

Plastic: The Elephant in the Room

By Sam Knight

Friday Apr 25 2008 16:40

At the end of a cobbled mews in Notting Hill, west London, in a series of small, dark rooms, you can track the advance of plastic containers into our lives. The Museum of Brands, a collection of pill bottles, chocolate wrappers and other artefacts of consumption, is sandwiched between a packaging design company and a smart dressmaker. In its low-lit displays, plastic emerges in the late 1950s and steadily encompasses more and more of the things we buy, consume and throw away. The first piece of plastic packaging appears just after a cabinet devoted to the Coronation: a pink bottle of Outdoor Girl talcum powder. The odd tub of detergent then presents itself before the 1960s deliver up Britain's supermarket diet: Coco Pops (1960), Spaghetti Hoops (1966) and Smash Instant Potato (1968). From the introduction of "Ski with real fruit" yoghurt in 1963, plastic spreads in all directions to its current eminence as the wrapping of choice for more than half the packaged goods in the UK. By the time the visitor reaches the present day - a bright archway of rainforest berry drinks, Asda probiotics and Nivea cell-renewal creams - it's so ubiquitous you barely notice it. What else could two litres of Diet Coke with lime possibly come in?

Close up, plastic packaging can be a marvellous thing. Those who make a living from it call it a forgotten infrastructure that allows modern urban life to exist. Plastic film, bottles, trays and pallets have helped society defy natural limits such as the seasons, the rotting of food and the distance most of us live from the fields and factories where our dinners, drink and drugs are produced. Evolved under the pressure of ever-rising oil prices, transportation costs and technology that allows goods to stay fresher for longer, plastic packaging is now absurdly sophisticated compared with the objects it contains. Temperature control for mushrooms; laser-drilled holes for salad bags; seven alternating layers of film inside a carton of UHT milk ... all this from just 2 per cent of the world's oil production.

And yet we do not like it. Increased use of plastic packaging in the 1960s led to fears that cows were swallowing polythene bags, and helped speed the passage of the Litter Act of 1971. The oil crisis then brought a wave of revulsion against our conspicuous reliance on foams, disposable coffee cups and the quantity of plastic rubbish in the sea. Partly we do not like waste - and used plastic packaging is often ugly and bulky - but plastic waste, with its hydrocarbon roots and industrial manufacture, is especially galling. We do not know where it comes from, and we do not know where it goes to, only that there is too much of it. In 2008, the UK will produce around two million tonnes of plastic waste, twice as much as in the early 1990s. The very qualities of plastic - its cheapness, its indestructible aura - make it hubristic, a reproachful symbol of an unsustainable way of life. When the subject comes up in conversation, someone usually ends up quoting The Graduate. Benjamin Braddock (played by Dustin Hoffman), beside himself with awkwardness at his parents' drinks party, is taken aside by a well-to-do businessman keen to impart his wisdom. "I just want to say one word to you - just one word," says the businessman.

"Yes, sir," replies Braddock.

"Are you listening?"

"Yes, I am," says Braddock.

A grave pause. "Plastics."

Did anything ever sound so philistine?

The facts, however, do not justify our unease. All plastics are, at least theoretically, recyclable. Plastic packaging makes up just 6 to 7 per cent of the contents of a British dustbin by weight and less than 3 per cent of landfill. After lagging behind for years, the UK is now on course to meet European Union recycling targets for plastic, while supermarkets and brands that are under pressure to reduce the quantity of packaging of all types that they use are finding good environmental reasons to turn to plastic: it is lighter, so requires less energy for transportation; it requires relatively little energy to produce; and it is often re-usable. An Austrian study in 2004 found that if plastic packaging were removed from the supply chain, packaging tonnage as a whole would have to increase fourfold to make up for it.

So are we just wrong about plastic packaging? Is it time to stop worrying and learn to love our disposable sandwich cartons? Certainly there are bigger targets for environmental savings - household insulation, energy emissions - and the plastics industry is keen to point them out. What's more, anxiety over plastic packaging has produced a squall of conflicting initiatives from retailers, manufacturers and Britain's 465 local authorities. It's a squall that dies down and then blows harder from one month to the next. "It is being left to individual conscience and supermarkets playing the market," says Professor Tim Lang, one of the prime minister's sustainability commissioners. "It's a mess."

But acknowledging the good qualities in plastic packaging - and the wrong-headedness of some reflex measures to curb it - cannot be allowed to obscure two unavoidable truths: our current, single-use relationship with plastic packaging cannot last; and change, both in the materials that we use and in the ways in which we consume, is going to come largely through the market. So our behaviour matters, but what to do? The customer is both king and fool at once.

Dick Searle likes to call himself Mr Packaging. He came out of retirement last December to become chief executive of the Packaging Federation, a one-room serviced office by Victoria Station that represents Britain's £10bn packaging industry and 85,000 employees. "This is it," he says, stretching out his arms and nearly touching the walls. "I am the Packaging Federation."

For 30 years, Searle worked in Britain's competitive, consolidating packaging industry and he has a highly developed sense of its contribution to our lives. "What has packaging

done for me? That is the bit which just isn't understood," he says. The question is addressed at length in a PowerPoint presentation called "The Role of Packaging in Modern Society", which he gives two or three times a month to audiences around the country. In his speech, Searle describes packaging as the "enabler of shopping as we know it" and describes how supply chains have evolved to meet the hectic needs of modern life.

According to Searle, packaging has played an unacknowledged role in the expansion of cities beyond one million inhabitants and the emancipation of women. But his most arresting claim is undisputed: that societies without sophisticated packaging lose half their food before it reaches consumers. In the UK, waste in our supply chains is about 3 per cent. In India, it is more than 50 per cent. The difference comes later: we throw out 30 per cent of the food we buy - an environmental cost in terms of emissions equivalent to a fifth of the cars on our roads.

Packagers do not like to choose one material over another - cardboard, metals and glass all have their good points - but there's nothing quite like plastic. With more than 20 families of polymers to choose from and then, sometimes, blend, packaging designers and manufacturers have a limitless variety of qualities to play with. There is the clarity of polyethylene terephthalate (PET), used in most plastic bottles and trays; the strength of high-density polyethylene (HDPE), the cloudier polymer that goes into milk bottles; and easy-sealing polypropylene (PP) which makes bags and films. Plastics are so versatile that they have qualities you would not necessarily associate with inanimate objects. PET, for example, has very good creep resistance.

But if there is one law of plastic that, in environmental terms at least, supersedes all others, it is this: a little goes a long way. A few grammes to make a plastic bag; 20g for a bottle. The implications of this are huge. It means, first, that plastic is relatively cheap to use - it represents just over one-third of the UK packaging market by value but it wraps more than half the total number of items we buy. Second, it means that even though plastic encases about 53 per cent of products we buy, it only makes up 20 per cent by weight of the packaging we consume. And in the packaging equation, weight is the main issue because the heavier something is, the more energy you expend moving it around. Glass is the opposite: it also accounts for 20 per cent of the packaging we consume by weight, but only 10 per cent of the goods we buy come packaged in glass.

The unbearable lightness of plastic packaging is the fundamental reason - despite the complexity of its recycling, despite the doubling of its raw material prices since 2004 - that it remains the wrapping of choice for so many goods. And as retailers, government agencies and manufacturers increasingly make decisions based on "life-cycle assessments" that evaluate the total environmental impact of transport operations and production lines, it seems likely to remain so. These are the decisions that the packaging industry is anxious to highlight, and they can make righteous indignation against plastic look plain irrational.

Take cucumbers. Since October last year, The Co-op has been selling cucumbers without a layer of film. "The wraps are off," says a spokeswoman. In response, the Cucumber Growers' Association (CGA) tested 20 cucumbers, which it refers to as "cues", against the new conditions, under which they are now transported in a plastic bag inside a protective cardboard box and then placed, filmless, on the supermarket shelf. (Most wrapped cucumbers are shipped on re-usable plastic trays, but these have sharp edges which would damage the naked ones). The cucumber growers argue that more packaging than the original 1.5g per item is now being used - albeit out of sight of customers - in return for a loss of more than a week of shelf-life and frost damage in the fridge. "Most people have their refrigerators set to 4C," complains Derek Johnson, of the CGA. "That's far too cold for a cue."

In the same vein, Marks & Spencer commissioned a study to find out which had less environmental impact: selling apples loose or wrapped. "We wanted to understand the actual science behind it," says Helene Roberts, head of packaging. Measured by tonne of apples sold, M&S packaged apples (four on a paper tray, covered by plastic film) needed 27 per cent less packaging than those sold loose (moved from one cardboard box to another). "It's quite a hard message to get over," admits Roberts. Other attempts to cut down on packaging have produced similarly mixed results. Asda, for instance, took all fruit and vegetables out of its packaging at its branch in Southport last year but had to suspend the trial indefinitely after the store's wastage rate doubled.

Moving products from glass into plastic has led to some more straightforward conclusions. Allied Domecq, the spirits brand, expects to cut the size of its transport fleet by up to 55 per cent in the US by swapping glass bottles for PET. Wolf Blass, the Australian wine label, now sells in plastic bottles in the UK after Waste and Resources Action Programme (Wrap), the government-funded NGO that advises on waste reduction, found that its PET bottles had a smaller carbon footprint than recycled glass equivalents.

Using more plastic is one of the easiest ways to reduce packaging - "I could cut 25 per cent tomorrow if I moved everything into plastic film," says Roberts at M&S - and our reluctance to see this happen shows how misguided our gut instincts can be. During my interview with Roberts, she showed me a chart from recent M&S customer research [see below]. Tonnage of packaging for various goods runs along the X axis and customer concerns over packaging runs along the Y axis. If public perceptions were accurate, then the heavily packaged items would appear in the top right corner of the graph with high values for both weight and concern. Instead, it was chaos. There was almost no concern about wine, which is the most heavily packaged of all, while organic food, the least packaged item, was top of the worry scale. That customers can be so wrong is unnerving for packagers, not least because customers and voters are one and the same and the industry risks having both the market and populist policies turn against it. The chancellor's recent threat to place a charge on plastic bags - described to me as "just bullshit" by one industry analyst - is seen as a worrying sign. "There's a moral question here," said Searle, of the Packaging Federation. "Are consumers always right? Are they

well-informed enough to guide these decisions? Is listening to them actually the right thing to do?"

If, slightly chastened, we accept that plastic packaging is excellent at what it does, then the next question to ask is how sustainable it is. One way to think about sustainability is outlined in the government's Waste Strategy for England 2007 and is known as "one world living". The idea is that if the rest of the world lived as Europe does, then it would need three planets to sustain it. In order to consume our rightful share of the world's resources, we must think in terms of radical reductions of our ecological footprint. More pressing perhaps, in the case of plastic, is that it is made from oil, which is going to run out. And more pressing still is that landfill in the UK - the squashy afterlife for 75 per cent of our plastic waste - is going to overflow, depending on where you live, between four and 11 years from now. We need to use our plastic more than once. It is in tracing the loop of plastic recycling in this country (or, more accurately, trying to) that the awkward features of the stuff re-emerge. But once again, the role of the consumer is ambiguous.

Plastic waste is now collected for recycling from about half the households in the UK. It goes to a privately run MRF (pronounced "murf"), or materials recovery facility, where it is sorted from paper, cardboard, steel and aluminium, crushed into giant bales and sold on for a second life. I went to a MRF run by Veolia, Britain's largest waste management company, in Alton, Hampshire, to see this happen. "This is recycling in the raw," said John Collis, the Veolia manager who oversaw the building of the plant. It handles 85,000 tonnes of waste a year and is one of about 20 of its kind in the country. We watched conveyor belts zipping up and down, tipping acres of paper into black-and-white heaps while workers, in sealed huts perched on gangways, pulled impurities from the stream. Air hissed from the sorting machines, trucks beeped as they reversed and cans leapt like jumping beans to hug a large magnet.

Plastic packaging, however, is harder to discern. This is again because of that essential quality: it doesn't weigh very much. One of the basic ironies of plastic packaging is that the same qualities - diversity and lightness - that make it perfect for moving and protecting goods end up working against its recycling. While manufacturers, retailers and logistics companies constantly battle to take another 10 per cent off the weight of plastic packaging, recyclers and waste companies are forever trying to aggregate and crush together enough plastic leftovers to make it economically and environmentally viable to reprocess them. This is the topsy-turvy world inhabited by people such as Bernard Chase, a recycler from Yorkshire, who finds it more rational to import used PET bottles from Belgium rather than send his lorries to pick up poorly sorted plastic waste two counties away.

Complexity doesn't help either. According to Wrap, there are 27 different polymers used in plastic packaging in the UK, often several in a single product. A shrink-wrapped side of beef, for instance, is typically protected by at least four layers of different films, including nylon and ethylene-vinyl alcohol copolymer (EVOH), a substitute for PVC. The energy and cost needed to separate every piece of used plastic packaging and then

break it down is dizzying. "It just isn't worth doing," says Paul Bettison, chairman of the environment board of the Local Government Association (LGA), which represents the recycling efforts of the 410 local authorities in England and Wales. The result is that the UK collects only two kinds of used plastic packaging in any meaningful quantity: bottles and tough, low-density films used by industry. This is because they are normally made from a single polymer and are both relatively heavy. By combing for those two products alone, Britain is expected to meet its 2008 plastic recycling target of 22.5 per cent by weight, laid down in the EU packaging directive. Not that much of the physical reprocessing actually takes place in this country. The majority - as much as 70 per cent, between 300,000 and 400,000 tonnes - is recycled in China, where strong demand for raw plastic materials and the availability of cheap labour to sort the goods has caused domestic British reprocessing to decline 20 per cent in the past three years.

As for the rest of the UK's discarded "mixed plastics", no one can agree what to do with them. The plastics and packaging industry argue for incineration. Peter Davis, of the British Plastics Federation, suggests that London alone should have eight "energy from waste" plants, instead of two today, and that we should learn from Europe, where France, Denmark and the Netherlands all burn about 80 per cent of their plastic waste and so reclaim the energy from its hydrocarbons.

"You haven't seen a plastic factory on fire, I have," Dick Searle tells me. "It was unbelievable, you could see the flames from 30 miles away, the calorific content is just amazing." Wrap, the government-backed NGO, will present its findings on how best to deal with mixed plastics in a report later this year.

So where does that leave us? What should we be campaigning for? More plastic packaging and more recycling? It's hard to tell. "It's like putting a man on Mars," says Bettison, at the LGA. "The nature of the beast is that the answer this year will be different to the answer we'll have in a year's time." But the right answer is important because consumer attitudes, whether in the form of irrational loathing of plastic packaging or strong demands for recycled plastics, have the potential both to encourage or to obstruct a more sustainable relationship with our wrappings.

Steve Kelsey, a packaging designer who has worked with plastic for nearly 30 years and is a creative director of PI Global, the firm next door to the Museum of Brands, in Notting Hill, finds the debate over plastic packaging frustrating. "Everyone is focusing on packaging because packaging is symbolic of what people perceive to be wrong about our civilisation and the impact it is having on the natural environment," he says. Kelsey argues that the hunger to do something quickly - to take the films off cucumbers, or nudge up the recycling rate by a percentage point or two - is diverting effort away from more difficult questions about how you truly alter supply chains, regulate the number of polymers or make manufacturers responsible for the disassembly as well as the construction of their packaging.

Rather than reduce the weight of a plastic bottle by a further 10 per cent, we should be thinking about in-store vending and "closed loops", where packaging is recycled into

more packaging, rather than endlessly degraded into lower-quality materials for other uses. It is changes like this that make a real difference. Helene Roberts told me that greatest reduction in M&S's packaging came in the mid-1980s, when the company switched to re-usable plastic crates and stopped consuming 62,000 tonnes of cardboard boxes every year, the equivalent of 80 per cent of its total current packaging.

"The reality is, we just don't understand what we should do right now," says Kelsey. "We need people to understand that the common-sense approach has led us to this problem in the first place, and common sense is not going to get us out of it. You need to put common sense down and look at the facts and the overall strategies that are going to get us there. They are not obvious. They are not immediate. Unfortunately you can't summarise them in a soundbite to use in parliament or on TV. It doesn't work."

And that is why plastic packaging is important, and why it might provide a way of thinking about broader questions of sustainability. Because it is so good at what it does, we must either grapple with the entire system in which it operates or carry on as we are. To target plastic on its own is to evade the complexity of the issues. Is our eagerness to demonise an easy target proof that we are incapable of the systemic change that is required?

"Plastics as a lightweight food wrapper is now built in, structured in, as the logical thing," Lang, the sustainability commissioner, had told me. "Does that make it an ecologically or environmentally sound system of packaging? No ... It seems to make sense, but it only makes sense if you have a structure such as we have. An environmentally driven packaging system would not look like what we have." Dick Searle - Mr Packaging - put the challenge another way. "The amount of packaging we have is a reflection of the life we lead. That's the fundamental issue. And if you want to make a major change to that, then you can change your life habits and you can try and get other people to change theirs. But I'm sorry, that ain't going to happen."

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Plastic: the facts, figures and false perceptions

Where does our plastic waste go? All types of plastic are recyclable, although the methods of doing so vary: there are six types commonly used to package household products.

Consumer perceptions of packaging Recent research by Marks & Spencer shows that consumer perceptions of overpackaging are often incorrect. For example, customers showed little concern about wine, which is the most heavily packaged product researched.

What about biodegradable packaging?

The world's first plastics were made from non-oil sources. John Osborn, an English craftsman working in Amsterdam, is credited with identifying the thermoplastic qualities

of horn as early as the 1620s. Cellulose, the most abundant organic compound on earth, is the main ingredient in cellophane, which was first used in Switzerland after its invention there in 1908. So why not return to biodegradable plastics?

Research into environmentally friendly, renewable polymers has been under way since the late 1980s. Polylactic acid (PLA) and other starch-based polymers from sugar cane, potatoes, corn and wheat have emerged as the likeliest packaging materials, and worldwide renewable polymer production increased from 20,000 tonnes a year in 1996 to nearly 400,000 tonnes in 2006.

The National Non-Food Crops Centre, in York, which co-ordinates British research into renewable polymers, has forecast that biodegradable plastics could make up 10 per cent of the world's \$1,600bn polymer industry by 2020. Sainsbury's and The Co-op are committed to using biodegradable plastics, but Asda has decided not to after finding that only 5 per cent of UK households have compost heaps. And Innocent, the fruit drinks company, introduced bottles made from corn starch last year but stopped the trial because of confusion over how best to dispose of them.

But the real problem comes when biodegradable plastics are put in the recycling bin: they are nearly impossible to tell apart from oil-based plastics and can contaminate the recycle, making it unusable. "It's bloody difficult," says Francis Jackson, of Closed Loop Recycling, which will be Britain's first recycler of food-grade quality PET when it opens in June. "People with the best intentions can actually be working in a counterproductive way."

Source: Financial Times, London April 25, 2008