**TRASH TRACKERS**

**A**) So you carefully separate your cardboard from your used glass containers, wash your

empty tins and tear the staples

off scrap paper. You fill your various bins and put them out

to be taken away with the remains of the week's meals and domestic rubbish. And then,

safe in the knowledge that you have done your bit for the environment, you forget all about

it.

**B)** In fact, the life story of your weekly garbage is just beginning. An aluminium can, for

instance, could have a variety of fates. It might be crushed and sent back to the canning

factory to be turned into new cans. Or it could end up in the nearest landfill site or get

shipped off overseas to be either recycled or dumped. The truth is that nobody can be sure

where an individual piece of rubbish will end up or how the junk in the landfill

there.

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**C)** New research is planning to find out. In a pilot project, a team from the Massachusetts

Institute of Technology (MIT) together with members of the New Scientist journal tracked

60 pieces of trash in Seattle in the United States. The next phase of the experiment will

begin - 1,000 more pieces of garbage will be electronically tagged and thrown away in

New York, Seattle and London, and tracked for two months.

D The experiment is more than just an attempt to satisfy curiosity as to where trash ends up.

The idea is to help plan for an ideal world of waste disposal, where nearly everything gets

recycled or reused and materials are not sent to landfill faster than the planet is able to

produce them.

**E)** At present, that ideal world is a distant dream only. Part of the problem is that we do not

know what we are dealing with. While a lot of effort has gone into creating green supply

chains to bring products to customers, almost nothing is known about what happens to the

waste. This waste is monitored, of course, but only to see how many tonnes of different

kinds of garbage arrive at a sorting centre, landfill or incinerator, and how many leave.

These are counted as electronic or household waste; the mass is measured, but not in terms

of the content.

**F)** In terms of environmental impact, it is the content, not the number of tonnes, that

matters. Within

the harmless-sounding category of household waste', for example,

lies everything from carrot peelings to used babies' nappies and low-energy light bulbs

containing mercury, or old electrical appliances, each of which gives a very different set of

environmental challenges. In an ideal world each should be dealt with separately.

**G)** Before that can happen, though, we need to get a clearer picture of the life cycle of

different kinds of waste, which is how the tracking project can give useful information

The team have designed tags that can be fixed to all kinds of rubbish, and these tags beam

out their location every 15 minutes for up to two months. Each is built around a mobile

phone SIM card and battery, and a motion sensor. A low-power microprocessor keeps

track of the motion sensor and, when the sensor registers movement it switches on the

SIM card, triggering a search for nearby mobile phone towers. The SIM then sends an

SMS containing this information to the team and the team's software compares it with

the standard map of signal strength fingerprints to determine the position of the tag. The

tags are not precise to the metre. In cities where there is a dense network of mobile phone

towers, the team can locate an object to within 100 to 500 metres. In rural zones, that may

be a kilometre or more.

**H)** While tagging waste can identify where recyclables are being tossed into landfill, or

where hazardous waste is illegally shipped overseas, there is a more fundamental reason

to tag trash: to find out where society stores the materials that it mines from the Earth and

temporarily turns into products. Today's landfill sites contain large amounts of important

metals, including gold, zinc, aluminium, nickel, copper, cadmium and mercury - in

many cases at higher concentrations than natural ore deposits - plus huge quantities of

recyclable glass and plastic. As commodities become scarce in the following centuries,

we may have to mine landfills for their riches, and that means finding out exactly where to

start digging