

Tracking plastics at sea

We are told that millions of tonnes of plastic materials are produced annually to meet our outrageous demand for packaging within packaging to protect us from the contamination of foods and other goods. Enormous amounts of plastic debris are accumulating in marine habitats worldwide, where it seems likely that they may persist for centuries.

Ocean scientists at the University of Plymouth have recorded in *Science*

for 7 May some of their research into the fate of seaborne plastic materials. They point out that over the past 40 years large deposits of plastics have been recorded in places from the poles to the equator, but that lesser deposits have been given less attention, and may have importance for the health of animals that which depend on a food chain involving them.

Most plastics resist biodegradation, although they may undergo slow mechanical degradation into sludges, some becoming composites with a biodegradable element. Moreover, some cleaning agents contain abrasive plastic constituents. Thus, the potential for accumulation of microscopic debris is great.

In a research project, sediment was collected from beaches and estuarine or subtidal sediments around Plymouth and sorted by flotation. Some fragments appeared natural, but about one third were synthetic



polymers, particularly abundant in the subtidal samples.

Nine polymers were identified. They were acrylic, alkyd, polyethylenepropylene, polyamide, polyester, polyethylene, polymethylacrylate, polypropylene and polyvinyl alcohol. Such plastics have a wide range of uses, from clothing fabrics to packaging and ropes.

Examination of plankton samples obtained from sites between Scotland and Iceland, gathered since the 1960s, revealed an increase in the proportion of plastic polymers. Apart from sediment grains and plankton, fragments were mostly fibrous and brightly coloured.

Large fragments can suffocate or impair digestion in birds, fish and mammals. Toxic substances in plastics products can pass into food chains, but to what extent and with what consequences remains to be discovered.

Were shell beads a turning point in art?

There has been a surge of interest in the significance of shell beads, assumed to be human artefacts, derived from cave deposits of the Middle Stone Age discovered in Blombos Cave in South Africa and in the Serengeti National Park in East Africa. Both finds are discussed in *Science* for 16 April. They are thought to date from 75,000 years ago and 110,000 years ago, respectively, and one interpretation asserts that they afford evidence of complex symbolic thought arising in the minds of their makers.

The South African beads are perforated shells of the snail *Nassarius kraussianus*. They were found in cave deposits in conjunction with two pieces of ochre with incised cross-hatchings and several crafted bone tools. The Serengeti deposit consisted of two carved ring-shaped fragments of ostrich egg-shell.

Radiocarbon dating of these artefacts has not been possible because it would involve their destruction. Whether the holes in the snail shells represent human activity has been disputed, although the indications are that a sharp stone point was used for the perforation and signs of wear round its edge were attributable to suspension of the fragment on a cord, presumably for decoration of the person.

Samples of cave art beginning some 40,000 years ago have for some time been held to indicate an abrupt advance in human behaviour, possibly genetically inspired. However, some critics have argued for a much more gradual development of artistic trends. The perforated shell fragments have now been added to the evidence of a marked cultural development long ago in human history. Further archaeological excavations will be necessary before sound support for the hypothesis is established.

What can be done about the growing challenge of lack of discipline?

The term "discipline" denotes many phenomena. Fundamentally it is a quality governing activity and may be applied to a subject of academic study, to a self-imposed set of rules and obedience to a moral or physical code, or to an attempt to regulate the activities of several or many individuals to eliminate clashes and friction.

I was recently shocked by some antisocial traits demonstrated by people who are my neighbours, though I am sure that the concept of neighbourliness is far from their comprehension. On several occasions reported, elderly people have been brutally assailed, apparently for whatever they carried in their handbags, and left to make the best of their way home, possibly with the assistance of an odd Good Samaritan.

One report that particularly disgusted me was of a child of two who was tendering a currency note across the counter of a store,

only to have it snatched without warning by a thug.

The question that arises is why individuals act in this antisocial manner, and what can be done to ensure that they desist.

I do not think that the notorious pronouncement by one of our past prime ministers that "there is no such thing as society" can do anything to throw light on the problem and its solution. There is an entity that we can call society, and what it signifies is a measure of discipline adopted by individuals in dealing with one another, based on requirements common to us all and without which we live in an anarchic state whose guiding principle is "blow you, Jack, I'm all right".

The power that drives society and civilisation derives from human sympathy and empathy. Unless we manage to put ourselves into the shoes of others on certain occasions, society is doomed. It cannot be

overemphasised that when we stoop so low in our social priorities as to cease caring for our children and elderly people, civilisation is in a parlous state.

Fundamentally, the drive towards greater sympathy and empathy should be part of the educational process. Poetry, literature and music are as essential to a civilised outlook on the world as are science and technology. They are important because of their dependence on rhythm and melody, which in their turn are governed by discipline. So discipline is the secret of great art as it is of a solid and satisfying social order.

We must somehow persuade our children to act in a disciplined way, responsibility resting initially with their parents and afterwards their teachers. Ensuring that a generous part of their formal education consists of literary and musical studies may well be the start of a better world.