Food as Power: An Alternative View

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Abstract: Lost, sometimes, in the more metaphorical interpretations of food and power is the basic crudity of food as stored energy. Muscles turn the chemical energy stored in food into mechanical energy, which enables work to be done. Power is the rate of doing work. Food, literally, is a store of power. In the wake of World War Two, Europe faced a shortage of coal and oil, the two most important sources of chemical energy that threatened to gum up the transport of goods from place to place. There was, however, no shortage of unemployed men. Geoffrey Pyke, the quintessential British boffin, pointed out that people are actually much more efficient than steam engines at converting chemical energy to mechanical energy. Pyke's proposal, that trains could be moved by cyclo-tractors, locomotives powered by the muscular effort of twenty to thirty men, themselves powered by sugar, went nowhere. The paper looks at the background to Pyke's proposal, its reception at the time and the future of food-powered machinery.

Not long after VE day, in May 1945, a strange scene played out along a street in the bombed-out wreckage of London's East End. A porter from Covent Garden piled bricks onto his barrow, grabbed the barrow's handles, pushed it down the road, stopped, and removed the bricks from the barrow. Then he did it again, pushing the bricks back to where he had started. And so it went all day. The next day, he repeated the performance, except that this time he carried the bricks by hand. On each trip up and down the road, with barrow and without, he was shadowed by a gaunt, goateed, somewhat wild-eyed individual equipped with stop-watch, pencil and notebook, in which he recorded the barrow-boy's progress.

The man was Geoffrey Pyke, something of a stereotypical back-room boffin who had been instrumental in several schemes to hasten the end of the war. With the war now over, Pyke transferred his considerable intelligence and analytical power to what he identified as the most pressing problem of the peace: hunger.

> The disaster confronting Europe this winter will probably kill more people than the first two bombs of the atomic epoch. Most of the Japanese in Hiroshima and Nagasaki died instantly. The Europeans will die slowly and painfully, of cold as well as hunger, and they will have to watch their children die first; hence the official expectation that they will not be content to die quietly — especially the women. (Anon, 1945)

Pyke identified the primary reason for the coming hunger as the shortage of coal. Without coal the trains, still mostly steam locomotives, could not run, and so most people who considered the problem saw it as one of lack of transport. Pyke dug down to the root cause: 'the fundamental factor is lack of power and of the equipment to use it'. He listed some of the things for which power was needed: 'to plough fields, to produce fertilizers, and to process, preserve and transport food, and food is needed to sustain the men who produce power in the form of coal'.

For Pyke, the lack of food and the lack of coal fed on each other. People could not get to work; food could not get to people. Without food, people — miners — could not work, and without miners, there would be no quick end to the coal shortage.

Where was the power to come from? Building additional locomotives and trucks was not the answer; the shortage was of fuel not machines. Pyke took inspiration from the past, distant and much more recent. During the war, he noted, 'ordinary people have been digging out everything that would move on wheels and pushing it'. And for almost all of recorded history the most important source of power had been muscle, human and animal. The war had killed almost all the draft animals, and it would take almost a decade to replace them. That left human muscle. His experiments with the Covent Garden porter had shown Pyke that a man can move twenty times more with a barrow than he can carry. But while barrows of various sorts might be enough for individuals to move their personal effects, or bricks, they weren't going to get the country moving.

He had done all the calculations and the results confirmed the wisdom of his entirely reasonable logic. There is a shortage of power to move things about. There is no shortage of people. Human muscles can be extremely efficient — much more efficient than coal-fired steam engines. Therefore, feed humans and use the energy they derive from food as the power to move things around.

Pyke, who had been quite influential at Combined Operations Headquarters during the war, now had few champions for his ideas. He tried to get all sorts of people interested. The Association of Scientific Workers was sympathetic but the Fabian Society dismissed him as a crank: ironic, considering Pyke's focus on bicycle pedals as cranks. Pyke was desperate to get a hearing for his proposal and called on *The Economist* magazine. They decided 'to provide space for the ventilation of a thesis that is at least *prima facie* reasonable'.

The Mobilisation of Muscle appeared anonymously ('By a Correspondent') on 11 August 1945 and set out the

proposal with remarkable clarity. Pyke took pains to point out the 'illusion' that the world is rich in power. In truth, he said, the world is 'wretchedly poor in power,' with the equivalent of less than a ton of coal per head, 'barely more than one-eighth of a horsepower'. Muscle, he pointed out, was not negligible but a primary source of power.

> Even in the United States, the home of mechanisation and of cheap oil power, of the 17 billion horsepower hours expended on farms in 1930 over half was animal muscle-power. The proportion in 1939 was but little short of half. In pre-war Europe, in agriculture and industry, muscle-power, the writer tentatively estimates, equalled about 30 per cent of all the molecular power expended. And of this 30 per cent human muscle-power was about half. (Anon, 1945a)

Strictly speaking, of course, muscle is not a source of power, any more than a locomotive is. Like the locomotive, muscle is a machine that converts molecular energy — food or coal as may be — into power. Muscle, besides, is more than twice as efficient as a coal-fired locomotive. Muscle can convert around 20% of its fuel into work. The steam locomotive gets only 5-7% of the energy that goes into it as useful work, much of the rest billowing out as a plume of steam. While that might be beautiful, it was acceptable only with ample supplies of coal available; with coal in short supply, it was absurdly wasteful.

Having filled in the background, Pyke set out to 'examine with ferocity of constructive purpose' the alternatives.

His experiments had shown that the Covent Garden porter — 'possibly of over average strength' — could move 9 ton-miles net with his barrow in 8 hours, roughly 26 times more than he could with no equipment. With better equipment the results would be even more favourable, and for Pyke the right equipment was obviously a bicycle. Rotating pedals use the strong leg muscles to the best mechanical advantage. Pyke knew too that a tandem offers less wind resistance per head than two single riders. As a *temporary* solution, 'pending the production of further, and perhaps more appropriate vehicles, Pyke proposed 'suitably geared bicycle-type structures, though with four wheels, seating 20 to 30 men'.

> With such 'Cyclo-Tractors' on railway tracks, men exerting one-eighth of a horsepower each could move 45 gross ton-miles (30 ton-miles of freight) a head in an eight-hour day, assuming the wagon to be always fully loaded. That is 90 to 110 times the 0.4 to 0.5 ton-miles which a trained man can accomplish [...] without any equipment. (Anon, 1945a)

Anxious, I imagine, to root his proposal in reality, Pyke created a table showing how many people pedalling Cyclo-Tractors would be needed to get goods moving around the countries of Europe at half their pre-war rates. In the UK, he calculates, it would take just 1.23% of the railway workers powering locomotives as he suggests. Italy, Norway and Yugoslavia could do it with a much lower proportion, Germany with a slightly higher.

Pyke gave other solutions their due and showed them to be wanting. A 3-ton lorry, for example, consumes 4.5 times its own weight in fuel a year. His pedallers would need food too, 'but it is only the additional food necessary to enable them to do heavy work that needs to be reckoned, and this provides a substantial economy of shipping'.

To emphasise his point, Pyke included a diagram showing how the energy of a pound of coal might flow through machine and man. The pound of coal, which contains about 3150 calories, delivers 173 calories of work if fed directly into a steam engine. Alternatively, the pound of coal can be used to produce a pound of refined beet sugar, which contains about 1820 calories. Feed that to a man and he converts it into 364 calories of work output. The man's overall efficiency is about 11.5% *versus* the steam engine's efficiency of 5.5%, a twofold advantage. It would be 'more economic, and politically necessary,' Pyke argued, to use what little coal there was to refine beet sugar than to power locomotives. And, as he sagely pointed out:

> Half of the sugar — *given the appropriate equipment* — would be needed for the haulers taking the place of the steam engines, but the other half would be available to feed other workers such as coal miners, whose present output is so heavily reduced for want of food. (Anon, 1945a)

Reading the article today, it seems clear that Pyke thought that he had presented the evidence on which policy should be based, and that was all there was to it.

> The living engines are already here, anxious to work for their salvation and that of their families and their civilisation, but, owing to the failure of foresight, lacking the equipment. (Anon, 1945a)

The Economist, for its part, threw down its own gauntlet and called on 'the authorities, British or American, either to say what is wrong with the argument or to accept it'.

The silence, at least in the pages of *The Economist*, was deafening.

Seeking, perhaps, a larger audience, Pyke also contacted the *Manchester Guardian,* where he was friendly with journalists, which published three articles in the week of 20 August 1945 by Pyke. While they expand somewhat on the Economist article, they do not add much. Efficiency remains the core of the argument. Pyke argues in the *Manchester Guardian*, for example, that if manufacturers put the raw material required for a three-ton lorry into cyclo-tractors, they would produce equipment capable of moving ten times as much freight as the lorry. Similarly, mining coal was itself quite inefficient, at least in some parts of the world. Society would be better off if miners used their energy to grow sugar beets which, as argued in

The Economist, would supply more energy to the muscle machines powering the cyclo-tractors than the coal the miner could dig out of the ground. The same for getting people to work, where a cyclo-tractor beats even individual bicycles, using 70% less energy than a train to move people a mile. Pyke estimated that before the war Europe's passenger trains used 13 billion tons of coal, 11 billion of which went to hauling the weight of the coaches.

The *Manchester Guardian* articles attracted a little more attention. The *Daily Herald*, for example, described the scheme as 'fantastic' and characterised Pyke as someone 'who ... has had considerable experience in the war of putting forward seemingly crackpot schemes later to be adopted by the highest authorities' (Anon, 1945b). But the *Daily Herald* summarised Pyke's arguments fairly and, like *The Economist*, asked the authorities to consider it. 'At least we might be told by the experts why it is impossible'.

Cycling magazine rose to the bait too. Its piece describes Pyke as an economist, which, to me, suggests less than due diligence. *Cycling* lifts most its content straight from the *Manchester Guardian* (Anon, 1945c). The piece is headlined 'Will the cyclo-tractor save Europe*?'* which forces me to point out that almost any headline in the form of a question presupposes a negative answer. *Cycling* duly obliges with an article on the following page, by one A.C. Davison, headlined '... Doubtful' (Davison, 1945). I'm not sure Davison knew who he was dealing with, because he offers Pyke a definition of power and then raises some rather trivial objections. '[T]he cyclist, although efficient, is only a small-power engine, and heavy at that, and the world is not flat'. Davison calculates that even without any additional freight, an eight-man cyclo-tractor would come to a dead stop on a slope greater than 1 in 17. And while he agrees that rail would be more efficient than road, he claims that 'the impossibility of combining traffic at 5 and traffic at 80 m.p.h. on the same track is insuperable'.

To its credit, or perhaps it had no option, *Cycling* gave Pyke an opportunity to reply (Pyke, 1945). On the question of gradients, he points out that Davison 'has forgotten the other side of the hill'. Gravity restores the energy expended on lifting the load, less a little bit for friction and wind resistance. Coaching inns were often at the base of steep hills, so that an additional fresh team could be harnessed to the load to give it a power boost; the same could be done for cyclo-tractors, and by design there just aren't that many steep inclines on railways, less than 0.6% of the track in Yugoslavia, 0.8% in Germany and 1.1% in France. As for different speeds, 'there are no trains running at 80 m.p.h. on the Continent today, and it is doubtful whether 1 per cent of the tracks are carrying traffic at over 50 m.p.h.' Every railway manager would know how to dovetail fast and slow traffic.

Three weeks later, *Cycling* magazine weighed in again with a small-minded critique by its 'health expert' (Fearnley, 1945) He poked fun at Pyke 'sitting in his Mayfair apartment,' possibly ignorant of Pyke's actual, shabby room in the no-man's land between Hampstead and Chalk Farm and, true to the mainstream science of the day, could only see that he didn't talk about the need for meat in the diet of his pedallers. The piece is, in my opinion, condescending and full of bluster, without much of that very important meat to it. 'The Man Who Knows the Answers!' as *Cycling* styles its health expert, concluded:

> Finally, we of the cycling world could not condone a practice which prostituted our sport and pastime to the level of post-war punishment of the vanquished on an experiment foredoomed to failure.[1]

Pyke, for his part, hoped only to rouse cyclists and cycling clubs, with their technical expertise, to pressure their MPs into at least testing the idea, and was not above scare tactics in trying to build a sense of urgency. In his rebuttal of Davison he wrote:

> According to one reputable British correspondent, Allied public health authorities in Germany, for example, 'are ordering Burgomasters to take measures ensuring that graves are dug now which men, debilitated by weeks of undernourishment, will not have the strength to dig in a few months' time'.(Pyke, 1945)[2]

Davison, like almost everybody else, could see only what he had seen before. Where Pyke wanted to use what fuel there was efficiently and effectively, Davison just wanted more of the same. Make a million new bicycles just like the old ones and give them to people — including the coal miners on the Ruhr — to cycle to work, blind to the waste inherent in the use of scarce materials and blind also to Pyke's argument about the waste of using coal to power locomotives rather than to refine sugar.

Pyke nevertheless welcomed Davison's article and hoped he would contribute further, perhaps by putting pressure on the authorities. He stressed that '[t]he first duty of a citizen must be a willingness to make a fool of himself. It is on that willingness that technical progress depends'. It is impossible to know what Pyke was thinking when he wrote this, for he certainly knew that he was no fool himself. But he had seen his ideas rejected time and again, enough for him to share one of his hard-won conclusions with the readers of *Cycling* magazine:

> The first social law in England, even now, remains that nothing must ever be done for the first time. Only the repeated breach of this law will eventually cause its disappearance.

More than sugar

Pyke was difficult but indeed no fool, and the reaction, what there was of it, could not have surprised him. David Lampe, Pyke's first biographer said 'the idea was sloughed off as one more comical product of English eccentricity'

(Lampe, 1959). The winter of 1945-46 was bitterly cold, with severe power shortages, and according to Lampe many Britons suffered more than they had during the worst of the war's bombings. Pyke kept pushing his idea to anyone who would listen and was met for the most part with polite indifference. Despite the calls to do so in both *The Economist* and *Cycling*, no-one challenged his ideas. No-one tested them and no-one was able to refute them. Worse: they were ignored.

In the summer of 1946, Pyke had another go, and this time he returned to a theme that he had raised briefly in his earlier pieces: food. This part of the story is much less well known and it shows both that Pyke was thinking of more than moving freight and that the authorities really didn't know how to respond. A confidential Ministry of Aviation personal file records the details (TNA 1946).

On 20 August 1946, Lord Nathan at the War Office received a 16-page paper from Pyke headed 'A Suggested Policy'. In it, Pyke moved far beyond the lack of power for transport and expressly addressed the need for power in global food production. He first drew a distinction between what he called 'dynamisation' and mechanisation. The former, he defined as adding engines to machines. Mechanisation, by contrast, makes the use of muscle power more efficient 'by the substitution of machinery for tools' — rather as the invention of the reaper, the binder and eventually the combine harvester made the use of horses in grain agriculture so much more efficient in the 19th century. Pyke recognised the need to build tractor factories, against the day when fuel would not be so scarce, and the first of his policies was that the United Nations should underwrite the risk of building those factories. The bulk of the paper, however, is devoted to the second of his suggested policies, 'that without waiting for action by the United Nations, organised scientific effort should at once be made within the British Empire for the evolution of prototypes for the mechanisation of labour in agriculture'.

The analysis of the current global food picture that Pyke offered is brief but compelling, pointing out that while there is no food shortage in the USA, the population there is consuming more per head, while the assumption that Britain 'by virtue of our economic power' can buy what it wants is no longer valid. More, he said that we cannot simply consume more ourselves without giving a thought to those less able: we should not eat more until others can also do so. And that means that

> [W]e shall be less willing than hitherto to tolerate differential efficiency in food production. If I cannot have more bread because of the backward methods of Asiatic agriculture, then I am going to want those methods of agriculture improved. Toleration of technical inefficiency will become a heresy.

Two overarching problems needed to be solved: better distribution of what food there was and increasing the amount of food produced, 'particularly in the areas of the greatest need'. Pyke's paper then focused on the second of these, devoting considerable space to explaining why we cannot afford to wait for tractors and draught animals and why mechanisation is, in any case, more appropriate for many of the people most in need of more food. Just as he had with the Covent Garden porter in his first cyclo-tractor proposal, he was careful to offer numbers to justify his claims; the area a man can dig with a spade is perhaps 20 or 30 times less than a horse-drawn plough in the same time, and a hoe is even less efficient than a spade. And, as with the cyclo-tractors, he saw beyond the immediate effects. Digging by hand 'represents a prodigious expenditure of man-hours,' which would lead to a shortage of labour, a shortage of industrial output and thus a shortage of agricultural output. In a final echo of the cyclo-tractors proposal, Pyke stated that '[p]rocesses essential to food production must now be performed by human power or they will not be performed at all. We are suffering, in short, from a power famine as well as a food famine'.

Pyke offered some examples of the kind of mechanisation that he had in mind. In Burma, for example, a plough for rice paddies is pulled back and forth by a steam engine. 'A similar ... apparatus powered by stationary multiple cyclo-mechanism may prove more productive than digging or hoeing by hand'. By and large, though, he was more content to point out the benefits of mechanisation. For example, Pyke says, Appleby's twine binder, fully developed in the 1870s, was the pre-eminent of many horse-operated machines that speeded up the harvest and actually did more to increase food production, per worker and absolutely, than later dynamisation.

His main purpose, however, was not to advocate for specific machines or even his own ideas. It was, rather, to build on his experience of the ways in which scientific methods and approaches contributed to the war effort, and to urge a similar attack on food production. He called on the Empire to establish a body, which might then be taken over by the FAO — the United Nations again — to research mechanisation for food production. He warned that it should not try first one thing then another but should attack on a wide front that will 'get through somewhere'. Above all, he wanted this body to let the scientists get on with it. His proposed body might select an area, such as rice, but otherwise he strongly suggests 'leaving the final detection and formulation of problems to those who are asked to solve them'.

Government's lack of energy

Having received Pyke's paper, on the same day that he received the letter, Lord Nathan, Under-Secretary of State for War, wrote to John Wilmot, Minister of Supply, specifically to ask about improvements in food production in the Far East and Asia. While distancing himself from the proposal[3] he suggested that 'there may be a case for examination of the ways in which it might be possible to

harness muscle power' and asked Wilmot to delegate one of his technical staff to contact Pyke to discuss.

The request then wends its way through the corridors of power. The Minister of Supply sends the request down the line, commenting that the machines Pyke proposes 'would present no difficulty either in design or manufacture'. The question is whether the machines are needed; 'an exploratory discussion' with the Agricultural Adviser to the Colonial Office and Pyke might answer that question (Bowyer, 1946). The reply agrees that 'we are competent to proceed,' but echoes the question of need. 'We should ask the Colonial Office to consider the proposal'. (Wrisberg, 1946) A note on the minute from the Minister asks 'Do you suggest any further action by our department?'

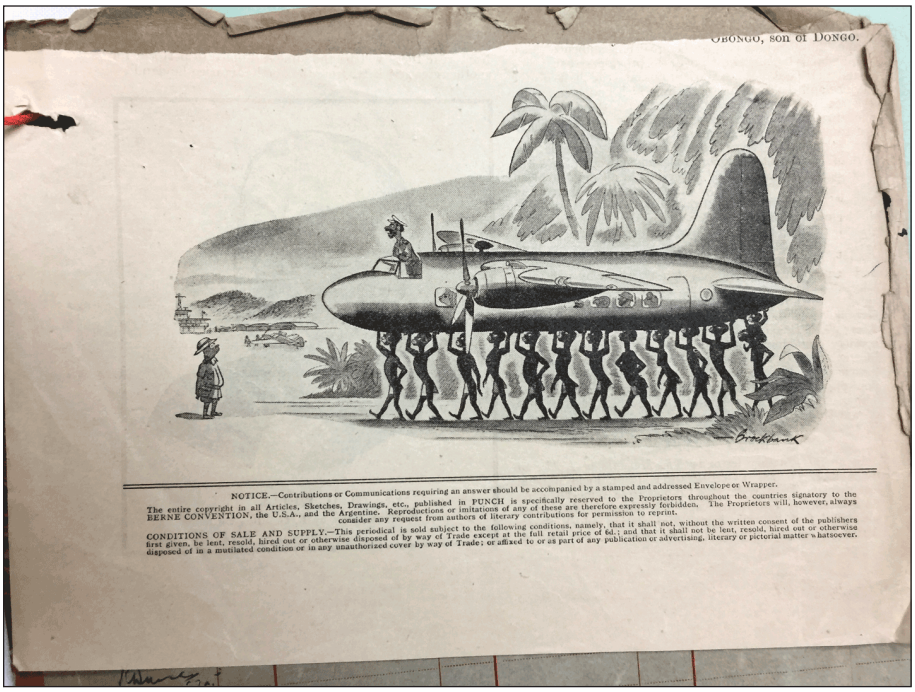
OBONGO, son of DONGO.

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Figure 1. Unsigned page torn from Punch magazine. (Photograph by author.)

The Colonial Office wrote to Pyke at some length, noting that any increase in the food supply in the colonies would come from annual crops, grown in the colonies mostly by peasants and that it would be the people, not the equipment, that might pose a problem

> The difficulties in the way of increased supplies of tractors do not seem to us an insuperable obstacle, particularly as compared with the limitations on action already imposed by social and soil conditions in the Colonies (Monson, 1946).

The Colonial Office went on to ask Pyke for examples of 'mechanization' rather than 'dynamisation'' but warned that 'I doubt ... if we could make much progress unless we were given considerably more detailed proposals than are set out in your memorandum'.

And there the trail more or less runs out. If the Colonial Office and its agricultural advisers did ever decide that there was indeed a need for research into the more effective mobilisation of human muscle power, I can find no record of it. The final folio in the Air Ministry file in which I found Pyke's memorandum is an undated, unsigned page torn from Punch magazine. I suppose it is the Colonial Office's last word on the subject (Figure 1).

The problem abides

And yet, even today, half a century on, power remains an important constraint on food supply, especially for small scale farmers. In developing countries, according to the FAO, only 6% of the energy for agriculture comes from engines of various kinds. The rest comes from muscles; 23% belonging to working animals and 71% to humans. In Pyke's day, it was a shortage of fuel for engines that drove his concern. Today, while fuel is more freely available, it is still beyond the reach of many farmers. As a result, research into mechanisation continues.

One reasonably well-known area of research is irrigation, where power is needed to move the water required to grow a decent crop. Pump-driven wells, often installed by well-meaning NGOs and development agencies, litter the landscape in many poor countries, their pumps broken and useless as they await parts and plumbers. More recently, engineers have worked to develop human-powered pumps, notably the treadle pump. While these are inexpensive to manufacture, more efficient than, say, a bucket lifting device and much better than a non-functional engine, they are certainly not cheap to operate. FAO points out that for a litre of petrol, a small engine can deliver in one hour what a person would have to work four days to achieve. The farmer who has such a pump has the equivalent of about 30 labourers working for the price of a litre of petrol. Even if the farmer reckons her labour at $1 a day, the opportunity cost of this 'free' work is higher, per kilowatt-hour, than some newer energy sources, such as photovoltaic cells (Anon, n.d.).

More generally, the goal of the kind of work Pyke envisaged would be to improve the livelihoods of small-scale farmers by making it easier for them to produce higher-value products and at the same time reduce the drudgery of muscle-powered agriculture (Sims *et al.*, 2016) This becomes especially important as men move to the cities in search of jobs, leaving women — who produce up

to 80% of the food in sub-Saharan Africa — to work the farms. However, although the men may have temporarily left the village, their norms continue to pervade the society. Thus, women are expected to work hard; making their jobs easier is not a concern. In Uganda, for example, women often use a short-handled hoe, which makes the work of weeding extremely arduous. A woman who uses a long-handled hoe, however, is seen as lazy. Lighter hand tools would be ergonomically more suitable for most women, but are seldom available. Overall, women themselves do not have time or opportunity to access the resources and information that might improve their lot; if they have any tools to help them do so; these are often produced for, and bought by, men.

Perhaps the most important task women perform is weeding the fields, which takes up more time than any other operation. The simplest changes can have profound effects, most notably planting crops in rows rather than broadcasting seed. Farmers often say that they do not have the time to plant in rows, because broadcasting is so much quicker, but this is a very false economy, given how much longer almost all other operations take as a result. Where maize is planted in rows, an animal-drawn hoe can weed an acre in 2-4 days, while it takes 2-4 weeks to do the same job by hand (Kienzle and Una, 2011) Additional benefits arise from the timeliness of the work. If mechanical weeding is delayed by a day or two, perhaps by illness, it makes little difference to the harvest. With a broadcast crop, a break in weeding, especially early in the growing season, can result in considerable loss of yield.

Many hand tools can be improved and made more efficient. Backpack sprayers, for example, must be carried and normally require one hand to pressurise the tank by pumping and one to wave the spray nozzle over the plants. A simple handcart that uses a drive wheel to pump the tank can be fitted with two nozzles to spray two rows of plants, reducing the time and drudgery of using herbicides and pesticides and, probably, the amount used. Simple hand tools can speed seed planting, better sickles make harvesting easier, muscle-powered threshers reduce the drudgery of preparing cereals; the possibilities are endless. However, the impetus to improve tools by mechanisation, in Pyke's sense, seems to be waning, just as it did in the Colonial Office. One expert in the field observed that 'in Africa at least, there is quite a strong current towards tractorization and away from hand tools and animal traction' (Sims, 2018 pers. comm.). This raises all sorts of further questions about sustainability, if those tractors depend on fossil fuels and have the expected environmental impacts.

That's not to say that human muscle power is an entirely abandoned field. A quick trawl through the internet reveals a wide range of schemes, from food blenders powered by a stationary bicycle, which Pyke would surely have liked, to highly-advanced piezoelectric shoes that harness some of the energy wasted in walking to recharge mobile phones.

On the night of 21 February 1948, Pyke took his own life 'in a moment of mental imbalance,' as the coroner decided. One of his obituaries picked up on the fear of innovation that he so often identified as an obstacle to progress, as indeed he had in *Cycling* magazine. 'Nothing must ever be done for the first time,' he was fond of saying'. A few months earlier, the BBC had offered Pyke the chance to promote his ideas about muscle power in a new series of radio talks called We Beg to Differ. Instead of leaping at the opportunity to reach a huge audience, Pyke insisted that he needed two talks, the first to soften up the audience so they might be better prepared to accept innovative ideas, the second to explain his own innovative ideas. No recording of the talks survived, but the script did. Pyke's biographer David Lampe gave this account of the second talk's conclusion

> 'Imagine that the bicycle had never been invented, and as a result of analysing the present position, as we have done tonight, we were to urge the right policy — the overdue policy — was now to evolve a machine which should replace and economize in the energy required for walking'.
>
> 'Do you feel confident that we should be taken seriously? Are you sure — if we did get a hearing — that we shouldn't be laughed at? Can't you see the coy, jocose newspaper paragraphs?'
>
> There followed a pause long even by Pyke's standards.
>
> 'And yet the bicycle *was* invented'. (Lampe, 1959, p. 193).

As David Lampe notes: 'Quite a few people talked about this broadcast too. Talked, but did absolutely nothing'.

About the author

Jeremy Cherfas is a freelance writer and journalist who lives in Rome. His main interest is in food systems and the many factors that interact to determine what, when and how we eat. Much of this finds an outlet in his regular podcast, Eat This Podcast, which has twice been nominated for a James Beard Award. He first became aware of Geoffrey Pyke decades ago while Biology Editor of New Scientist magazine and is glad to have the opportunity to explore and share one of the lesser known facets of Pyke's work.

Notes

1. He uses the rest of the page to advise J.T.W. of London S.E 11 how best to reduce the size of his buttocks, depending on 'whether they are large and fat or large and muscular'.
2. I have not been able to confirm Pyke's source for this, but an online search hints at a report (reprinted?) in the 16 September 1945 edition of the Sunday Times of South Africa.
3. 'I do not wish it to be thought that I am in any way sponsoring Mr. Pyke's ideas or projects: I am merely

drawing your attention to them so that if you think fit they may be examined'. TNA, AVIA 49/26

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