered, historical and material composition. As Star writes: “When standards change, it is easier to see the invisible work and the invisible memberships that have anchored them in place” (1991, 44). The crucial point here is that it is not only the technology that becomes black boxed, but also the larger heterogeneous networks of humans and non-humans that produce and reproduce it on a daily basis. In questioning these seemingly stable and fixed socio-technical systems and artefacts we get to ask why we “get the technologies we deserve” and how and in what ways they “mirror our societies” (Bijker and Law 1992, 3).

Clothing is a particularly interesting subject for the study of intervention. Changes in clothing portend changes in society. Identifying, focusing and understanding these changes can reveal much about socio-political shifts. Yet it is often overlooked and undervalued in critical study. Barbara Burman (1999), a textile historian, has written extensively about the “culture of sewing” and gender politics of clothing in nineteenth and twentieth century British history. Despite the richness of this topic for understanding social shifts and gender relations she explains how many scholars “have regarded clothing as peripheral to historical enquiry, as too ephemeral or too everyday to warrant attention” (1999, 3). From an STS perspective, this makes clothing a primary area for understanding socio-technical relations.

- 128 My empirical focus in this chapter is on inventive forms of cycle wear, which emerged as a result of intersections of new technologies (bicycle, sewing machine, and mass media), social conditions (restrictions on women's freedom of movement), and political contexts (patenting reform, dress reform movement, and women's rights movement). How did women respond to the challenging social circumstances and physical issues presented by cycling? What did they invent? How can these inventions be seen as creative socio-technical mobile devices of resistance?

Interventions in Gender Relations and Public Space

The bicycle took Victorian society by storm in the 1890s. Although it had been around in various forms throughout the nineteenth century, it was the Safety Bicycle, with its two matching wheels, rear-drive pedaling system, lower price and easier handling that broadened its appeal and reach. While middle- and upper-class Victorians embraced this new form of mobility with enthusiasm, some found it easier than others. Cycling proved to be physically, materially, and ideologically challenging to women (Jungnickel 2015). Established Victorian social norms and behaviors for how middle- and upper-class women should move and act in public shaped how, and in many cases even if at all, they should ride a bicycle. Higher-class women were not expected to move much. At the time "leisured, or idle, wives and daughters had become expensive status symbols for successful middle-class men" (Holcombe 1973, 1). Conventional fashion, with floor-length skirts, up to seven pounds of layered petticoats, restrictive corsets, and tailored blouses and jackets, made it physically difficult if not impossible to undertake mundane domestic activities or leisure pursuits. The extent of a woman's immobility reflected the capacity she had for those around her, such as a household of servants, to be mobile. Writing about the social role of fashion, sociologist Diane Crane argues: "The ideal role of the upper-class

woman, who was not expected to work either inside or outside the home, was reflected in the ornamental and impractical nature of fashionable clothing styles” (2000, 16).

The popularity of cycling in the late nineteenth century exacerbated problems with women’s conventional fashion for those wishing to engage in more active lifestyles. As contemporary cyclists know, the many moving mechanisms of the bicycle do not fit well with layers of loose flapping materials. Despite this, many persisted with this unruly combination and newspapers reported on the sometimes terrible consequences.

Sir—I see in your columns a doubt expressed as to cycle accidents due to dress. We have had a terrible one in these parts, which can clearly be traced to the skirt. I allude to the death of Miss Carr, near Colwith Force. The evidence of her friend who rode just behind her, says that “Miss Carr began the descent with her feet in the rests, but finding the hill become much steeper, she strove to regain her pedals and failed.” I think she failed because she could not see the pedals, as the flapping skirt hid them from her view, and she had to fumble for them. Could she have taken but a momentary glance at their position, she would have had a good chance to save her life. The poor girl lingered a week. (The Buckman Papers 1897, *Daily Press*, September 20)

Although it had been around for a while, the dress reform movement had a resurgence in the late nineteenth century. Members campaigned on multiple platforms but broadly advocated more *rational* dress over *irrational* fashion. However, wearing more suitable cycle wear, such as rational dress in the form of bloomers or knickerbockers, short or no skirt, and looser or no corset did not result in a seamless social experience. These highly visual “New Women,” who moved independently, often without a chaperone, at speed, in new places and times such as the evening, unsettled some parts of society. Their masculinized dress and behaviors were seen to “ape the lifestyles and

130 perceived privileges of manhood” (Simpson 2010, 55) and many felt society’s wrath in different ways; some were denied entry to inns, catcalled in public spaces, and in some cases suffered physical violence. Writing in 1899, Irene Marshall’s experience illustrates how difficult it must have been for a woman to claim a cycling identity at this time.

But it took some courage five years ago to ride in rationals. The idea was almost entirely new and the British Public was dead against it. Hooting and screeching were then the usual accompaniments to every ride. Caps, stones, road refuse—anything was then flung at the hapless woman who dared to reveal the secret that she had two legs. And the insults were not confined to the lower classes. Well-dressed people, people who would be classed as ladies and gentlemen, frequently stopped and made rude remarks. In fact, cycling in rationals in 1894 was a very painful experience. (Marshall 1899, 40)

To cycle as a woman was an intervention in established middle- and upper-class behaviors in Victorian society. To wear radical new forms of cycle wear was yet another intervention in how a woman should move in and through public space. Neither were initially comfortable or safe positions to inhabit. While many women persisted, bravely putting their radically clothed mobile bodies in public spaces, some intervened in socio-political and technological contexts in more subtle ways through their clothing. By imagining, designing, and patenting new forms of cycle wear, such as convertible cycle wear, inventors set out to equip women with the devices to limit the possibility of harassment while, at the same time, resist these limitations and attempt to re-configure the parameters of conventional feminine modes of behavior and movement in public spaces.

Interventions in Cycle Wear

Patents and patenting are useful sources of data for social science research. American historian of technology Ruth Schwartz-Cowan defines a patent as “a temporary monopoly on the economic benefit that can be derived from an invention. As such a patent turns an idea into a form of property; the person who has a new idea, a patent asserts, can own it in the same way that he or she may own land or money” (1997, 120). Inventors tell us about themselves, their identified problem, solution, and who in many cases they were designing for. Patents also provide a particularly good record of women’s inventions, at a time when women are largely absent from other primary records.

A boom in patenting in the mid-1890s has been attributed to cycling’s popularity. The late nineteenth century was a period of significant legal reform in Victorian Britain. The early 1880s Patent Reform Act greatly reduced fees and streamlined what had previously been a more complicated and time-consuming process. This opened patenting up to a wider range of new and smaller inventors. The Married Women’s Property Act also came into force around this time, and allowed married women to have more control over their own property. A decade later, the cycling craze that swept the country provided further motivation for individuals to seek to claim their ideas and forge new paths into social, cultural and economic domains. Amongst patents for velocipedes and their many accoutrements were some from a group of Victorian inventors attempting to respond to the “dress problem”—how to enable women to safely and comfortably cycle while not looking too much like a cyclist. To do this, inventors intervened in what clothing could do. Many attempted to design this dual role *into* skirts:

My invention relates to the improvements in ladies’ skirts which will render them equally adapted for cyclists, tourists and ordinary wear; and has for its object to provide a skirt that will have all the comfort and convenience of a divided

skirt with a smooth seat for the saddle, and yet in walking, will be *indistinguishable from an ordinary skirt*. (Sellick 1897, emphasis mine)

This invention relates to improvements in cycling skirts and has for its object to construct these in such a manner as to allow the rider the full use of her limbs without any of the leg exposed and at the same time to *have the appearance of an ordinary walking skirt* when the rider is not on her machine. (Sibald 1897, emphasis mine)

This invention relates to improvements in connection with ladies' skirts and has for its object to provide an arrangement which can be *easily altered from an ordinary skirt* into a divided skirt and *vice versa*. (White 1897, emphasis mine)

The broad aim was to give women choice to perform multiple identities. While there were many strategies at work, I focus on a unique subset of patented cycle wear—convertible costumes. These garments enabled the wearer to convert their clothing when required, from middle- and upper-class urban walker or shopper to cyclist and back again. An illustrative example of these patented designs is by Alice-Louisa Bygrave, a dressmaker from Brixton in London. Her patent for “Improvements in Ladies’ Cycling Skirts” was accepted on December 6, 1895. It features a skirt with a built-in pulley system at the front and back. Weights stitched into the hem ensured a quick change when needed. Bygrave explains her unique design:

My invention relates to improvements in ladies’ cycling skirts and the object is to provide a skirt as proper for wear when either on or off the machine ... I fasten a tape or cord to the bottom edge of the skirt in front and carry this cord up through suitable guides to the top of the skirt where it is made fast in any convenient way ... As the wearer prepares to mount her machine, she pulls both cords in from the top, thereby raising the skirt before and behind to a sufficient height. (Bygrave 1895) [Fig. 1]

What is particularly relevant to discussions about socio-technical interventions is the location of these convertible devices in the garment. They were hidden *inside* skirts: in the seams, behind the waistbands, stitched into the hems, and hidden in gathered fabric. Concealment was central to the design. The nature of the garment would reveal itself only if and when the wearer desired it. What this also means is that the convertibility of these costumes was difficult to discern from the outside, on the surface. As evident in the larger research project in which examples of these costumes were made and worn, many of these designs only make sense on and with the body (Jungnickel 2017). This is one reason why no surviving artifacts from this period have been found (as yet) in British museums or galleries. These women did their jobs so well in deliberately concealing the nature of these garments that it makes it hard, if not impossible, to see and know the value of these designs if you are not specifically looking for them.



[Fig. 1] Illustrations of Alice-Louisa Bygrave's patented cycling skirt (Source: Bygrave 1895).

134 Inventors like Alice-Louisa Bygrave recognized the desire of some women to claim multiple identities. They sought to intervene in the mobile landscape by providing wearers with choice and control. Wearers could safely and comfortably cycle if they wished. They could also choose to avoid unwelcome social abuse by not looking like a cyclist. These garments equipped women to resist dominant normative codes of behavior, at different times, and for specific purposes. Convertible cycle wear made possible *other* ways women could inhabit public space and negotiate relationships with new technologies and society.

Learnings from Historic Interventions

Why are historic accounts of interventions useful to contemporary researchers? Even though located over a century ago, these examples remind us that the past is not so far removed from the present. As Eichhorn argues, the archive should be viewed “not as a place to recover the past but rather a way to engage with some of the legacies, epistemes, and trauma pressing down on the present” (2013, 5). The history of radical new forms of mobility clothing shows us that interventions do not have to be loud, heroic, or even easy to see to produce valuable social insights. The case of convertible cycle wear is an extreme version of this. Designs were deliberately hidden, inside the seams and hems of skirts—often indiscernible to non-wearers. Yet, they intervened in the gendered normative mobile subject, making possible different means for women to negotiate mobile identities in public space at a time when this was physically and ideologically problematic. The importance of attending to marginalized or fringe behavior is also present in this essay. STS and clothing scholars argue that understanding social change comes not from a study of standardized normative behavior but rather from attending in detail to the marginalized, deviants, and rule-breakers. As Crane writes: “Had a nineteenth-century social scientist set out to predict how women would dress at the beginning of the twenty-first century, it would only have

been by considering the clothing of the most marginal women in Europe and America that an accurate assessment would have been obtained" (2000, 99). Designing and wearing convertible cycle wear was not a dominant form of inventive activity, yet it is revealing for how individuals were using patents to collectively explore and materialize forms of resistance.

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