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M.R. McGuire

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The laughing policebot: automation and the end of policing

M.R. McGuire 

Department of Sociology, University of Surrey, Surrey, UK

ABSTRACT

Though there has always been a close relationship between professional policing and technology, the sheer scale of operational dependence upon new technologies has begun to raise a number of concerns. In this paper I trace 3 kinds of contrasting dynamics in the perception of the policing/technology relationship. A first view has tended to see this relationship in largely unproblematic, positive terms, one which generally results in 'more efficient', cost-effective forms of policing. Against this, a more sceptical position can also be traced. On this view, whilst enhanced access to technology often benefits police performance, it has often also come with enhanced opportunities for misuse which threaten dystopian scenarios of coercion, denial of rights and – at worst – the spectre of technologised police states. I argue that a third view is now plausible, one that has been far less discussed, even though it may present the greatest challenge to the viability of policing as we have known it. For the emergent technologies now reshaping policing often involve automated tools like predictive algorithms or facial recognition systems. This raises the question of what limits to the automation of policing there may be and whether automation will ultimately entail the 'end' of professional police forces as once envisioned by Peel.

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I know a fat old policeman
He's always on our street.
A fat and jolly red-faced man
He really is a treat.

He said 'I must arrest you!'
He didn't know what for.
And then he started laughing
Till he cracked his fat old jaw

Oh ho ho ho ho ho ho. Ha ha ha ha ha ha.
Ho ho ho ho ho ho ho. Ha ha ha ha ha ha.

Introduction

When the performer Roland Penrose penned his famous music-hall paean to the police in the 1920s, policing was on the threshold of a supposed 'golden era' which was to culminate in the 1950s (Fielding 1991). In the UK, the figure of the 'bobby' was becoming an increasingly well established and even respected figure within the local community. In the USA, where problems of corruption and

CONTACT M.R. McGuire  m.mcguire@surrey.ac.uk

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politicisation had plagued nineteenth century policing, reform movements were underway and enlightened police chiefs like August Vollmer and O.W Wilson were soon to pioneer new approaches for enhancing officer professionalism (Uchida 2015). At the time then, the indiscriminate arrests referred to in Penrose's song and the laughter which accompanies them suggested little more than comic incompetence. To contemporary ears, however, the song carries a more ambiguous resonance. Beyond the obvious connotations of police bias or malpractice, its laughter evokes something quite disturbing. In fairgrounds and end-of-pier arcades a mannequin dressed in a police uniform would perform the song when fed an appropriate coin. The mannequin's awkward movements were the source of many a childhood nightmare,¹ but I want to suggest that something far more threatening can be read into its mechanical gyrations. They presage a decisive shift in our relationship with policing, one which marks a change from police forces which *use* technology, towards forces which are used *by* technology. In just the same way as the laughing policeman is only a device which acts like a policeman, I want to suggest we may be reaching a point where policing is no longer conducted by police as they have been traditionally understood, but by devices which merely act like police forces.

Technology, justice & policing – contrasting perceptions

Whether at the commission stage, the apprehension stage, the sentencing stage or the punitive stage the sheer volume of criminal justice tasks now partly or wholly dependent upon technology is striking. The concerns that some commentators have begun to express about the implications of this dependence (McGuire 2012) are especially pertinent in the context of the gatekeeping role police forces have in interpreting and dispensing the law – for it is at this front line where the key ideals of justice are arguably most fragile (Reith 1956). An extensional view of technology, which defines it in terms of augmentations to bodily capacity (McLuhan 1964, Brey 2000, McGuire 2012) allows us to see why the process of justice has always been highly technology dependent.² Viewed in terms of bodily extensions, the dependence of premodern justice upon tools like swords, branding irons or gibbets was no less 'technological' than the dependence of contemporary justice systems upon tasers, CCTV or databases.

There are however two factors which suggest that the balance between technology and justice may have irrevocably changed. One is the sheer *volume* of technologies upon which determinations of justice now depend. It is hard to imagine any trial where some form of technology-based evidence does not play a decisive role in arbitrating culpability – whether this involves fingerprint traces, a browser record or a DNA sample. A second factor relates to our perceptions of technology and the way these are shaped by what Marcuse once called the *technological a priori* (Marcuse 1964). Just as Kant argued that it was impossible for us to think outside of a world determined by our a priori faculties of time and space, the late modern order, shaped as it is by the technological a priori, exhibits an increasing inability to think outside of technological norms. Our disproportionate faith in the power of technology to enhance the criminal justice process is a perfect example of this. In particular, the belief that more/better technology will make policing 'more efficient' or that more/better technology make the justice process 'more reliable' in establishing criminal culpability (Foster 2005, Bowen and Gibbs 2018b)

But the history of technology has also come with a less optimistic set of perceptions about its impacts upon social life and its institutions. The birth of the modern, industrial era was characterised as much by resistance and doubt to what it signified as faith in the progress it offered. In this way, the romantics despair over the violations to nature brought by 'satanic mills' and mechanised production (Carlyle 1858, Ruskin 1991); the Luddite attacks upon machinery (Randall 1995) or the fear of automation manifested within the Frankenstein parable (Szollosy 2017) mark out a very different set of co-ordinate points in the way technological change has been perceived.

Attitudes towards the birth of modern policing and its unfolding relationship with technology have been no less affected by these contrasting perceptions. On the one hand, the creation of the modern police seemed to offer a new kind of institutionalised technology of control, a far more

efficient solution to urban disorder than earlier, private solutions like the thief catcher. But it was equally clear to the founders of modern policing that this new technology of control required effective safeguards to prevent over-reach, perhaps most notably in the limitations placed upon access to firearms technologies. Such safeguards were not just about building public trust (by avoiding the appearance of armed militias on the street). They were also an acknowledgement of the risk that a police force which appeared too technologised might also become machinic – detached from the community and social roots upon which its authority should ultimately depend.

Similar tensions in perceptions of the police relationship with technology have continued to characterise the public imaginary ever since. The perception of an ‘arms race’ between criminals and law enforcement (Ekblom 1997) has usually meant that the acquisition of new technology by the police has been thought to be both desirable and essential. But the latter half of the twentieth century also began to witness increasing concerns that technology might have negative impacts upon policing. As new kinds of images of policing began to emerge – from the technologised surveillance state of Orwell’s 1984, through to the relentless mechanised police operative in the film *Robocop* – Virilio’s suggestion that ‘totalitarianism is latent in technology’ (1996, p. 3) became increasingly plausible. And for many, the sense that the greater access to advanced technology the police acquire, the more likely accountability and legitimacy in the policing function will break down has become a conclusion which is hard to shift (see for example Ferguson 2017, Parry *et al.* 2017, Willis 2019).

These shifting attitudes suggest a kind of typology within our perceptions of the police-technology relationship.

- i *The received view*: Technology has and will continue to largely enhance police capacity, making performance more effective at lower cost. On this view, an equation between more technology and more efficient policing is largely self-evident and continued investment in new police technologies should generally be welcomed.
- ii *The sceptical view*: Whilst it might be accepted that greater access to technology often improves police performance, this is not a given, or something that should be accepted uncritically. It is equally important to be clear that enhanced police access to technology offers enhanced opportunities for misuse (whether unintended or not). At worst, this can lead to dystopian scenarios of coercion, denial of rights and (ultimately) a technologised police state. We should therefore be more on our guard where new technologies are introduced and set out clearer standards for technology use.
- iii *The end of policing view*: This third position represents a view which has barely been explored in the literature. Yet it implies an outcome which may be the most concerning of all. For it suggests that, as policing comes to depend ever more heavily upon technology, it is not just police legitimacy which becomes increasingly questionable, but the very existence of the police as an institution.

In what follows it is third view to which I want to pay special attention. Though there have been studies which attempt to measure the *effectiveness* of certain varieties of police technology use (see for example Nogala 1995, Neyroud and Disley 2008, Byrne and Hummer 2016, Willis 2019) understanding of how this impacts upon perceptions of policing remains limited. It is worth noting that the police themselves are not unaware of the mixed blessings on offer here. In one detailed piece of recent research which examined the attitudes of police towards the introduction of technology (Koper *et al.* 2015) a clear generational divide appeared to emerge. As one officer put it, ‘There are three generations of officers when it comes to technology – officers who won’t use it, a mixed middle-of-the-road group, and young officers who rely too much on technology’ (Koper *et al.* 2015, p. 199). I want to suggest that this scepticism on the part of older professionals is about more than the mere reluctance to face change. Rather it exhibits precisely the suspicion that too

much of a dependence upon technological solutions may point to the end of professionalised policing as we have known it.

Three kinds of implication I: enhancing policing performance

There is a very real sense in which the history of policing as an *institution* can be inextricably linked to a history of ways in which technology has served to enhance the policing *function*. Ostensibly, things were not initially promising. With a standard issue kit consisting of little more than a wooden truncheon, a rattle (to call for assistance) and a reinforced top hat³ (Taylor 2010, Emsley 2011), the newly constituted police force were hardly at the vanguard of technologised control. But such impressions are misleading. They overlook the plausible sense in which, by their very nature, professional policing organisations constituted a new technology of social control (XXXX 2012, Willis 2019). And though it is usually held that the UK police were founded as an unarmed body, back-up weapons technology was in fact available from the very start. This amounted to little more than 50 flintlock pistols at their inception, but these were gradually replaced by revolvers as part of an ongoing programme of firearms acquisitions. Similarly, though the first US police force (the New York Police Department, founded in 1845) were only issued with ‘billyclubs’ (Chadwick 2017) they were free to use any gun they could access, and standard-issue firearms were provided from the 1890s onwards.⁴

By the close of the century, the profound relationship between technology and policing had become more transparent, with a raft of technological augmentations now available to forces. The increasingly scientific approach to crime control was at the core of these with a new kind of technical specialist – the ‘detective’ – leading the way. Inspector Bucket, the detective who featured in Charles Dickens’ *Bleak House*, provided an early representation of the refinements to police efficiency these new specialists were thought to bring. Bucket’s analytic intelligence and nose for material clues pointed towards a more technical, scientific form of policing that has become a recurring motif in the way police forces are represented to the general public ever since. From Sergeant Cuff of Scotland Yard in Wilkie Collins’ *the Moonstone*, through to Poe’s Auguste Dupon and of course Sherlock Holmes, the detective prefigured the transformation of policing into a more algorithmic form of crime control, where ‘feats of ratiocination’ coupled with the right kinds of tools produced outputs where truth was revealed and guilt secured. The increasing range of new tools and techniques available to police forces over this period were essential ingredients to this input/output relationship. For example, toxicology and its new methods for detecting poisons suggested how technology could make invisible indicators of guilt manifest and were successfully applied from the 1840s onwards when the Marsh test for arsenic secured a conviction in the Lafarge poisoning case (Bertomeu-Sánchez 2006). The Bertillon system of criminal identification coupled with emerging photographic technologies provided the police with far more reliable ways of recording and tracking criminal identities. Together with the new Henry system for classifying fingerprints (Kurland 2009) and emerging forensic techniques such as the use of blood type analysis, policing was now increasingly dependent upon technology to realise its functions. By 1910 the formation of the world’s first ‘crime lab’ in Lyon, France by Locard defined a model of technology driven policing which was quickly adopted by other forces around the world (Stetoff 2011).

In addition to these new tools for establishing guilt, police were early adopters’ of a range of other new technologies which radically changed their *modus operandi*. For example, the telegraph network was employed almost from its inception as a tool for intercepting and apprehending criminals and helped secure its first successful convictions as early as the 1840s (Tarr 1992). The enhanced operational capacity it provided to communicate and coordinate was soon supplemented by the introduction of telephones in Chicago in the 1880s’, the advent of the police signal box police (Stewart 1994), and the advent of wireless two-way radio communications in the 1930s (Thomas 1974). Performance of other key functions, such as order maintenance was also augmented by various technological shifts, from relatively straightforward devices like the swing-cuff handcuff,

available from 1912 (Nichols 1997) to the arrival of motorised patrols in American cities from the late 1920s onwards (Walker and Katz 2012).

Policing in the early part of the twentieth century therefore became a far more technologically driven activity than it had been in the previous century. Perceptions of this shift, both on the part of government and the public seems to have been wholly largely positive – as something which contributed to an increasing ‘professionalization of the police (Douthit 1975, Uchida 2015). There is little evidence of doubt, or any sense that increased technologisation might pose problems or serve to undermine policing. Almost invariably, technology was associated with a more effective and more efficient police force – a perception which probably still constitutes the majority view – not just amongst policing scholars (cf. -Anderson 2013, Strom 2016) but within government and the police themselves. Indeed (in a further echo of the arms race argument) increased technologisation is regarded as *essential* if the criminal misuse of new technology is to be successfully resisted. Thus, the National Police Chiefs Council argue for, the huge potential (of technologisation) in improving ‘how we protect the public’ (NPCC 2016), whilst the US National Institute of Justice highlight how, technology has a ‘positive impact on U.S. law enforcement agencies in terms of increasing efficiency, providing communication, enhancing information-sharing practices, and improving informational and analytical capacities’ (Strom 2016, 2.3). Similarly, the UK parliament insist that, ‘Forces are facing rapidly-evolving threats from criminals who exploit new technology in advanced and innovative ways, yet their own technological solutions are not always up to the task’ (UK Parliament 2018).

Three kinds of implication II: overreach and misuse

More sceptical attitudes towards the impact of technology upon policing began to emerge in the post WWII period (Hummer 2007, Harris 2007, Lum *et al.* 2017, Marx and Guzik 2017⁵). An erosion in the relationship between police and the community from the mid-1950s partly stemmed from a gradual rise in crime rates and the demographic shifts resulting from immigration (Newburn 2003). But technology was also instrumental to this shift in perceptions. A combination of motor-vehicle, telephone and radio technologies helped move policing away from its traditional, more localised neighbourhood focus towards more reactive approaches (Esbensen 1987, Reiss 1992). And though this offered the promise of an improved, more targeted service to the public (Myhill 2006) it also produced a kind of ‘technological distancing’ which has arguably been growing ever since.⁶ Not only did police forces become less visible, as technology enhanced intelligence they also became less dependent upon the kinds of information from the community upon which policing had previously relied. For many in the post-war period, a sense grew that the police were more concerned with technological imperatives than with community needs. Equally problematic has been the attitude of central government towards technology as a policing tool. The concept of ‘high policing’ (Brodeur 1983) identified a shift in the nature of policing, one more focussed upon the preservation of existing power structures than public needs. And crucial to the increasing blurring of executive power with the legislative and judicial branches was the assumption that ‘if we have the technology, why not use it?’ (Marx 2014). Thus, whilst other characterisations of late modern policing such as ‘strategic’, ‘pro-active’, or ‘intelligence-led policing’ (Maguire 2000) have certainly been sensitive to the significance of technology in shaping their models, the implication of technological overreach seen within the high policing approach has been less considered than it might have been.

In fact, more general analyses of the negative impacts of technology upon policing have been lacking. One useful corrective to this lacuna might be to scrutinise the origins of this connection more closely. For even a brief inspection of some of the historical trends within the police-technology relationship suggest a recurring correlation between enhanced access to a technology and a subsequent overenthusiastic, occasionally illicit misuse of it. Take for example, the way police used early mass communication technologies like the telegraph and the telephone. Much of this was positive but the extent to which it began to determine operations also led to disquiet. As the Mayor of Philadelphia rather presciently observed at the time, ‘now the police have but one

soul, and that soul is the telegraph (cited in Tarr 1992, pp. 10–11). Suspicions of potential misuse were not lost on the public and significantly damaged police-community relations. For example, telegraph wires were deliberately targeted during the New York draft riots of the 1860s and poles were pulled down and attacked by mobs (Tarr 1992). In the UK, the Electric Telegraph Company Act of 1846 made it an offence to “wilfully remove, destroy or damage any electric telegraph” following a number of attempts to cut wires or damage poles (Mather 1953). Yet police were more than ready to use the telegraph system for extensive surveillance – often in direct violation of the law. For example, New York police were the very first perpetrators to be charged under the State law of 1892 which specifically prohibited telegraph eavesdropping (Petersen 2007). And almost as soon as telephones became available to the general public, police had begun to co-opt this new technology into their illicit surveillance activities. Ongoing public concerns about their disregard for the law led to a further investigation by the New York State legislature in 1916, in the course of which it was found that police had the capacity to tap any line of the New York Telephone company. Police appeared to be using this capacity without constraint and were found to be listening in to politicians, doctors and confidential discussions between lawyers and their clients (Diffie and Landau (2007)).

Concerns about overreach became increasingly hard to ignore as police dependence upon technology continued to expand. Thus, whilst factors such as corruption scandals, or overly heavy-handed policing of demonstrations undoubtedly played their part in changing public attitudes towards the police from the mid-twentieth century far more attention needs to be paid to the changing relationship between police and technology. For if there ever was a ‘golden era’ of policing in the immediate post-war period (see Emsley 1996 for an overview of this debate), then suspicions of technological misuse played as much of a role in shattering this consensus as these other more familiar factors (Reiner 1992, Wright 2002). Two themes central to this shift can be seen in initiatives for new technology requirements for the police set out by the US Crime Commission and related agencies from the late 1960s onwards. The first was computerisation. The Law Enforcement Assistance Administration (LEAA), formed in the wake of the Crime Commission initiated a spending programme which filtered over \$7.5 billion in funding to computerisation and related technologies (NIJ 1998). Amongst the key outputs of this were new digital resources like the NCIC (National Crime Information Center) and AFIS (Automated Fingerprint Identification System) which reshaped the processing of crime data as well as creating important preconditions for the trends towards automation I will discuss in the next section. In the UK, fears that the US policing was ahead in computerising operations created pressures for the development of the police national computer (PNC) which was eventually in use from 1974 (Williams 2014). However, this first move towards computerisation was largely invisible to the public at the time. What was more evident and thus far more instrumental in shifting immediate public opinion were the second class of technologies earmarked for development by the National Institute of Justice from the mid-1970s onwards. These technologies marked a decisive shift away from public co-operation towards more sophisticated (and coercive) forms of public *management*. For example, on the NIJ’s wishlist were far more comprehensive ways of augmenting communications and co-ordination with devices such as, ‘portable, mobile, and base station transmitters; mobile receivers ... voice scramblers, car location systems ... radio transmitters, receivers and repeaters’ (NIJ 1998, p. 6). Improved performance standards were also being urgently sought for, ‘portable x-ray devices for bomb disarmament, ... active and passive night vision devices, ... handcuffs, riot helmets, crash helmets, police body armor, ballistic shields, and hearing protectors’ (NIJ 1998) Developments like these went hand in hand with the acquisition of overtly militaristic technologies like CS gas (Feigenbaum 2017), water cannons, rubber bullets, Kevlar armour and tasers and pepper spray between the 1960–1980s.

The wholesale investment in these kinds of technology did not just change the way the police *appeared* to the public. Equally significantly, they entailed the kinds of operational changes (such as the advent of ‘Special Weapons and Tactics (SWAT) teams (Beck 1972)), which furthered a

growing gap between them and the communities they were meant to serve. In the UK, it was not until after the Brixton riots in the 1980s that police forces began to adopt these new, rather alienating and militaristic riot technologies (Brain 2010). But in terms of wider control technology, in particular surveillance-oriented devices, they were pioneers – for example in the early adoption of CCTV. By 1969 there were already 14 UK forces using CCTV (Williams 2003) and the scene was set for the wholesale adoption which followed – and the further retreat of the police behind an increasingly pervasive technological veil.

On the one hand then, the deployment of new kinds of order maintenance technologies from the late 1960s not only changed how police behaved but also, perhaps more importantly, how they appeared to the public. To many commentators the adoption of such technologies has amounted to nothing less than a creeping militarisation of the police (Waddington and Winter 1987, Kraska and Kappeler, 1997) and an accompanying retreat away from visibility and legitimacy. On the other hand, the gradual adoption of digital technologies, though less immediately discernible in terms of impact has engendered longer term, potentially more sweeping changes – not least the absorption of many policing specializations into digital tools. Taken together, both trends have set the scene for the challenge to traditional policing to be discussed in the final section – a creeping dehumanisation in both its appearance and function.

Three kinds of implication (III): technology and the end of policing

As indicated, the idea that technology *enhances* police performance by increasing efficiency or *worsens* it by facilitating authoritarianism, are themes that have been well explored in the literature. Far less discussed has been the suggestion that the process of technologisation may now have reached a kind of tipping point, one where its advantages or disadvantages to policing are no longer the main issue. Rather, we need to ask whether this process risks so *undermining* traditional policing that it threatens the ‘end’ of police forces as public institutions altogether?

It is important to distinguish how this kind of ‘end of policing’ argument differs from other varieties which have recently emerged. One version centres on the threat to public policing from privatisation (White 2018). The multiplicity of police forces in the US means that private policing is already well established there and even though the balance continues to shift (Pastor 2015), the trend remains largely uncontroversial. In the UK privatisation has also increased with a growth in commercial policing agencies like TM Eye which are able to conduct patrol surveillance and even arrest activities (Camber 2018). In turn, other key policing roles like incident response and investigation, victim & witness support, intelligence management, forensic evidence co-ordination, public engagement or the provision of legal services are being increasingly outsourced to private providers like G4S – often at the instigation of the police themselves (Travis and Williams 2012). A second kind of ‘end of policing’ debate has arisen from the way police interventions across a range of social problems from drug use, homelessness, mental illness, gang violence or youth crime seem to have become increasingly inappropriate (Vitale 2017). Vitale’s conclusion – that it may better for such problems to be dealt with by more specialised agencies entails the removal of police from many contexts where they previously played a central role.

In both these scenarios, however, though the traditional role of the police is eroded, they do not wholly disappear. Police forces continue to exist, albeit with more sharing of duties with private agencies, a re-articulation of their relationship with communities, or better oversight over data. By contrast, the threat to police forces under discussion here entails a more wholesale disappearing, one where key functions become increasingly farmed out to technological substitutes. It is this kind of shift which I suggest may prove to be truly fatal – so hollowing out traditional policing roles that it leaves us with something that is only policing by name, not nature.

A well-recognised outcome of any process of technologisation has been the loss of skills and jobs which become ‘rationalised’ and ultimately replaced by technological devices and resources. Policing is no different in this regard, as many commentators have acknowledged:

perhaps the most salient issue related to the new technological innovations is whether –over time – we will replace people (police officers ...) with various forms of Thing technology (CCTV, cameras that detect speeders ... , etc.). For example, why do we need police officers patrolling the streets (and highways) when we have the technological resources (via cameras to detect speeders and red light violations, and CCTV to monitor public places) to remotely monitor activities and deploy a smaller number of police to address crime problems that are detected? The downsizing of police force manpower may be an inevitable consequence of this type of technological innovation. (Byrne and Marx 2011, p. 29–30)

Technologisation which leads to a downsizing of the workforce has clearly been an important factor in the disappearance of traditional policing and it is a trend that cannot be overlooked. In the UK alone there were around 21,000 fewer police officers in 2016–2017 than there were in 2010 (Home Office 2018). Increasing distance from the public has been one outcome. For example, there has been a shift away from manned desks in police stations (where the public can interact directly with police officers) towards online or telephone services. In London over 70% of crime reports now originate in this way. (MOPAC 2017). This trend flies in the face of recurring evidence that the public prefer higher police visibility and are far more likely to respond positively to the police where it happens. We know for example from the Crime Survey for England and Wales that where officers are seen on patrol at least once a week, over sixty-nine per cent of adults are likely to rate the police as excellent or good. By contrast, only 53% of adults who said they never saw the police on patrol thought that the police were doing an excellent or good job (ONS 2014).

But just as instrumental as economic factors in the downsizing of forces have been the a priori dictates of technological rationality. For the mindset that comes with this has been decisive in driving the gradual delegation of traditional policing responsibilities to inert devices. Many of these devices now perform crucial policing functions but have become such a familiar part of the landscape that we barely notice them anymore. For example, it is now taken for granted that traffic lights are the ‘obvious’ way of policing traffic, but they were not universally welcomed when first introduced (Rooney 2018). Especially when the first device of this kind (installed in Westminster in 1868) exploded after just one week, resulting in the death of the policeman who was operating it (Gardner 2017). Yet the advent of the traffic light was just the first step in the growth of ‘policing by device’, an all-pervasive system which now involves everything from APNR to internet filters or CCTV. Taken together, such devices have not only familiarised the public with the idea that they can be policed by technology, without any need for human interaction, but that this is a form of policing which is ‘more efficient’ overall. In the end, as Marcuse predicted, technological rationality always seems to prevail and we find ourselves gradually, almost imperceptibly, being drawn into ever more artificial ways of delivering policing.

The spread of this technological policing net is a phenomenon which has tended to be considered primarily in terms of its surveillance or privacy implications, but this tells only part of the story. For just as significant in the longer term may be the damaging effects of intensifying technologisation upon the police themselves. Or indeed the public. For the impacts of replacing police forces as visible societal guardians with more invisible forms of mechanism-driven policing may ultimately be as corrosive for the public good as any privacy violation. And though it will be argued that there will always be certain things police officers do which cannot be done in any other way, I want to suggest that the most recent wave of technologisation centring upon developments in automation & AI may undermine even these last areas of specialisation (see Joh 2018 for some questions about police automation).

It is already clear for example that many of the more cognitively driven aspects of what once made a ‘good copper’ – crime detection skills like finding clues, facial recall, hunting down suspects, making inferential leaps, acting on hunches and so on – are on the point of being emulated by algorithms or more advanced AI. This process is well underway in the context of more complex or technical crimes like banking frauds or cybercrime. For example, banks and other financial institutions increasingly depend upon algorithms to identify anomalies in financial transactions, and to assess whether these indicate instances of fraud or money laundering (MacKnight 2017). Similarly, algorithms

provide a key resource in digital forensic investigations such as retrieving content from mobile phones or identifying hackers on the basis of their techniques (Mitchell 2010, Bowcott and Devlin 2018a). To many commentators however, such developments still represent only 'improvements' to policing, leaving its fundamental human ingredient intact. Thus,

... most of what we currently think of as policing will continue to require human labour. This includes areas such as community engagement, victim liaison, the use of police powers to stop or arrest, and most of the order maintenance function. (Muir 2016, Kelling and Moore 1988)

Current research around automation in the workplace would appear to lend some *prima facie* support to these sentiments. Policing has often been rated as one of the professions which are more immune to such a shift, with only a 22% likelihood of traditional police officers being replaced by machines according to some measures (BBC 2015, Frey and Osbourne 2017). However, even assuming these measures can be trusted, a 22% possibility of automated policing is not an insubstantial possibility. And the model of law enforcement sometimes referred to as 'standard policing' (Kelling and Moore 1988) has in fact already undergone important structural changes from the 1990s which make it more suitable for automation. In particular, the shift towards more targeted approaches (Weisburd and Eck 2004) – as seen in hot spots policing or problem-oriented policing (PoP) – has created an increasing dependence upon technological support. These more anticipatory strategies, captured in acronyms like SARA (scanning, analysis, response & assessment) require a raft of devices like mobile technologies, automated fingerprint identification systems or computerised mapping digital databases in order to be effective. For it is only with such devices that the instantaneous, easy-to-access information required to better target interventions can be obtained. For example, effective interventions require the capacity to rapidly retrieve information on crimes within a designated hot spot location or calls for assistance from the public at addresses situated there (Koper *et al.* 2015). Furthermore, many of the processes and systems involved in doing this are now partially or wholly automated.

Though it appears necessary for human officers to collect the original data needed to populate enforcement databases, such observational information can also now be acquired more effectively by semi-autonomous devices on many occasions. For example, scanning of crime scenes (actual or potential) has been made far easier with the use of intelligent unmanned aerial vehicles (UAVs) or 'drones' many of which can also conduct their own independent real-time analysis and evaluation. Even better, the size and mobility of UAVs also means that they can get into many spaces that would be inaccessible to human officers – for example through drainage pipes, external ledges and rooftops on high buildings and so on. Police forces themselves have seen the advantages of UAVs over human officers and have been investing heavily in the technology. At least 347 sheriffs departments, state and local police agencies and various emergency services in US have acquired UAVs in the past couple of years (Gettinger 2017), with similar acquisitions now underway in the UK. For example, Devon and Cornwall police recently announced the formation of a 24-hour drone unit with the potential for multiple applications which can replace traditional officers (Smith 2018). Elsewhere the Metropolitan Police and British Transport police are actively trialling UAVs armed with night sensors and with data analysis tools for autonomous decision making (Holloway 2018). In addition to providing more exhaustive capacities for recording and photographing crime locations than traditional scene of crimes officers, such devices offer other advantages. They can engage in the pursuit of suspects, respond to accidents, observe and intervene into traffic jams and acquire footage of fatal road traffic for the coroners and courts. They can even assist in missing persons searches – often far more effectively than traditional officers where there is a need to scan hard-to-access locations like cliffs, caves or long coastlines.

The structural shifts towards proactive, rather than reactive policing has blurred traditional law enforcement with crime prevention – and beyond even into tasks like accident and emergency

provision (see NAP 2018). Here too semi-automated or automated devices are rapidly changing the policing landscape. Just as motorised police patrols superseded the physical presence of officers 'on the beat' as a form of crime prevention, the requirement for a police presence behind the wheel of patrol vehicles is itself now under threat – this time from the technology of driverless vehicles (Zargorsky 2015). The near to mid future prospect of road traffic systems where robotic vehicles have become the norm is likely to mean that driverless police cars will, in turn, assume responsibility for patrol and traffic control duty. And maybe even more than that. Ford has recently filed a patent for a self-driving police car with AI capabilities (Nelson 2018) which can not only identify road traffic violations but can also pull law-breaking drivers over and issue them with warnings or tickets. UAVs already possess the capacity to conduct patrol functions – with the further advantage that they can operate without being observed or detected. UAVs can also perform other useful crime prevention functions such as photographing infringements as they happen or sending over feeds of unfolding situations back to central controllers (Alderton 2018).

Automated systems based upon prediction and risk are also likely to make increasing contributions to crime prevention. For example, the 'Harm Assessment Risk Tool (HART)', under trial by Northumbria police is a tool designed to prevent crime by anticipating potential reoffending (Oswald *et al.* 2018). HART can be 'trained' using data based on five years of an individuals offending pattern which serves to categorise them in terms of low, medium or high risk of offending upon release. Claims that HART has up to 98% accuracy in classifying offenders and 88% in classifications of high-risk offender likelihood are yet to be fully evaluated but this is just one of many similar risk prediction systems under development (See Fazel *et al.* 2012 for a systematic evidence review of these), all of which pose threats to officer driven crime prevention. Amongst these are the NDAS (National Data Analytics Solution) which is being considered as a predictive tool for preventing violent crime by a number of UK police forces (Baraniuk 2018) and algorithmic systems which aim to predict and prevent child abuse (Pegg and McIntyre 2018). There are some obvious ethical and procedural concerns around all systems of this kind (see Martin 2018 for some of these), but the issue here is more about the *possibility* of automated crime prevention, rather than questions about its acceptability. Especially given the recurring force of technological imperatives in overcoming such objections.

Yet no matter how irresistible the push towards automated, algorithm-driven forms of policing may seem at times, two kinds of objections centred upon the 'necessity' of human intervention remain. First, the claim that some kind of unquantifiable human ingenuity – 'police intuition' – will always be required to interpret patterns in crime data effectively. On this view, the ability and experience of officers to 'sense' that something is out of place, wrong or needing further investigation could never be replaced by automated agents. Second, the insistence that physical agency and/or force will always be necessary to conduct basic policing functions like detaining suspects, assisting in road traffic accidents and so on. Even here, however, plausible scenarios are emerging where the bulk of such tasks could be successfully conducted by robotic officers.

There is for example no research which definitively demonstrates that 'hunches or intuitions' form a necessary component of law enforcement or solving crimes. Where this suggestion has been made it has tended to relate to more low-key forms of offending like burglary (see Curtin *et al.* 2001). Nor do we have any real understanding of what such intuitions might consist in anyway, other than 'situated judgement' (Bittner 1982) or plain experience. Many accept that this kind of policing expertise largely resides in 'familiarity with a wide range of practical situations that (police) are likely to encounter in practice' (Thacher 2008, p. 53) and it is not at clear whether repeated exposures to practical policing scenarios are quite as impervious to AI systems – especially the more adaptive varieties – as it might first appear. Thus, advanced machine learning and intensive training may indeed be able to replicate experience in the field in such a way that, over time, it comes to resemble what we think of as police 'intuition'. It is also worth remembering that similar reservations were once expressed about automated chess playing systems. Whilst they possessed a mechanical ability to plan further ahead and see more board permutations than most humans, the idea that an AI based chess system

would ever be able to reproduce the kind of insight and intuition that a grand master was thought to possess was roundly rejected (Dreyfus 1965). Yet since the first defeat of a world champion – Gary Kasparov by IBMs Deep Blue system in 1997 (Hsu 2002), chess programmes now routinely outplay even the most elite grand masters. More recently the DeepMind AlphaZero AI system has demonstrated evidence of precisely the kinds of creative, intuitive patterns of reasoning argued to be unattainable by automated agents. Indeed, the intuitive pattern of play it exhibited went far beyond the capacity of any human player. For example, AlphaZero was able to train itself to a level where it could match most chess experts within 9 h and managed to reach expert level in the strategy games Shogi and Go. Analysis of AlphaZero by chess masters suggests that, wholly autonomously, it discovered radically new kinds of approaches, utilising moves and responses which overturned hundreds of years of expert thinking about chess strategy. Thus, the adoption of predictive analytic software by police forces around the world (at the last count by over 60 police departments in the USA and up to a dozen in the UK, Jouvenal 2016, Couchman, 2019) is likely to be only the beginning of a more complete shift towards AI. For however remote the prospect of automated agents being able to deal with the range of complex ‘crime scripts’ typically encountered by human officers may seem, adaptive learning systems like Alphazero will, in time, bridge even this gap. Responding to context, negotiating cultural sensitivities and emulating ‘irreplaceable’ features of policing such as officer intuition is therefore not so far away as it may first appear.⁷

A related objection here, that robot officers would lack the ‘moral standards’ which a truly professional police officer is expected to exhibit, can also be questioned. The capacity to balance sensitivity with an application of the law when policing an industrial dispute or the measured use of force when responding to emotionally charged scenarios like a domestic dispute or a hate crime (See Muir 1977, Thacher 2001, Muir 2016) seems no less impervious to adaptive learning than intuition. Nor does there appear to be any *necessary* connection between moral virtue and policing. Human officers haven’t always proved to be very reliable moral arbiters in arrests, or in using force in line with appropriate ethical standards (Weisburd *et al.* 2000). Perhaps more importantly in terms of the pragmatics of operational policing, there is little evidence that governments are overly concerned about ethical or moral issues arising from the use of force by automated agents. US border patrol has for example been actively considering weaponising its Predator drones to immobilise potential suspects or in using non-lethal force against ‘targets of interest’ (Gallagher 2013) Elsewhere, police forces in certain US states have already approved legislation that would permit the use of non-lethal force by robots/drones (Peterson 2015). And whilst these are robots which are largely under police control at present, a capacity for autonomous action and decision-making is, as we have seen, already there. In the end, if those in power decide that police robots are ‘more efficient’ or more cost-effective, they will surely find a way of overriding qualms about the ethical standards of officers or building socially acceptable simulations of such standards into AI devices.

Similar considerations apply to the second kind of objection noted above – the apparent requirement for physical intervention, as for example in arrest scenarios. A number of automated options which have already emerged suggest that, in the mid to longer term, the physical presence of a (human) police officer may no longer be the only kind of agent required to make an arrest, or to intervene in a public order situation. For example, policing agencies in Dubai introduced robot patrol officers in 2018 and are aiming for 25% of their forces to have been replaced by 2030 (Molloy 2017) Whilst the scope of their duties is currently somewhat limited – involving routine tasks like data collection or enabling the public to report crime and to pay fines, more sophisticated interventions involving detention are being discussed. And the commercial potentials here mean that research in this area is receiving heavy investment. Thus, policing robots are already under development which possess capacities to use force against suspects or to intervene in public disorder situations, by deploying tools such as tasers, tear gas and the like (Asaro 2016). Taser enabled robot drones have been trialled by some police forces and there have been recent proof of concept demonstrations which show how robot drones can use a taser to detain a suspect (Chayka 2014). Similarly, police in India have acquired five drones which can intervene to control crowds by utilising pepper

spray and mining companies in South Africa are considering purchasing the Skunk drone, which is armed with teargas pellet guns, in order to confront striking workers (Kelion 2014). The prospect of specialised squads of automated officers capable of intervention and detention becoming operational in the near to mid-future cannot therefore be dismissed.

Images of a robot dog enforcing social distancing in Singapore during the covid-19 pandemic (BBC 2020) is emblematic in this context. Elsewhere, other instances of automated agents involved in arrest or intervention scenarios serve to reinforce such a suggestion. In one example, a Knightscope K5 security robot assisted in an arrest after being 'assaulted' by a drunk whilst on patrol. The robot radioed in for support and the assailant was successfully detained (Sulleyman 2017). In another, a (remote controlled) police robot in Dallas intervened during a siege by an armed suspect in 2016 (Sharkey 2016). The suspect had shot a number of officers but was himself killed when the robot, armed with plastic explosives, approached him and detonated the charge. This followed on the heels of similar incidents. One in 2011 where a mobile home was destroyed by fire as a result of an overenthusiastic use of tear gas by a robot and another in 2014 where a robot was used to deliver chemical munitions to a suspect in an Albuquerque motel siege (Sharkey 2016). The ethical issues and problems of accountability raised by granting robots the right to use force are of course significant (especially where this turns out to be lethal) but are again not insurmountable (Lin *et al.* 2012, Asaro 2016).

For any of these supposed limitations upon automation in policing then, the challenge really boils down to how good AI can get. We already know that where AI is task oriented, it can be very good. And though it is still relatively early days for the development of more autonomous policing decisions, as we have seen in the case of chess playing AI systems, there is significant capacity both for learning and for creative intelligence in addressing complex crime scripts. Ultimately then there do not seem to be any knock down arguments or decisive reasons why automated agents could not conduct most policing functions at least as well as existing officers – even those which seem to exhibit some irreducible human component. Indeed, in many cases, there may be reasons to suppose that they can perform these functions better, and more in tandem with a public-facing role. Ongoing concerns about prejudice or the excessive use of force suggest that human police officers can be demonstrably poor at making key decisions about duties like arrest and detention. All too frequently, emotion, bias, misjudgement and other human frailties distort performance – often with tragic results (Brown and Daus 2015). When it comes to other policing functions – such as recall or evidence collection, the potential superiority of automated agents is apparent – not least to those who fund and control our policing forces.

But surely, it might be argued, at least one obstacle remains. Doesn't the Peelian axiom that '... the police are the public and the public are the police' (Home Office 2012), suggest that there will always need to be *some* kind of fundamental connection between the police and the public they serve, whether this lies in wholesale community engagement, victim support or simply helping senior citizens across the road? Community oriented policing has certainly been perceived to be an increasingly important requirement for forces since the 1980s. In the UK, legislation such as the Police Act (1996) and the Crime and Disorder Act (1998) has emphasised the need for the police to liaise and engage with the public more extensively (Myhill *et al.* 2003). In the US, the practice of community focused policing has had a far longer history (Robin 2000) and remains an official priority (cf. President's Task Force on twenty-first Century Policing 2015) in spite of recent, well-publicised difficulties around the disproportionate use of force against certain community groups (Cazenave 2018). But how confident can we be that human officers will always serve as the primary delivery point for community policing? In China for example AI based police stations are being trialled to liaise with the public and perform engagement roles (Bergan 2017). Largely centred upon dealing with vehicle and driver issues such as registration and advice at present, the concept is one that will clearly be expanded into a wider public facing basket of duties in time. An example of these potentials can be seen with the Sanbot public service robot which utilises IBM's Watson AI system (Sanbot 2018). Sanbot has the potential to be deployed across a range of contexts where police

officers might formerly have played a role. For example, when situated within police stations, Sanbot enables the public to report cases involving everything from assault, fraud, theft and even stalking and the manufacturers claim that this can be done up to four times faster than where traditional officers are used. Sanbot can also engage in more proactive police/public roles – for example, utilising its facial recognition systems to help find lost persons. It can operate in courtrooms where they can engage in smart interactions ‘such as analyzing digital logistics or answering questions’. It may even have a presence in airports and transport locations – not only by recognizing potential security threats but in the more mundane task of responding to public questions and requests for guidance (aided by its capacity to engage in 28 different languages).

Might public resistance to robots policing our streets offer one last reason for doubting the progress of automation here? Unfortunately, that too appears to be a forlorn hope. One of the more unwelcome lessons of the information age so far has been the readiness of the public to ignore sweeping technological intrusions into everyday life provided they (appear to) gain something, or such intrusions are not overly noticeable (Athey *et al.* 2017). Whether it is mass data collection via Facebook, GPS location tracing by mobile phone or the Alexa in the corner, resistance has been largely muted and it is the gains rather than the losses which have been appreciated. Indeed, perhaps one of the most worrying factors which may accelerate the end of traditional policing is that in many cases we actually *prefer* interactions with robots over humans – provided certain familiarities and continuities remain in place. There are complex cultural and psychological factors at work here – for example in far Eastern contexts like Japan or China there appears to be a far greater readiness to engage with automated agents than there is in more European situations (Broadbent 2017). But one clear and striking fact that does emerge from current research in the area is that the *appearance* of robots plays a big part in how we respond to them. And predictably enough, our preferences appear to be oriented towards agents which are overtly ‘human-like’ or which possess exaggerated ‘cute’ or cuddly features (Rich and Sindner 2009). It is perhaps in this last point where the most subversive threats to the future of policing may lie. Confronted with a choice between a uniformed human officer with poor PR skills and a policebot which laughs *and* looks cute when it does it, public preference may be drawn, inexorably, towards the automated option. Even where this laughing policebot comes packaged with a capacity for deadly force.

Conclusions: the laughing policebot?

The emergence of professional police forces was heavily associated with the technologies of industrialisation and the social changes such as mass industrialisation and urbanisation that went with that. Since that point, policing and technological change have remained closely intertwined. Whilst the general consensus has been that new technologies usually ‘improve’ policing, there has never been any metric which demonstrates this decisively, whether in terms of crime reduction or improved police-public relations. Thus, there have been other questions about the kinds of new technologies the police have been given access to and the way that they use them. To some, the dehumanising impacts of advanced riot technology, or the readiness to use digital technologies for surveillance have produced a sense that police technologisation is more about the needs of an authoritarian elite than those of the wider public.

In this paper I have argued that we should pay more attention to a third trend in the relationship between technology and policing, one which, in the end, may prove to be far more pernicious. Just as professionalised policing was born in the wake of the first industrial revolution, the developing ‘fourth industrial revolution’ (Schwab 2017), where digital technology fuses with the physical and the biological may, in a kind of inverse symmetry, be instrumental in its disappearance. Automation here is key. Whilst policing has sometime been thought to be immune to the kinds of shifts underway in other professions this conclusion may be somewhat premature. We are already at a stage where many traditional policing roles from law enforcement to public engagement are increasingly being eroded by algorithmic, automated alternatives. And even supposedly irreducibly human roles

like conducting an arrest may be conducted by robots in the near to middle future. These changes are not inevitable. Irrespective of the force of the technological a priori and the sense that a shift towards AI is unstoppable (Brennan *et al.* 2018) we have choices about the direction we want policing to take. But if the police are not to be instrumental in sleepwalking towards their own demise they will need to be far more sensitive to a recurring tendency to, 'adopt technology before adequately evaluating (its) potential impact' (Weisburd and Neyroud 2011).

It is also true of course that policing, as something conducted by publicly instituted professionalised agencies is a relatively recent innovation in criminological terms. It cannot therefore be assumed that professional police forces will be an inevitable or permanent feature of the criminal justice systems of the future. Yet we should surely reflect more closely upon what might replace them before we accept a slow erosion in their status. Of course, it could still be objected that no matter how automated policing functions become, there will still be humans making decisions at some point in the chain of command. That may (or may not) be true, but we then have to ask ourselves whether this is really policing anymore? To what extent do banks of operators in darkened rooms filtering the decisions of autonomous devices accord with the 'ready offering of individual sacrifice in protecting and preserving life' (Home Office 2012) which Peel laid out in his original vision for the police force? And would the PR charms of a laughing policebot (whether a machine or a human behaving like a machine) ever amount to the 'ready offering of individual service and friendship to all members of society' (Home Office 2012) he advocated?

Notes

1. For those who have never seen it, a typical performance of the laughing policeman can be experienced at: <https://www.youtube.com/watch?v=qVFUgYfLhZI>
2. See also Nogala, D. (1995) for a discussion of policing-specific definitions of technology.
3. Apparently intended to double up as a step for climbing walls or other barriers.
4. US Marshalls were armed prior to the newly constituted urban police forces
5. Such critiques were however directed at specific implementations of new technologies, rather than the police-technology relationship as a whole. See for example Willis *et al.*'s (2018), discussion of the way a new records management system increased tensions between command staff and line officers in a US police agency.
6. This has not been a wholly uniform or uninterrupted process. For example, a return to foot patrols and higher police visibility within the community was advocated in the Scarman report which followed upon the UK Brixton riots (Scarman 1981). But, as is suggested later in the paper, a decrease in direct police-public contact appears to remain the predominant trend.
7. It is worth noting here that Sherman's essay, *Experiments in Police Discretion* had raised the possibility of front line policing decisions being made by algorithms as far back as (appropriately enough) 1984 (see Sherman 1984).

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ORCID

M.R. McGuire  <http://orcid.org/0000-0002-8525-9104>

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