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NB This is a draft version. Please quote only from the published article, as cited above. Figure 1 refers to: 'Why not a school for pedestrians?', a cartoon by Arthur Watts from *Punch (Summer Number)*, 14 May 1934. It has not been reproduced here for copyright reasons.

"He Who Thinks, in Modern Traffic, is Lost":

Automation and the Pedestrian Rhythms of Interwar London

In August 1933, Dr F Roberts of Cambridge published a letter in *The Times* disparaging the use of the word 'pedestrian' to refer to the ordinary walking person. There was, he acknowledged, no real alternative; 'walker' intimated strenuous hiking, whilst 'footer' and 'stroller' were plainly ridiculous. Yet as a more general common adjective, 'pedestrian' was already imbued with regrettable connotations.

> The last Budget, [he wrote], was dubbed in your columns "a pedestrian budget." If this implies that pedestrians are without imagination the metaphor may be in some degree justified. If it implies that pedestrians take no risks nothing could be farther from the truth. (11)

As Roberts' letter intimates, urban walking had become a hotly contested topic in interwar Britain. In the year of its publication, 597 pedestrians were killed whilst crossing the carriageway in the City and Metropolitan Police Area; evidence, it appeared, of the alarming mismatch between speedy modern motor vehicles and London's antiquated road network. With cars running alongside horse-drawn carts, electric trams and slow heavy lorries, the metropolis seemed beset by an increasingly

entropic arrhythmia, manifest in black-spots of extreme congestion and an agitated confusion as diverse types of driver tried to negotiate each others' tempos and conditions of manoeuvring. In response to this urgent crisis, a coalition of administrative bodies, government departments, municipal bodies and interest groups tried to ameliorate London's traffic problems by orchestrating the movements of its various component units. Part of this involved a sustained and contentious supervisory attention to the motions of foot passengers and their perceptual modes of responding to the dynamic urban environment. Thus, if in its adjectival form 'pedestrian' implied a lack of imagination and an aversion to risk, then its ascendency as a noun during this period was entirely consistent. In what now appeared to many as the new 'motor age', pedestrianising the pedestrian had become a hegemonic project.

In his book *Rhythmanalysis*, Henri Lefebvre foregrounds urban walking as a key example of 'dressage' or the breaking-in of the individual to (re)produce what he calls "an automatism of repetitions" (2004: 40). Subjected to diffuse social discipline, the walking body orders itself via a regulated measure embedded in its musculature and exercised via a practised repetition that by-passes subjective volition. "In the street", he writes, "people can turn right or left, but their walk, the rhythm of their walking, their movements [*gestes*] do not change for all that" (40-1). The appearance of this rhythm as an innocent expression of the walker's unsullied physiology makes it harder, he argues, to recognise its profoundly historical and geographical origins – something now only recoverable by reflecting on the "jauntier" movement of archaic pedestrians captured on archival film footage (38). Lefebvre roots this discipline in what he calls "the military model" (39), a term that reveals his debt to Michel Foucault's earlier exploration of dressage in *Discipline and Punish* ([1975]/1991). Here, Foucault traced a mode of instrumental power developing within European

armies from the seventeenth century; through a micromanagement of the soldier's body it became instilled with an "automatism of habit" (135), its accustomed gestures performing and policing the condition of its own subjection. This, Foucault argued, had hinged on the mechanism of the exercise, a carefully managed and repeated activity that invoked an optimal performance it never quite achieved. By enmeshing the body within a complex assemblage of instructions, supervisions, signals, architectures, classifications, time-tables and mechanical apparatuses, the military exercise served to correlate the soldier's physiological rhythms to the requirements of the wider system. It thus sought to produce an efficient and docile body, productively self-aligned through its own habituated measures.

Lefebvre is clearly aware of how contemporary pedestrians are precariously managed by a dynamic complex of both human and non-human actors. Gazing from the balcony of his Parisian apartment, he notes the rhythmic variance between those strolling tourists abruptly halted by solicitous street entertainers and the aggravated flows of peak-time pedestrians ordered by the automated pulse of traffic lights (29). Here, then, pedestrian rhythms are both systemically structured and contingently impacted by local particularities. Yet if the military manoeuvres of the eighteenth century provide an insight into the wider processes of modern discipline and its systematic correlation of corporeal rhythms, then the incorporation of urban pedestrians into this formation requires closer investigation. In industrial cities, this generally occurred sometime during the first half of the twentieth century as the purposes and meanings of the urban roadway were persistently, if unevenly, revised. Across the urbanised West, the street became culturally redefined no longer as a site of heterogeneous social activity, but as a functional conduit whose purpose was to facilitate the speedy flow of traffic. Historians have noted how the motorcar and its

attendant ideologies of automobility impacted on the status and meaning of urban walking, whilst subjecting it to new cultural imperatives and forms of physical discipline (Bonham, 2006; Norton, 2007). Yet this essay returns to the streets of interwar London to consider, in particular, the mechanics of pedestrian dressage; for the importance of this moment lay not only in the reformulation of the highway, but in the attendant reorganisation of the walker's body and its rhythmic practices of movement and perception. Submitted to new modes of administrative ordering, pedestrians became re-imagined as modern urban subjects, corporeally invested with mechanisms of self-government and compliance that would productively bind them to the requirements of the corporate whole. In practice, this strategy encountered inexorable limitations, but its complex legacy still largely structures the ordered polyrhythmicity that constitutes the modern metropolitan street.

The periodical *Punch* had already intimated something similar within a cartoon published in May 1934 [figure 1]. Above the caption 'Why not a school for pedestrians?', Arthur Watts drew a large hall in which strapping instructors supervised a stream of pedestrians as they dashed chaotically between two rotating circuits of model cars. The suggestion here was that the accelerated tempo of passing motor vehicles had now entered into conflict with traditional ways of crossing the road. This task would have to be relearned; a matter of both speeding up one's movements and developing a sharper acuity concerning how and when to enter the carriageway. More significant, however, was Watts' casual invocation of contemporary innovations in motor manufacturing. His circuits of half-built cars, moving through the hall at their own steady speed, mimicked those moving assembly lines recently installed at such UK plants as Morris at Cowley and Ford at Dagenham (Turner, 1964; Burgess-Wise, 2001). First pioneered in 1913 at Ford's Highland Park

factory in Michigan, the assembly line was the dominant motif within a major shift in industrial organisation, premised on a reconfigured relationship between human labour and the productive apparatus. Watt's crowd of middle-class urbanites forced to reorient their movements - with varying degrees of success - to the sudden demands of the automobile unwittingly parodied those Fordist factory workers simultaneously adapting their gestures to the very same thing. Connected to the motorcar at different moments in its lifecycle, the industrial labourer and the urban pedestrian were subjected to similar processes of enforced correlation. Both were located within new organisations of time, space, regulation and supervision that sought to realign their corporeal rhythms within a dominant assemblage of mechanical devices and informational flows. Yet the streets of London proved far less amenable to corporate management than the regimented space of the factory floor, a factor which radically complicated contemporaneous attempts to automate the rhythms of pedestrian practice.

"When this man tells you to walk, you walk": scientific management and the automated body

To understand the connections between Fordist labour practices and the interwar mechanics of pedestrian dressage, it is worth turning to the work of FW Taylor, an American mechanical engineer and leading advocate of industrial reorganisation at the turn of the twentieth century. His crowning polemic, *The Principles of Scientific Management* ([1911]/1998), still provides the most rigorous articulation of modern industrial management and its rhythmic reorganisation of the active human body. As an ardent reformer, Taylor's bugbear was what he termed the

‘initiative and incentive’ approach to industrial organisation, whereby workers learned their trade by observing more experienced colleagues on the job. Since labouring skills were largely “handed down from man to man by word of mouth” and “almost unconsciously learned through personal observation” (13), any task was invariably being done by a myriad of local ‘rule-of-thumb’ methods. More significantly, this placed technical knowledge solely within the body of the aggregate workforce, far outside the competencies of management. This, Taylor argued, was disastrous. Within an industrial structure based on maximising profits (and thus paying employees the lowest possible daily wage), the workers’ interests lay in concealing from their employers just how productive they were capable of being. Thus manufacturing remained endemically dogged by ‘soldiering’, via both “the natural instinct and tendency of men to take it easy” and the more “systematic” deceleration of the entire workforce to the speed of their most tardy individual (6).

Against this, Taylor proposed his own system of ‘scientific management’, involving a major structural reorganisation of industrial production. Amongst the many ‘rule-of-thumb’ methods concurrently in operation, he reasoned, one alone must be the most soundly productive, and it was the employer’s duty to determine and enforce this technique. This process involved three successive stages. First, the manufacturing process had to be disaggregated into its smallest component procedures, which Taylor christened ‘tasks’. Then, deploying stopwatches and statistics, the most efficient way of performing each task was to be determined through the elimination of all wasteful corporeal or mechanical exertions. Finally, this optimum method had to be established as the absolute standard to which all workers must henceforth conform.

Once each component task had been properly ordained, management could deploy individual workers at different points in the production process as and when they were needed. As Taylor explained:

> The work of every workman is fully planned out by the management at least one day in advance, and each man receives in most cases complete written instructions, describing in detail the task which he is to accomplish, as well as the means to be used in doing the work (17).

This marked an important inversion of the body's relationship to its productive activity. As the term 'rule-of-thumb' suggests, labouring practices had conventionally been guided by the contingent variability of workers' bodies, facilitating a more eurhythmic accordance between muscular exertion, perceptive responses and the tempos of the machinery they used. Taylor's 'task', however, relocated this agency within a managerial abstraction. The labouring body now had to adapt to a prescriptive rhythm imposed from above, orchestrated via detailed instructions and arranged apparatuses, and which ultimately determined how much they were paid. Rest breaks too were to be carefully administered, not with reference to an individual's actual exhaustion but to the optimum rest breaks of that optimum labourer to whom they had now to aspire. As Taylor explained to Schmidt, a "mentally sluggish" pig iron loader at the Bethlehem Steel Company:

> you will do exactly as this man tells you to-morrow, from morning till night… When this man tells you to walk, you walk; when he tells you to sit down, you sit down, and you don't talk back at him (21).

Taylor's innovation was thus to bisect productive labour into two discrete activities. All elements involving some aspect of intelligence - deciding how best to arrange the machines, what speed to run them at, or when to take a break - were

divested from the labourer and requisitioned by management. Even the most skilled machine operators, Taylor insisted, should not direct their own activities, for the time and effort this required would detract from their ability to achieve maximum productivity. Such calculations could only be done by a separate team of planners, preferably in an office away from the shopfloor, where they could focus unhindered on the task of planning each worker's schedule for the following day.

Every labourer's performance had to be monitored so that each could strive to match the required tempo, whilst managers could identify those underachievers too asynchronous to remain in employment. Yet, crucially, Taylor also recognised that such supervision would become less necessary over time as the worker's body become accustomed to its task and internalised its abstract set of optimum measures. Management thus became a matter of instilling the correct corporeal habits - the military exercise had colonised industrial production. In addition, by 1911 Taylor had already articulated the cybernetic structure of the modern corporation. Foreshadowing the digital computer that Alan Turing would map out a quarter of a century later (1937; 1951), all productive processes had been recast as an informational exchange between a commanding 'control' unit (the management) and an obedient 'executive' (the workforce). This self-regulating assemblage, sustained by its own internal flows of supervision and feedback, integrated each worker into an industrial apparatus that determined not only the goals to which their exertions were directed but the corporeal rhythms of their correlated labour. As Taylor proclaimed: "In the past the man has been first; in the future the system must be first" (iv). By means of a series of abstract exercises, the labourer had been fully subjected via an automatic set of rhythmic gestures instilled within their perceptive apparatus and expressive musculature.

“No code of customs to guide them”: the problems of pedestrian sovereignty

Taylor’s writings did not directly influence the interwar drive to reform London’s pedestrians, but they did articulate the wider corporate logic through which its administrators came to approach the task of traffic management. Since at least the nineteenth century, the metropolitan highway had been culturally positioned as an emblematic space of national freedom; to move at will amidst its diverse populations was to celebrate a particularly English love of liberty and democracy. Indeed such that many Victorian modernisers had been significantly defeated in their attempts to improve traffic circulation by accusations of their assault on these principles (Winter, 1993). Early film reels seem remarkable today not only for the jauntiness with which London’s walkers trot along its pavements, but for the apparent disorder of their uncoordinated trajectories. The largely horse-drawn traffic moves in two steady - if unregimented - flows, but pedestrians are seen entering the carriageway at will, to snake alongside and between its vehicles in what now appears as a precarious and incomprehensible anarchy.

During the 1920s, as the motor car gained in its ascendency, these archaic ways of walking came to register as fatally out of place. Two practices caused particular concern: individuals stepping into the roadway to avoid an obstacle on the pavement without due regard to passing vehicles; and substandard attempts to cross the road either through distraction, inattention or by misjudging the speed of oncoming traffic. Newspapers editorials, correspondence and the declarations of magistrates and coroners contributed to an ongoing debate in which blame alternated between selfish drivers out to deprive walkers of their rightful place on the King’s Highway and those ‘reckless’ pedestrians who obstinately refused to adjust

themselves to the requirements of modern traffic. Setting out to adjudicate between these positions, a loose conglomerate of public officials, administrative agencies and pressure groups sought to address what was now clearly recognised as the modern traffic 'problem'. Although the Metropolitan Police had been responsible for the everyday management of London's traffic since the mid-nineteenth century, the upkeep of its roads remained apportioned between numerous borough councils and local authorities. In 1924, however, the London and Home Countries Traffic Advisory Committee was created, gathering these bodies together with members of the Home Office, the Ministry of Transport and motoring organisations, to advise the Minister of Transport on traffic policy within the metropolitan area. This administrative rationalisation was recognised as the vital precondition for effectively managing London's roadways, a belief later consolidated by the dual promotions of Herbert Alker Tripp as Assistant Commissioner of the Metropolitan Police in 1932 and the forthright Leslie Hore-Belisha as Minister of Transport in 1934. Thus, by the mid-1930s, the improvised polyrhymicity of London's highways had become recognised as a legitimate object of bureaucratic management, something to be ordered and reorchestrated by a team of absent experts. By 1938, Tripp could confidently write of:

> a new science…which, as it takes shape, is found to be of a far-reaching character, embracing not only the immediate supervision of vehicles on the road, but also the problem of legislation, of public opinion and psychology, of road layout and equipment, of town and district planning, and many other matters (1).

The metropolitan road system had been refigured as a Taylorist factory writ large.

All this involved a foundational assumption about the functional purpose of the modern highway. As Tripp explained, traffic control had only two real objectives: "to develop a rapid free flow of traffic"; and "to prevent that rapid traffic from being an undue danger either to its own units or to the public at large" (1). The street was no longer an open stage on which a diverse populace improvised a picturesque democracy; it was, instead, a productive apparatus, still residually pluralist, but solely directed to the attainment of maximum safe speed.

Under the gaze of experts, the pedestrian had been quietly reconceived as a variable component within a larger assemblage, their exertions to be managerially aligned with the requirements of the corporate whole. Traditional ways of negotiating the street were positioned as archaic and counter-productive, for old rule-of-thumb methods plainly invited catastrophe, congestion and death. As Mervyn O'Gorman, Vice-chairman of the Royal Automobile Club, remonstrated in 1929:

> Looking about I find one single traffic unit on the road whose movements are provided for by no legislation or custom, and for whom there is neither constant nor perfect control… That unit is the pedestrian, and this (apart from his frailty) is the chief cause of his sufferings. On the footway he wanders at will immersed in his thoughts, amusements, conversation. When he steps into the roadway he suddenly enters another world where the movement of every entity is, and must for safety be, controlled and foreseeable… walkers have no code of customs to guide them and to inform others as to their probable next movements. (13)

Prone to distraction and absent-mindedness, ordinary pedestrians had become sub-standard operators; they simply couldn't remain focussed on the job in hand. As a

leader in *The Times* explained, car drivers were less prone to inattentiveness because driving remained "a new and unusual" activity. Yet "the walker is doing something which he learned to do in infancy and has been doing ever since," which had penetrated over "countless ages" to the depth of primordial instinct. According to this logic, motorists had already attuned themselves to the heightened perceptual responsiveness demanded by the car. Yet the pedestrian's body remained the site of an unstable conflict between habitual rhythms of (in)attention and the contingent irregularities of the mechanised roadway. What was needed, claimed *The Times*, was "the penetration of the instinct by the sense of danger" (1927a: 13); an environmental responsiveness as automatic and unthinking as the reflex of putting one foot in front of the other. As the paper continued: "He who thinks, in modern traffic, is lost; until pedestrians act as 'unconsciously' as do all good drivers they must remain in danger" (1927b: 13).

These entreaties for pedestrians to develop a heightened 'road sense' would recur throughout the interwar period, for their 'hesitation' or 'faltering' remained an urgent and often fatal problem. On highways now dominated by the rapid but irregular tempos of passing motor vehicles, the pedestrian's traditional jurisdiction over when and where to step into the carriageway could no longer be endorsed. The lengthy distance covered by a car within its driver's normal reaction time turned such uncertain movements into a definite hazard. Hence the idiosyncratic rhythms of individuals on foot had to be rendered entirely predictable.

Throughout the 1920s and 30s, London's walkers were subjected to successive attempts to choreograph the rhythms of where, when, and how they moved through their city's streets. Common to all was the disaggregation of walking into a component set of separate tasks. Proceeding along the pavement and crossing the road

became conceptually distinguished, opposed to each other and discretely managed within contiguous and controllable sequences. This involved a complex ensemble of mechanical devices, official personnel and regulatory imperatives, all of which sought to produce a newly automated pedestrian subject fully correlated with the ordered polyrhythmicity of modern managed motor traffic. However, in practice, the contingent rhythms of less controllable elements within the metropolitan highway persistently intervened, effectively frustrating its more simplistic imaginings of repetition and control.

"Cross Now": the technologies of pedestrian automation

The pragmatic limitations of pedestrian discipline became evident very early on. In 1917, the newly-formed London 'Safety First' Council began an earnest campaign to retrain walkers to "Keep to the Left" of the pavement. If this measure was universally adopted, they argued, then those nearest the kerb would always be facing the oncoming traffic and thus less likely to step into its path. By 1918, the council claimed the support of 24 out of London's 29 local authorities, some even erecting signs to instruct pedestrians accordingly. Yet despite the irrefutable logic of this proposal, it consistently failed to persuade either the government or the police. As one Metropolitan Police memo of 1919 explained, the automatic behaviour it hoped to instil faced insurmountable difficulties:

> ["Keep to the left"] is the reversal of an instinct inherited for generations… Instinctively we move to the right when meeting and we are so constituted physically that if lost in a fog or in darkness we shall almost certainly move to the right.

Like the more general problem of acclimatising pedestrians to the demands of the motorised highway, the walking body was understood as already endowed with its own primordial rhythms. Resynchronising these would require relentless supervision, involving considerable manpower and political resolve. In the absence of these things, a comprehensive programme of pedestrian dressage was already unachievable.

Thus traffic managers sought alternative means to prevent pedestrians from drifting in front of vehicles. In 1930, the Traffic Advisory Committee recommended the painting of a continuous white line parallel to the kerb to remind walkers of the immanent danger. More selective in its supervisory address, this measure was similarly opposed by the police on the grounds that adaptation to the line was likely to occur far more rapidly than adaptation to the perils it announced. Indeed, Tripp was defiant that the only real solution lay in the total physical segregation of pedestrians and vehicles. Under his influence, a mile of metal railings was opened in May 1936 on both sides of East India Dock Road in Poplar, the first section of a scheme that would eventually stretch for three continuous miles. As Hore-Belisha explained to the press, such guard rails would "by physical necessity create a practice which seemed psychologically difficult" (*The Times*, 1936: 11). Thus, if the residual rhythms of pedestrian (in)attention were too engrained to be comprehensively resynchronised, such railings promoted a more forceful disciplining of walking practice. As a mechanical apparatus, they effected a permanent and impersonal supervision that divested the pedestrian of any residual self-government. Yet they were also very expensive and – away from the marginalised districts of the impoverished East End – proved contentious to implement. Thus, despite Tripp's emphatic advocacy, their use remained selective.

Efforts to automate pedestrian behaviour thus came more to concentrate on the segregated task of crossing the street. The central innovation here was the designated crossing place, a complex assemblage that sought to order where individuals entered the road and thus cleanse the rest of the carriageway of errant pedestrian activity. The first concerted experiments began in December 1926, when signs bearing the words "Please Cross Here" were erected across the tributaries to Parliament Square. This had recently been converted into a 'one-way' gyratory system, in which – foreshadowing Watts' cartoon - the accelerated circulation of clockwise vehicles had made crossing the road a great deal more hazardous. Between the signs, a white line was painted across the carriageway to inform drivers where to stop when so directed by the police, thus producing a 'safety lane' across which the free flow of vehicles was alternated in a binary rhythm with the passage of unhindered pedestrians. On 11 June 1934, over a hundred such crossing places were launched at junctions around Westminster, Camden Town and Mile End, all under the jurisdiction of either pointsmen or automated signals - the first phase of what was envisaged as a holistic system that was eventually meant to cover the entire metropolis. Ultimately, Hore-Belisha hoped to secure legislation that would prohibit pedestrians from entering the carriageway other than at such designated crossings. Fearing that any distance of more than 200 yards between them would spawn legitimate complaints about excessive deviation, he also pushed through the creation of additional 'uncontrolled' crossings, governed not by police officers or automated signals, but solely by a regulatory code of conduct. These were marked on both pavements by a metal pole surmounted by a yellow glass globe, which - with shameless self-publicity - the Minster immediately christened 'Belisha beacons'.

The most pressing dilemma here concerned how to ensure that pedestrians acknowledged the authority of these devices and restricted themselves to the designated safety lanes. The initial proposal focussed on erecting signs at a distance from the crossing to mark out a 'sterilised' space within which entering the road would now be forbidden. Yet police concern about their lack of enforceability led to an ongoing experiment with alternative methods of supervision. From December 1936, special officers routinely distributed printed paper slips to those individuals seen wilfully trying to traverse the street in the vicinity of a crossing. Mimicking Taylor's scheme of written instructions, these informed pedestrians of their substandard behaviour, but crucially avoided confrontation by replacing direct orders with a more generalised plea for responsible behaviour. Similarly, three years later, when so-called 'courtesy cops' were stationed at several key crossings armed with portable amplifiers and loudspeakers, officers announced only a generic recommendation to use the safety lanes rather than to chastise specific individuals (McKenzie, 1939). Outmoded notions of pedestrian sovereignty thus set clear ideological limits on how explicitly London's pedestrians could be managed and Hore-Belisha's foreshadowed legislation never came to fruition. Indeed, metal railings became the apparatus of choice for sterilizing the space around designated crossings, their tacit and impersonal injunctions marshalling walkers towards the lanes with less fear of retribution.

The pedestrian crossing place contained a clear imperative towards automating the responsive behaviour of walkers – wait until given the directed signal, then proceed across the carriageway – but the apparatus itself was perpetually frustrated by both the inherent irregularity of London's traffic flows and the archaic layout of its road network. One residual problem concerned how exactly the pedestrian should

interpret the orders given. A frequent early complaint was that pointsmen were found to habitually release traffic before individuals had reached the other side. Yet as Tripp made clear, officers could not wait for every pedestrian to mount the opposite pavement for, on busy crossings, a heavy flow of walkers would prevent vehicular traffic from progressing at all. Officers were thus ordered only to signal to pedestrians their intention to release stationary vehicles; it was the responsibility of the pedestrian to monitor these signals and calculate for themselves if they had sufficient time to cross.

Likewise, there was an ineluctable ambiguity concerning how London's pedestrians should respond to automatic traffic lights. Throughout the 1930s, decisions were routinely made not to add pedestrian-facing signals to such devices, for it was generally recognised that walkers would be unlikely to stand waiting for authorisation if a sizable gap appeared in the traffic. A persistent contravention of the "Don't Cross" command, it was feared, would jeopardise the authority of the entire assemblage. Thus official regulations reluctantly conceded that pedestrians were at liberty to traverse crossings at any time, providing they did not "hinder the free passage" of any oncoming vehicles (Minister of Transport, 1934). In addition, whilst such regulations stated that those vehicles turning into a tributary sidestreet from the line of proceeding traffic had to give way to any crossing pedestrians, it was overwhelmingly felt that a direct order to "Cross Now" would foster in walkers a misplaced and dangerous sense of invulnerability.

Thus, time and again, the responsive automation built into the design of the controlled crossing place was undermined by the unavoidable contingency of the environments in which they were erected. To this end, experiments were made in 1938 with a number of 'compulsory crossings' that forced pedestrians to wait behind

metal barriers until the controlling officer signalled for a colleague to raise them. That observers should note a general acquiescence with the devices suggests that, by the late-1930s, pedestrians were becoming accustomed to such temporal management (*Evening News*, 1938). Yet such compulsory crossings were soon dropped on account of their heavy running costs. Despite the endeavours of London's administrative authorities, then, the dangerous unpredictability of its motorised highways demanded the retention of some element of pedestrian initiative, a more complex set of environmental responses that exceeded automatic reflexes.

Similar difficulties were encountered at uncontrolled crossings away from the direct jurisdiction of pointsmen or traffic lights. Here pedestrians had a clear right of way, since regulations required "the driver of every vehicle…to proceed in such manner and if necessary to stop so as to allow free passage to every pedestrian who is crossing the carriageway" (Minster of Transport, 1934: 2). Yet uncertainty persisted over how both parties should interpret each others' movements, for there were no codified signals for expressing a desire to cross - aside from one's proximity to the crossing point itself. In July 1937, an Appeal Court earned the wrath of motoring organisations by ruling that since pedestrians had legal priority at uncontrolled crossings, they could never be found negligent even if they stepped into the direct path of an oncoming vehicle (McKenzie, 1937). Commentators agreed that such forthright adherence to the regulations invited catastrophe, and called for all parties to exhibit a greater 'give-and-take' when negotiating the crossing - an informal mutual courtesy that resisted codification as either a set of rules or mechanistic signals.

The temporal irregularities of London traffic caused further complications, for at certain uncontrolled crossings a continuous stream of pedestrians risked holding up vehicles indefinitely. Thus at selected points, Belisha beacons were eschewed in

favour of pedestrian-activated push-button signals, which halted the traffic for a clear 20 seconds, followed by a compensatory two minutes of uninterrupted vehicular passage (*Evening Standard*, 1931). These devices formalised mechanically those semi-improvised alternations between pedestrians and drivers, but uncertainty still persisted. The two-minute buffer period encouraged more impatient pedestrians to cross prematurely against the signal, such that when the lights did change, vehicles were frequently halted when there was no-one to cross. Indeed, additional sensory pads were often embedded into the surface of the carriageway precisely to detect, on each and every occasion, whether the two-minute delay was actually required. Thus, the rhythmic variability of London's vehicular and foot traffic undermined the more straightforward attempts to choreograph its activities according to an ordered binary measure. Only by means of a highly complex assemblage, sensitive to a range of contingent factors, could a system of direct orders become operationally viable.

Conclusion: from the automatic to the cybernetic pedestrian

The complexity of London's road network and its rhythmic irregularities thus worked to frustrate attempts to automate pedestrians and recodify their practices as a disciplined set of habituated responses. Any instruction to "Cross Now" remained dangerously direct, whilst uncontrolled crossings had always to be supplemented by an informal mutual courtesy. Those devices that worked most directly to discipline the walking body – guard rails, 'compulsory crossings', and pedestrian-activated vehicle-actuated traffic signals – were only selectively deployed due to their prohibitive cost. Thus, within the dynamic environment of the modern highway, ordinary walkers were positioned as more than unthinking automatons – something

which most regulations and apparatuses acknowledged. By the close of the 1930s, pedestrians may have become accustomed to using designated crossing places, but they retained a formal and practised autonomy over the places and times at which they entered the carriageway.

London's interwar pedestrians were thus refashioned as strangely hybrid creatures. Whilst more generally aligned to wider corporate objectives, the contingencies of the metropolitan street demanded a more sophisticated form of predictable behaviour. Pedestrian management became less about habituating certain corporeal actions, than about instilling a type of intelligent responsiveness that could readily adapt to all unforeseen circumstance. This, in itself, moved the underlying model of British pedestrian management beyond the docility of the Taylorised labourer, towards the more complex intelligence of that cybernetic subject that Norbert Wiener would articulate at the end of the Second World War (Wiener, 1950; Galison, 1994). Encapsulated most succinctly by the figure of the anti-aircraft gunner, this approach conceived of the individual not as a servile labourer, whose corporeal rhythms were bound to the regular measure of the commanding machine, but as an expressive element within a wider assemblage, in which the human subject and the mechanical apparatus worked in conjunction to ameliorate the impact of all unpredictable variables. Whilst geared towards an outcome that was fully aligned with systemic objectives – safely crossing the road in a manner that didn't upset the smooth passage of motor traffic - each individual street-crossing remained a complex and variable performance, as pedestrians engaged with those other devices to achieve a stable (though never fully predictable) eurythmia with the highway. This residual element of individual sovereignty came to define the London pedestrian in the twentieth century, perhaps more so than in comparable cities in the US and Australia

(Norton, 2007; Bonham, 2006). Exceeding the docility of disciplinary dressage, the perpetual and ongoing synchronisation of the pedestrian into the contingent polyrhythmicity of London's streets pointed to a newly cybernetic form of urban engagement, an ordered but ultimately less determined type of responsively programmed 'road sense'.

Note

The unpublished sources used in this chapter reside at the National Archives, Kew (TNA/), within the following files: MEPO/2/4666; MEPO/2/4730; MEPO/2/4715; MEPO/2/4724; MEPO/2/7210; MEPO/2/7374; MEPO/2/8035; MT/128/67; MT/128/67; MT/34/223; MT/34/253; MT/34/254. This archival research was made possible by a generous Small Research Grant from the Royal Geographical Society (with Institute of British Geographers).

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