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Sustainability, Society and You

Big Issues for our World

Waste – Rubbish or Resource?

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Attitudes to waste

In the modern urbanised world, attitudes to waste tend towards the negative. But attitudes to waste are a reflection of a society's political, philosophical and religious frameworks and we learn much about humanity by considering how perceptions have changed through time and space.

Source of evidence

History is littered with examples of the ingenious schemes designed to rid us of the rubbish from which we cannot escape. We might think of the legal procedures of the Assizes of Nuisance in medieval London that fined those who defiled the streets. Our attention might be drawn to the efforts of Napoleon's engineer Bruneseau or later the works of Haussman to clean up Paris, or to Albert Giblin, that forgotten hero of waste management whose early 19th century invention, the Silent Valveless Waste Water Preventer, was later popularized by the all too familiar Thomas Crapper. Across the centuries, the efficient removal of waste from the domestic setting has become synonymous with 'progress' and civility. By the 18th century it was part of the discourse of improvement, a marker of polite society, a policy driven by the urban bourgeoisie.

Archaeology is particularly well suited for understanding attitudes to waste as the profession is, essentially, based on the study of ancient rubbish; concerned with examining the artefacts and food remains thrown away by people in the past.

Given the archaeologist's fascination with ancient refuse it is possible for them to highlight cultures that were fastidious recyclers and others that accumulated monumental rubbish dumps.

Importantly, when archaeological data are combined with information from other disciplines it is possible to examine the consequences of the different strategies that humans have employed to deal with 'waste'.

Non-existence of waste

Looking back, or sideways, to hunter-gatherer groups it is clear that 'waste' was/is not a valid concept. Many modern hunter-gatherers societies believe that their environment provides for them in a parental fashion and, as such, they tend to consider it inappropriate to take more than is needed, or waste what is taken.

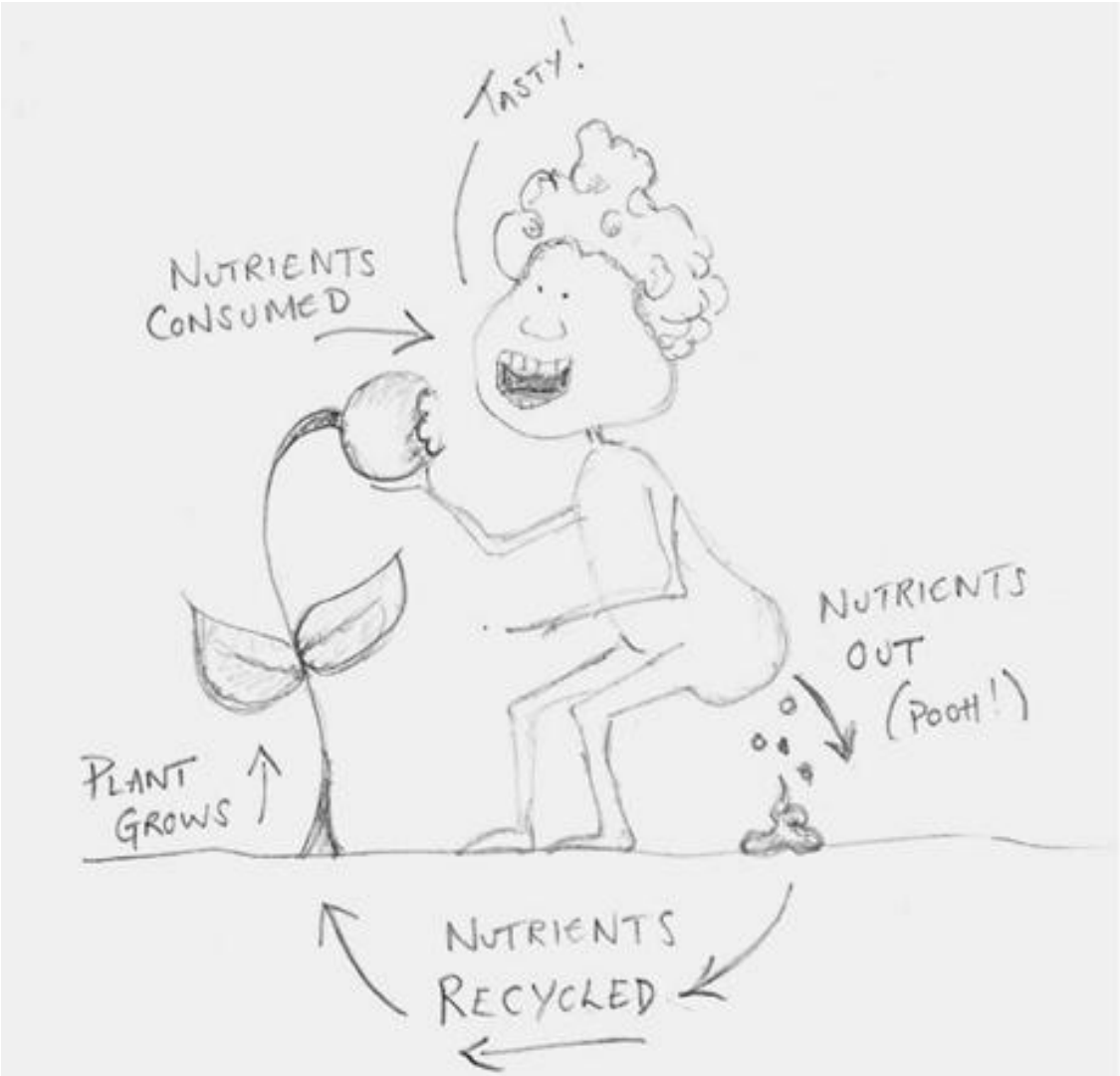
If we assume that similar beliefs were held by ancient hunter-gatherers, this could explain why Mesolithic settlements produce little evidence for over-hunting and many of the animal remains are highly processed, suggesting that all part of the carcass are utilised.

The mobility of hunter-gather groups and their low population density also reduces the impact of human faeces on their environment. Indeed, human manure would have been spread widely and thinly and so would probably have been an important addition to the nutrient cycle.

The Virtuous Cycle of Return

The ecosystems in which hunter-gatherers exist are generally sustainable because nutrients are recycled efficiently: they are drawn from the soil by vegetation which is consumed by animals (including people) and then excreted back into the same environment.

As soon as humans start deliberately growing food but consuming it elsewhere, the balance can be lost with nutrients excreted away from the environment that produced them. This not only begins to deplete the soil of its nutrients but can also create a problem of human 'waste' (excrement) at other locations.



Above image developed at the University Of Nottingham

The necessity of waste

As hunter-gatherer groups began to settle down into permanent farming communities, they were confronted with these two problems:

- Accumulations of waste from both humans and the newly-domesticated animals seemingly increased rates of disease.
- The communities had to keep the soil fertile over many years of activity.

The solution was the domestication of animals, for not only did these animals provide the traction for working the land, but now corralled and deprived of their extensive ranges, these early farming communities were able to gather their dung more easily and spread this on their fields.

Classical attitudes to waste

For the ancient Greeks and Romans, human and animal manure held an elevated status. By the first century Virgil wrote in his *Georgics* that:

> Yet shall thy land from these at pleasure rear,
> Abundant harvests each alternate year,
> If rich manure fresh life and nurture yield,
> And ashes renovate th'exhausted field
> Thus lands in grateful interchange repose,
> And wealth unseen beneath the fallow grows.

From this poem is made clear the need to manure fields and leave them to lie fallow for a year so that the soil may recover.

The rise of abhorrent waste

Whilst waste is an important fertilizer, it is also a source of disease and internal parasites – both of which spread rapidly within towns.

The Roman authorities sought to deal with the issue of waste by constructing a monumental sewerage system, the *Cloaca Maxima*. The *Cloaca Maxima* was as much a powerful expression of urban development as it was a practical waste management solution. The sewers also had strong religious connection, with a shrine dedicated to the *Venus Cloacina*, 'Venus of the Sewers', and man-hole covers depicting a river god swallowing away waste – known today as the *Bocca della Verita*, 'Mouth of Truth'.

For the Romans, cleanliness was very much next to godliness. Roman dirt existed to be cleaned up and the prominence of the sewers in Roman literature, in archaeological remains, in the shrines to *Venus Cloacina* and in the metaphors of political debate indicate that to control dirt was to reach the state of purity and order that was the cornerstone of the Roman religious and political system.

Medieval filth as a source of fortune

Waste was a source of goodness and, for many, brought not only material benefits in the form of food but also spiritual succor: the Bible is full of references to dung and dunghills, the Old Testament making clear that it is from the dung heap that the poor will be delivered and the unrighteous condemned.

Furthermore, the metamorphosis through which unholy excrement is converted into wholesome fertilizer is akin to transubstantiation. Undoubtedly this was read as an allegory of Christ's crucifixion and resurrection: from death and decaying matter, through the process of putrefaction, comes a substance that can restore life.

For this reason, great efforts and industry was put into retrieving manure and spreading it on fields – even the urban population made a contribution, their 'night soil' being collected by gong farmers, or 'gongfermours'. The gonfermours's job was to clean out urban cess-pits and take the contents out to collection points in at the extremities of towns so that it might be spread on the fields.

Cleaning up European cities

The medieval system operated largely unchanged until the 1850s and 1860s when London's sewers were overhauled on a scale akin to that witnessed earlier in Rome.

Interestingly, two plans were put forward for London. The first was to channel the city's effluent to a number of key points outside the city, where it might then be transported to the fields. However, critically, this plan was rejected in favour of a scheme that sought its immediate disposal into the Thames.

At approximately the same time, the sewers of Paris were also disgorging large quantities of effluent into the Seine. This genuine waste of a useful resource was commented upon by Victor Hugo (1862: 54) in *Les Misérables*:

"*All the human and animal manure which the world wastes, restored to the land instead of being cast into the water, would suffice to nourish the world*"

Critical turning point

To a large extent the changes to traditional waste management systems were encouraged by an international cast of chemists, such as Lavoisier, Senebier, Priestley, Ingenhouz, Tilley and du Hamel, whose experiments demonstrated that plant vitality rested on the uptake of chemicals rather than biological inputs.

In 1840 Justus von Liebig published his Agricultural Chemistry and within a year the first artificial fertilizer factory opened at Deptford, south-east of London, where a 'Super-phosphate of Lime, Phosphate of Ammonia, Silicate of Potash, etc' was manufactured.

A new age was born. Where previously farmers had relied on the recycling of locally-produced waste to keep their land in good condition, they now could access a range of specialized products designed for specific crops or soil conditions. What on earth could go wrong?

A new generation of waste

In India there is now considerable debate about the future of farming as international conglomerates aggressively push forward monocultural practices using high-yield crops underpinned with the use of agrochemical fertilizers. This is threatening not only the livelihoods of smallscale farmers but also having an immediate and deleterious impact on the ecosystem itself.

This apparent 'need' for chemical fertilisers to feed the large proportion of the world's human population is now the major source of nitrates in the environment. This is having considerable environmental impact. Nitrous oxide is a significant greenhouse gas but there are also other environmental effects, as outlined in the following table:

Compound	Chemical formulae	Environmental effects
nitrate ion	NO_3^-	acid rain, eutrophication of water‡
nitric acid	HNO_3	acid rain, eutrophication of water
nitrogen dioxide	NO_2	smog, acid rain, eutrophication of water
nitrous acid	HNO_2	smog, acid rain
nitric oxide	NO	smog, acid rain
nitrous oxide	N_2O	greenhouse gas, destruction of ozone in the stratosphere
ammonia/ammonium ion	NH_3/NH_4^+	smog, eutrophication of water, aerosols§

The increased use of nitrogen compounds in agriculture is also indirectly implicated in:

- Marked increase in the incidence of asthma in many developed countries.
- The formation of algal bloom which 'choke' lakes, rivers and streams. The blooms may contain a type of bacteria, called cyanobacteria, which produce toxins, killing water life and posing a threat to people

A necessary evil

Many would argue that such chemical fertilisers are necessary if we are to feed a growing, frequently starving population. However, food is losing its flavour, the very make-up of the soil is being destroyed, and farmers are required to buy in fertilizers and thus find themselves exposed to the vagaries of the market. This is a sorry indictment of the impact of chemical fertilizers on the lives of producers and consumers, and on the land itself.

Back to basics

The first half of the 20th century saw the publication of a number of influential treatises which rejected chemical fertilizers and advocated more organic methods. We might pick out Rudolf Steiner's 1924 lectures, published as *Spiritual Foundations for the Renewal of Agriculture*, which responded to the damage he perceived had been done to agriculture by 'modern cultural and intellectual trends'.

Steiner's suggestion for a more holistic approach, that emphasised the use of manure and planting according to lunar cycles, resonates with the earlier agronomic texts of Roman and Arabic writers. His treatise would become the basis of biodynamic agriculture. This, together with the works of others, led to the formation of the Soil Association in 1946, which remains the most important voice for the organic movement.

In the post-war period, in what might be described as a Malthusian ground swell, we have seen a return to more natural practices. This largely unchoreographed movement from below lies behind biodynamic farming, organic farming, local food, and slow food movement. What articulates the practice and philosophy of this amorphous group of individuals and organisations is a concern for the environment and the future of the soil. As a consequence those involved are increasingly discarding the chemical solution and returning to the very principles that guided farming throughout the pre-industrial era.

Deep time perspectives

In order to return to a situation where human and animal 'waste' is considered as an important product, it will require the West to get over our phobia of faeces and dirt, and gain a more balanced perspective on labelling materials as 'waste'.

Waste at source

One of the most high-profile examples of food waste is that of fish 'discard' – whereby caught fish are thrown back (dead) into the sea by fishing fleets because they have exceeded their EU quota. This is an example of waste at source.

Discards have become a major feature of the fishing crisis, publicised by the campaign led by celebrity chef Hugh Fearnley-Whittingstall, who has argued that half of all fish caught in the North Sea are discarded. His *Fish Fight* was a very creative campaign against the practice of discarding fish on the grounds that the fishing team have exceeded their quota, and that the fish being discarded are less valuable than other species.

His campaign became part of a wider battle against over-fishing, and for changing the way we consume fish, which engaged the public through petitions, challenging them to become more discerning consumers. The Fish Fight campaign also developed effective alliances with movements like Greenpeace to force the large supermarkets to change their practices.

Food waste

Supermarkets are responsible for huge quantities of waste: shelves hold baskets of oranges, scores deep, hundreds of cartons of milk are on perpetual display and meat and fish counters bulge with pre-wrapped, oven-ready protein. A proportion of this food is never sold and while some supermarkets have signed up to food bank donations, large quantities of unspoilt but 'past sell-by', or slightly blemished items, are, literally, 'dumped'.

'Freeganism' is an attempt to redress food wastefulness. Opposed to the routine waste of supermarkets and households, freegans seek to draw attention to the financial and friendly benefits of sharing wasted foods. Whilst freeganism is now a term used in common parlance, the message is still not getting through to the general public. It is estimated that nearly 30 per cent of the food Britons buy is wasted, with over 6.7 million tonnes being discarded uneaten.

The issue of waste, and perhaps more importantly, wastefulness, goes to the heart of global inequalities. As Tristram Stewart notes, 'All the world's nearly one billion hungry people could be lifted

out of malnourishment on less than a quarter of the food that is wasted in the US, UK and Europe'. Moreover, a 'third of the world's entire food supply could be saved by reducing waste – or enough to feed 3 billion people; and this would still leave enough surplus for countries to provide their populations with 130 per cent of their nutritional requirements.'

The statistics of waste – food waste, packaging waste, electronics waste, wasted journeys – are shocking, and have economic, environmental and, perhaps increasingly, personal implications.

What is rubbish

In many Chinese cities street recycling is a way of life. Here 'waste' is a means for people to earn money to live. If they work hard (and are lucky) they make more money than if they had not migrated from their villages. Many cities have a steady supply of materials such as paper, corrugated card, plastics and metals. These are collected for recycling (that is, making into new items with a similar function). The recyclers will spend their entire day travelling around neighborhoods collecting and buying materials. Once they have collected as much as they can carry, they then take their load to depots where the waste is weighed out and money changes hands. In many cases the people collecting waste are rural migrants who have moved towards China's coastal cities in search of a better life for themselves.

Conclusions

Attitudes to 'waste' reveal a lot about the cultures responsible for its generation (or not). Rubbish may be a focal point for communities, as in Prehistory when middens proclaimed wealth and fertility, or in modern Chinese cities where rubbish middens proclaim the opposite: poverty and ill-health.

Where connections are made between illness and waste, humans have gone to extraordinary lengths to ensure that 'filth' is jettisoned out of eyesight.

Many cultures have seen great feats of civil engineering to deal with waste, such as the sewer systems that were monuments to Roman and Victorian civilisation. However, as is the case with most short-term

solutions, the problem was just passed down the chain (or drain) creating much larger long-term problems of water pollution and soil fertility.

Sanitation systems, for all the benefits that they have brought for human health, have also created a legacy of cultural neuroticism about 'filth', with communities discarding ever greater quantities of 'rubbish' (or perfectly good food) that ought to be used to bring others out of starvation.

Acknowledgements

Much of the text above is drawn, with permission, from:

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Bradley, M. 2006. Roman sewers and the politics of cleanliness, *OMNIBVS*, 51: 3-5.