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Did the Safety Bicycle Influence Human Evolution in England?

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INTRODUCTION

Over the last 25 years, the assertion that "there is little doubt that the most important event in recent human evolution was the invention of the bicycle" has reached a large audience. Perhaps the widest dissemination of the idea in the United Kingdom has come via the long-running and oft-repeated BBC television comedy quiz programme QI. This show works on the premise that widely believed and seemingly obvious answers to general knowledge questions are often incorrect. It comes up instead with surprising but supposedly true alternative answers; the more amusing and outlandish the better, as far as entertainment value is concerned.[1]

The assertion has been taken up and repeated by some writers beyond the world of television light entertainment. For example, in the USA in 2015, Zach Bielak, BSc, a researcher in mechanical engineering in the Department of Mechanical Engineering and Materials Science at Rice University in Houston, Texas, published a working paper entitled "From Pedal to People: The Social Effects of Biking". In this he states:

Historically, bicycles have played a crucial role in increasing biological diversity. As bicycle culture began to pick up speed in the 1890s, it allowed members of rural isolated communities to travel to adjacent territories, which in turn allowed them to avoid marrying their cousins. This, of course, led to an incredible increase in genetic diversity within rural communities that had access to bicycles. In fact, according to geneticist Steve Jones, "there is little doubt that the most important event in recent human evolution was the invention of the bicycle".[2]

Also, in 2015 in the UK, William Manners, writing in the Bike Blog of *The Guardian* newspaper in an article entitled "The secret history of 19th century cyclists" stated:

For the majority of those living in rural areas, owning a bicycle dramatically increased the number of potential marriage partners, as for the first time they possessed their own means of travelling beyond their local communities. The widening of gene pools which resulted from this process means that the biologist Steve Jones ranks the invention of the bicycle as the most important event in recent human evolution.[3]

Bielak and Manners both cited Steve Jones. So who is he, and what exactly did he write about bicycles and genetic diversity?

Steve Jones

Professor John Stephen Jones was born in Wales in 1944. He is a geneticist and a former Head of the Department of Genetics, Evolution and Environment at University College London. He is also a Fellow of the Royal Society and has won its Faraday Prize for excellence in popular science communication. He has published many popular science books on genetics and evolution. He has also made many appearances on television, including presenting a self-scripted television series on human genetics.[4]

Steve Jones' oft-quoted comment is found in his award-winning book *The Language of the Genes*, first published by HarperCollins in 1993. The book was republished by Rhône-Poulenc the following year, after winning that company's prize for science writing, sponsored in conjunction with the London Science Museum and the UK's Committee on the Public Understanding of Science. The Language of the Genes is a popular work and gives neither specific citations of references nor a list of source material.[5]

The paragraph in question is on pages 236 and 237 of the Rhone-Poulenc edition and reads as follows:

In time the newly mixed populations of the world will reach a new equilibrium. Most of the recessive genes hidden in the descendants of mixed marriages will reappear. This will take thousands of years, but there is little doubt that the most important event in recent human evolution was the invention of the bicycle.

That is it in its entirety. The claim seems to be based on the twin assumptions that:

- the bicycle brought a revolution in personal mobility to people of modest means, and
- that such people had hitherto been confined to the localities in which they were born.

Evidence

The present writer has been studying family history, local history, and cycling history for nearly 40 years. He would be delighted if Steve Jones' assertion was true. However, this writer/researcher has been unable to find any strong evidence to support it. He has no desire to disparage Steve Jones, for whom he has a great admiration. Therefore, between September 2017 and February 2018, he emailed Professor Jones three times, politely requesting supporting information. No reply was forthcoming.

A major problem with Professor Jones' assertion about bicycles and genetic diversity is that it is unprovable unless one could show that cyclists had sexual intercourse that led to live births with individuals with different genetic makeups. It appears that no such evidence exists, which is hardly surprising if you consider the problems involved in collecting such data.[6]

It is important to note that feudalism, whereby society was organised and stratified on the basis of various forms of land tenure, ceased comparatively early in England. For the most part, it formally ended, following a long decline, with the Tenures Abolition Act of 1660. Once they were no longer tied to the land, labourers could move around the country (or emigrate overseas) in search of work and self-improvement. One of the strongest strands of evidence against Professor Jones' assertion is the considerable pre-existing geographical mobility evidenced not only by the huge numbers of English people who had emigrated to North America, Australasia, southern Africa, India, and beyond, but also by the official reports accompanying the decennial censuses for England and Wales in the decades preceding the invention and popularisation of the safety bicycle. For example, the General Report of the 1861 Census of England and Wales states:

There is not only a constant movement of parts of the population to and from other countries and England, but there is a constant migration from one part of England to another.[7]

Moreover, the General Report of the 1871 census states that 42% of the population of London was born elsewhere.[8] *The General Report of the 1901 Census* states that "the Counties that showed the greatest loss of natives were, as might be expected, the Agricultural Counties": the report lists a dozen English counties where, on average, about 45% of the natives had emigrated. Most of these were in the rural south of England, where agricultural wages and job prospects were particularly poor.[9]

Can any significant proportion of the considerable mobility cited above be ascribed to the bicycle? Probably not, for the reasons set out below.

1) Bicycles were relatively unaffordable

According to the UK government's *British Labour Statistics: Historical Abstract 1886-1968*, the average annual cash wage of an agricultural labourer in 1901 was £38.78,[10] excluding overtime, bonuses, and perks.[11] At that time, the cheapest Raleigh bicycle (from the budget-priced Gazelle range) cost £15.75; the most expensive Raleigh was £37.50. So, whereas a cheap new Raleigh-made bike would cost the average agricultural labourer about 22 week's basic wage, a top of the range Raleigh would absorb almost a year's basic income.[12]

Prices tumbled during the early 1900s. By 1907, the most expensive Raleigh had more than halved in price, costing no more than the cheapest model did just six years earlier. A basic Raleigh-made Gazelle had also more than halved in price and could now be bought for a mere £6.75. But even that price was still about two months' basic wage for an agricultural labourer.[13]

We need to be mindful that in 1907 the average weekly wage for many agricultural labourers in southern England was below subsistence level. In Oxfordshire, for example, it was £0.75p – the lowest in England. The contemporary social investigator Benjamin Seebohm Rowntree estimated that a family of two adults and three children needed a minimum weekly income of £1.05 – 40% higher than the actual average in Oxfordshire. Two-thirds of that £1.05 sum was required for food, which would just about sustain the main breadwinner but at a level worse than that provided in the dreaded Poor Law Union workhouses. The diet would include no meat other than a little bacon, no butter or eggs, and hardly any tea. The other third of Rowntree's recommended £1.05 minimum weekly income was needed for fuel, rent, clothing, insurance, and sundries. There was no allowance for tobacco, beer, newspapers, amusements, or holidays, let alone major discretionary purchases such as bicycles. Moreover, compulsory schooling and a decline in part-time work opportunities for married women meant that other family members were less able to contribute to the household income than had been the case in the mid-19th century. Thus, in the early 20th century, many rural families in southern England were living in chronic poverty.[14]

There would, of course, be some second-hand bicycles available at more affordable prices. Also, manufacturers ran hire purchase schemes, often referred to as "gradual payments", so that a purchaser did not have to save up the whole purchase price in order to acquire a bicycle. Nonetheless, it is clear that purchasing a bicycle at this time was beyond the means of many working class people living in rural areas of England. This was especially so in the agricultural counties of southern England (such as Oxfordshire and Berkshire) where, in the absence of wage competition from major industrial employers, agricultural wages were lower than the national average.

Thomas Hardy's famous novel *Jude the Obscure* was published in book form in 1895. Although no specific dates are given, the book is clearly set in a 19-year period ending about the time of publication. This places it approximately in the period 1875–1894, the safety bicycle becoming available midway during that period. The protagonist, Jude Fawley, is a young working class stonemason from a poor rural background who aspires to be a university scholar. In the course of the story, he travels by various means around rural southern England. Although Hardy fictionalised the place names, the locations are clearly identifiable and include Wantage, Reading, and Oxford. Jude's modes of transport are frequently mentioned (railways - 18 times, carts - 8 times, and numerous mentions of walking) but there is not a single reference to a bicycle or tricycle.[15]

2) Pre-existing means of transport were affordable and comprehensive

As we have seen above, the high relative price of bicycles in England in the late Victorian and the Edwardian eras[16] is one reason to doubt the extent to which they contributed to the spreading of the gene pool. The most important argument against Professor Jones' assertion, however, must be the many well-established means of more affordable transport that obviated the need for a bicycle. The most relevant of these were carriers, railways, tramways, and "Shanks's pony" (i.e. on foot).

By road via carrier

Even if you lived in a relatively remote village, there would almost certainly be a regular carrier service connecting your abode to one or more of the nearest market towns. For example, the country carriers of rural Berkshire connected virtually all the county's villages to one or more market town at least once a week. Although the prime function of the carrier was to act as a shopping agent, the carrier also conveyed passengers. These would sit on benches in the covered cart. It was not particularly comfortable, but it was relatively cheap, convenient, reliable, dry, and required no great physical exertion. Thus, although such transport would not normally be affordable for commuting on a daily basis, anybody could get to their nearest market town regularly and cheaply, and be back home again the same day. Alternatively, they could stay overnight in the town, and a day or two later, catch a carrier to another village within that town's hinterland, perhaps 20 miles from their home village. From the market town they could also catch a train to a larger town, further away.[17]

By canal

In the late 18th and early 19th century, longer distance travel for rural folk had been facilitated by the canalisation of rivers and by the construction of new canals. Thus, for example, it was possible for working class people to immigrate from a remote Berkshire village to North America, starting their journey via the village carrier. He would convey them a few miles to the Wiltshire & Berkshire Canal which provided affordable access to the port of Bristol.[18, 19] By the time the safety bicycle was introduced, travel by canal was in steep decline, but it was still an option in some localities.

By rail

The coming of the railways rapidly displaced passenger traffic on the canal

network, as trains offered more convenient and speedier travel. By the time the safety bicycle appeared there had been railways in rural England for up to forty years. For example, in rural Berkshire, the Great Western's line from London to Bristol was opened in 1840 and various other lines soon followed it. By the 1880s, there was hardly a village in the county that was further than six miles from a railway station – a distance that could be walked in two hours, even if the carrier was not used. Every market town in the county was either on a main line or was connected to one via a branch line or steam tramway.[20] Berkshire, though largely rural, was connected to London by two separate mainline railway routes; it was also connected by two routes to Bristol and to the south coast, the south-west peninsula, Wales, the English Midlands, and beyond.[21]

Moreover, passed in 1844, an Act of Parliament decreed that every railway route must run at least one cheap, basic service each day, in enclosed carriages, with a minimum average journey speed of 12 miles per hour (20 km/h) including stops. For a fare initially set at one old penny (£0.004) per mile, passengers could carry up to 56 pounds of luggage free of charge. Thus, relatively affordable rail travel was guaranteed, even for the least affluent of the rural population. Whilst the fares were not so cheap as to facilitate long distance daily commuting, they were low enough to make it easy to move to another part of the country and to facilitate occasional journeys back to visit friends and relatives. These "Parliamentary Trains" led to the widespread introduction of Third Class carriages and "workers' specials", which made rail travel more accessible to those of modest means.[22]

By tram and bus

The 1870 Tramways Act led to a huge increase in the provision of tram (streetcar) systems in English cities and larger towns. Initially, most passenger trams were horse drawn, but mechanically propelled trams were rapidly adopted. Steam power soon yielded to electric propulsion, the first electric trams in England coming into use two years before the first Rover safety bicycle was launched. Trams were augmented on less busy routes by horse-drawn buses.

From the mid-1890s onwards, the cinematographers Sagar Mitchell and James Kenyon filmed street views of numerous English cities. Often, their cameramen filmed from trams. In these films, restored and conserved by the British Film Institute, the ubiquity of urban public transport is noticeable. Bicycles do appear, but not in large numbers.[23]

Walking

Many men and women in rural localities routinely walked several miles every day just to get to their workplaces. It was commonplace for groups of people to walk much longer distances to special events, such as a football match between rival town teams. In *Jude the Obscure*, the novel cited above, Thomas Hardy describes his protagonist walking back and forth along what is now the A338 main road between the thinly disguised village of Fawley, high on the Berkshire Downs, and the market town of Wantage in the Vale of White Horse, a round trip of some 10 miles (16 km) involving a steep climb on the return stretch of about 250 feet (78 metres).[24]

Previous studies

In his 1985 book *Migration in a Mature Economy: Emigration and Internal Migration in England and Wales, 1861–1900*.[25], Professor Dudley Baines states that, among other factors, "a very important issue in migration history is the extent to which the rate of emigration and its characteristics were determined by the transport improvements". He mentions railways and ships but nowhere does he refer to the bicycle or tricycle. Clearly, in his view, the safety bicycle was not a significant factor in internal migration.

However, in an 1968 paper, *Working –Class Isolation and Mobility in Rural Dorset, 1837–1936: a Study of Marriage Distances*[26], Dr P.J. Perry thought differently as this extract illustrates:

Before the coming of the bicycle, the countryman generally travelled on foot. Carrier's vans and carts, the railways, and other possibilities were too expensive for general use and often not in accord with the needs of the would-be traveller. Dependence on walking, however, much restricted the area of frequent and everyday contact. He or she who after 10 or 12 hours of heavy agricultural work, and neither as well fed or well shod as the present generation, had the energy to walk 5 or 6 miles regularly must have been the exception.

It was this situation that the bicycle, inter alia, transformed, although exactly how and when remains uncertain. Before Stanley's [sic –should be Starley's] safety bicycle of 1885, cycling, although it had enjoyed several phases of popularity, was a wholly middle class and mainly urban activity; cycles were rarely seen in the countryside. But from the mid–1880s onward, the situation changed; the bicycle was advertised to the working man, admittedly mainly the more affluent townsman, and the price of the new models fell to about £10 for the cheapest machine, with hire purchase available. This was a large sum by the standards of even the most affluent rural labourers, but not necessarily an impossible one; saving for a bicycle began very early in these circumstances, the young bachelor had the strength and opportunity for a second job, or for piece work, and a second-hand market began to develop in the late 1880s.

By means of detailed statistical analysis, Dr Perry's paper shows rural isolation of the working class in a particular corner of rural Dorset substantially and rapidly breaking down in the last two decades of the 19th century. He notes Peter Laslett's assertion in the then recently published book *The World We Have Lost*[27] that "before the coming of the bicycle and paved highway, there was a fixed distance from the labourer's cottage beyond which a full day's work was out of the question – it took too long to get there and back". Dr Perry puts his statistical findings and Laslett's assertion together, and he suggests that the breakdown in social isolation, evidenced by a greater percentage of marriages taking place between people from parishes further apart resulted, to a substantial degree, from the introduction of the Starley safety bicycle in 1885. However, he concedes that there are problems substantiating this idea. The present writer suggests that there may be an element of truth in it but coincidence does not necessarily mean causality.

It is certainly true that many of the rural working class could not afford to commute daily by carrier's cart or train; neither was there the time or energy to walk three or four hours every day to and from work. However, the carrier, the train, and the long hike (sometimes used in combination) were all feasible means of social interaction on a less frequent basis, such as weekly, monthly, annually, or *ad hoc*. Thus, for much of the rural population, it was relatively easy to attend occasional social and commercial gatherings such as markets, festivities, weddings, sports events, and, importantly, hiring fairs, the latter offering many opportunities for meeting potential marriage

partners and for getting employment further away from the home parish. Having met at such an event, a couple could enjoy courtship by using these means of transport to meet fairly regularly without it proving unaffordable or anywhere near as expensive as purchasing a bicycle. Also, a marriage could result from two people from diverse birthplaces working for the same employer. (An example being the present writer's maternal grandparents, who were born in Dublin and Somerset respectively, but they met through employment on the same Warwickshire estate.)

In the absence of evidence to the contrary, it seems probable that Professor Jones' assertion stems largely from Dr Perry's paper. However, Perry himself warns:

This study is very much an introduction; to draw general conclusions and broad hypotheses from so geographically circumscribed an example would be foolhardy...

A case study

The present writer's great-grandfather, George Lewis Hadland, came from a long line of Oxfordshire agricultural labourers. George was the youngest of 10 siblings who survived to adulthood and who were born between 1841 and 1864 in one of the poorest agricultural counties in southern England. In three centuries, the Hadland family had only moved 12 miles but George's generation changed that. By the 1880s, with cheap imports of farm produce and increased mechanisation of farming, the prospects for agricultural labourers were poor. On the other hand, travel had never been easier or more affordable. Consequently, only 2 of the 10 Hadland siblings stayed in their home village:

- *2 moved to other parts of Oxfordshire, 5 to 12 miles away (8 to 19 km)*
- *1 moved to Birmingham, 50 miles away (80 km)*
- *2 moved to London, 60 miles away (96 km)*
- *3 moved to Worcestershire, 40 to 50 miles away (64 to 80 km)*

These moves were easy, as there was a railway station 3 miles (5 km) from their village, connecting to 18,000 miles (29,000 km) of track. You could walk to the station in an hour, but you could also convey yourself and your luggage in the local carrier's cart. Later, there was even a railway station in the village itself. This form of travel meant that emigration was easy but so was maintaining contact with the folk back home.

George left home as a teenager and became a self-employed painter, decorator, glazier and plumber. In the 1890s, he bought a pneumatic-tyred safety bicycle, which enabled him to travel around the city and its hinterland, carrying his tools with him, to wherever his clients were. George's children certainly gained greater genetic diversity than they might if their father had stayed in his home village and married a local girl. But this had nothing to do with bicycles: rather, it reflected easy railway access from the rural countryside to the city.

Conclusion

There was considerable population migration within England during the late 19th and early 20th century. Although not biologically provable, there can be little doubt that this was beneficial to the diversity of the gene pool. However, by the time the safety bicycle was introduced, this mobility had been proceeding for several centuries, and it was increasing with the development of other forms of transport.

In the 19th century, improved inland waterways and roads, and the rapid creation of a dense network of railways, made movement around the country and abroad ever easier. Moreover, millions of English people emigrated to North America, Australasia and southern Africa. Many others worked on the Indian sub-continent, where considerably more mixing of genes went on than was admitted at the time.

As has been demonstrated above, bicycles were beyond the means of much of the rural working class population until well into the 20th century, but they were not necessary for the mobility needed to improve the gene pool considerably. This does not mean that they played no part in widening genetic diversity. However, it seems that Steve Jones' assertion that "the most important event in recent human evolution was the invention of the bicycle" is, in the light of the evidence presented above, an overstatement as far as England was concerned. ●

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End notes

1 Wikipedia contributors. "QI." *Wikipedia, The Free Encyclopedia*, 11 April 2018.

2 Zach Bielak, *From Pedal to People: The Social Effects of Biking*. Houston: Rice University, June 2015.

3 William Manners, writing in the Bike Blog of *The Guardian* newspaper in an article entitled "The secret history of 19th century cyclists" (9 June 2015)

4 Wikipedia contributors. "Steve Jones (Biologist)." *Wikipedia, The Free Encyclopedia*, 11 April 2018.

5 Steve Jones, *The Language of the Genes*. London: HarperCollins for Rhône-Poulenc, 1994.

6 Email correspondence between the author and Professor John Stewart, October 2017.

7 *General Report of the 1861 Census of England and Wales; with Appendix and Tables* (1863 LIII (3221) 1)

8 *General Report of the 1871 Census of England and Wales* (1873 lxxi, Part II (C.872-I) 1)

9 *General Report of the 1801 Census of England and Wales: with Appendices* (1904 CVIII (Cd. 2174) 1),

10 All sums of money quoted in this paper have been decimalized to the pound sterling format currently used. Pre-1971, the British pound comprised 20 shillings, each consisting of 12 pennies (or pence), each penny being worth two half pennies (ha'pennies or ha'pence) or four farthings. In the much simpler current decimalized format, a shilling equates to £0.05 and an old penny to £0.004.

11 *British Labour Statistics: Historical Abstract 1886-1968*. London: Department of Employment and Productivity, 1971.

12 Roger Lloyd-Jones & M.J. Lewis, *Raleigh and the British Cycle Industry*. Aldershot: Ashgate, 2000, table B.5.

13 Raleigh Bicycles catalogue. Nottingham, 1907.

14 Kate Tiller, "Labouring Lives," in *An Historical Atlas of Oxfordshire*. Oxford: Oxfordshire Record Society, 2010.

15 Thomas Hardy, *Jude the Obscure*. London: Osgood, McIlvaine & Co, 1895.

16 Strictly speaking, the term "Edwardian" means the reign of King Edward VII (1901–1910), but it is commonly used, as in this paper, for the period from the death of Queen Victoria until the outbreak of World War I (i.e. 1901–1914).

17 Joan Dils, "Berkshire Country Carriers", in *An Historical Atlas of Berkshire* (second edition). Reading: Berkshire Record Society, 2012.

18 Nigel Hammond, *Rural Life in the Vale of the White Horse (1780–1914)*. Wantage: Rectory Orchard, 1974.

19 Brian Boulter, "Berkshire Rivers and Canals," in *An Historical Atlas of Berkshire* (second edition). Reading: Berkshire Record Society, 2012.

20 Nigel Hammond, op. cit.

21 Brian Boulter, "The Railways of Berkshire," in *An Historical Atlas of Berkshire* (second edition). Reading: Berkshire Record Society, 2012.

22 Railway Regulation Act 1844.

23 Patrick Russell, "Mitchell and Kenyon" in BFI *Screenonline*, http://www.screenonline.org.uk/film/id/1084507/

24 Thomas Hardy, op. cit.

25 Dudley Baines, *Migration in a Mature Economy: Emigration and Internal Migration in England and Wales, 1861–1900*. Cambridge University Press, 1985.

26 P.J. Perry, "Working –Class Isolation and Mobility in Rural Dorset, 1837–1936: a Study of Marriage Distances" in *Transactions of the Institute of British Geographers, no. 46*. London: Institute of British Geographers, 1969.

27 Peter Laslett, *The World We Have Lost*. London: Methuen, 1965.