At the international level, there is an increasing awareness that many of the environmental problems that our civilisation has brought upon itself are either focused on the shorelines or most obvious in their vicinity. Fertiliser run-off from agricultural lands produces eutrophication of coastal waters, marine litter washes up on Norway's otherwise flawless beaches, and disoriented whales as well as dead sea turtles are brought ashore by the tides, while oil spills, such as the one from the Deep Water Horizon disaster in April 2010, threaten coastal ecosystems.

A recent report released by the European Environment Agency (EEA), *Balancing the future of Europe's coasts* (http://www.eea.europa.eu/publications/balancing-the-future-of-europes), summarises the economic importance of the coasts and the pressures that they are exposed to and calls for a concerted effort to manage these conflicting interests.

A previous effort, the EU's Recommendation on Integrated Coastal Zone Management (ICZM), dates from 2002, but the new report finds that its implementation across the EU is no better than 50%, which it blames on lack of clear administrative responsibilities for coastal matters. A new directive aiming to clear up the red tape is underway.

Meanwhile, an important issue highlighted by the report is the coordinated collection and use of high-quality geo-spatial data concerning the environmental health of coastal regions. Combining diverse and non-matching regional datasets to build an integrated high-technology mapping effort, as provided recently for forests on a global scale (Curr. Biol. (2014) *24*, R1–R4), could transform the management of coastal areas as well as the research into coastal ecology.

The report also announces that the EEA is currently developing a system of accounts to quantify 'ecosystem capital', such as fish stocks or biodiversity, and to track changes to this capital, e.g. from environmental degradation or over-exploitation. Similarly, the report also calls for vulnerabilities of coastal locations to be assessed and monitored, such as coastal erosion, eutrophication, or loss of sediment in the Venice lagoon.

There is also scope for international research collaborations motivated by the shared problems of coastal regions around the world. For instance, the current EU Framework Programme, FP7, includes a project known as JERICO (Joint European Infrastructure for Coastal Observations, http://www.jerico-fp7.eu/), which runs until April 2015. The JERICO network aims "to build a solid and transparent organization towards an operational service for the timely, continuous and sustainable delivery of high quality environmental data and information products related to the marine environment in European coastal seas. This will give generic support to protect environment and biodiversity, understand climate change and better predict related impacts and facilitate the sustainable exploitation of marine resources."

The collaborative project uses a number of robotic monitoring devices such as Argo floats and remote-control gliders. It also aims at improving data compatibility in the field.

The green ray

In contrast to other fields where unsustainable use of planetary resources endangers the survival of our civilisation (Curr. Biol. (2013) *23*, R1017–R1020), the current threats to coastal lands are directly endangering economic assets to an extent that it appears likely that mitigating measures will happen reasonably quickly. Even though North Carolina has passed legislation in 2012 to ignore climate change, other places like New York and New Jersey, along with much of Europe, will act to protect the valuable assets lined up along their coasts.

While economic interests in developing countries like Myanmar are still driving destructive changes to the coastal environment, the economies lining the European shores realise that they have to save their coasts to save themselves. In some cases, as in Belgium, they may even find that restoring wetlands is the more economic option, and helps both the coastal economy and the ecology. This unique aspect of the importance of the seashores for both people and nature may encourage mutual support, which may help to ensure that, even in a few decades from now, both turtles and humans will still be able to benefit from their visits to the beaches.

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Q & A

Malcolm Burrows

Malcolm Burrows is an emeritus professor in the Department of Zoology at the University of Cambridge, UK. He obtained his PhD at the Gatty Marine Laboratory, University of St Andrews in Scotland and then held post doctoral positions in Eugene Oregon, Oxford UK and Canberra Australia. In 1976 he moved to the Zoology Department in Cambridge where he gradually achieved the status of Professor and for 14 years was also head of department. He has worked on the actions and connections of neurons controlling locomotion, particularly the different roles played by small local interneurons that can be either non-spiking or spiking. In recent years he has focussed on the interactions between the body, muscles and the nervous system in solving the complex problems of locomotion as exemplified by the powerful and extremely rapid jumping movements of insects. He wrote The Neurobiology of an Insect Brain *(Oxford, University Press, 1996).*

What turned you on to biology in the first place? For many becoming a biologist seems almost innate and is often reflected in collecting and watching animals from a very early age. I preferred playing cricket. I was, however, very fortunate to come under the influence of an inspirational biology teacher. Perhaps to make up for earlier, lost opportunities, studying insects in the field and in the laboratory has been a real joy in my later life.

Any advice for someone wondering whether to start a career in biology? If you become a scientist you probably won't get rich, but you might get to live and work in some very interesting places around the world.

If you knew earlier what you know now, would you still pursue the same career? Yes, I would; it has been fun, rewarding and has enabled me to collaborate with a range of amazing people more skilled and

knowledgeable than me. I have always worked on a variety of invertebrate animals, each selected because I thought analysis of a particular attribute of their behaviour would enable a generic problem to be addressed. For example, locusts proved excellent subjects for recording the electrical activity of individual known interneurons and relating their actions directly to the performance of natural behaviour. Research on locusts is providing productive insights into the widespread phenomenon of phenotypic plasticity; when food gets scarce, they are forced together and change from life as cryptically coloured solitary individuals to life in a crowd. They then form large swarms that still devastate vast areas of crops. We showed that the rapid change from solitarious to gregarious behaviour depends on the action of a small number of neurons that release serotonin. Locusts are also excellent jumpers, and this has led to an analysis of the biomechanical mechanisms in them and other insects. This has thrown considerable light on how a particular protein (resilin) participates in energy storage and shock absorption and has revealed wondrous mechanical tricks that the skeleton adds to ease the complexity of computation by the nervous system. These include such diverse devices as spring loaded paddles to aid take-off from water and interacting gears to ensure that legs move at the same time. Getting funding for such studies has always been harder than for studies on mammals, in which the clinical or economic relevance is seemingly easier to claim. There is the tendency to put too much emphasis on applying science at the expense of understanding fundamental problems.

What is your favourite conference? My favourite conferences have been those of the International Society of Neuroethology because they represent a meeting of like minds in a very friendly atmosphere. I also like the occasional small discussion meetings, though they suffer from the exclusion of young rebellious voices.

Do you have a scientific hero? Big influences on my approach were my thesis advisor Adrian Horridge, and Graham Hoyle, my second postdoctoral advisor. Both of them emphasised, by their own example, the importance of doing experiments and building a solid base of evidence. They both believed that what one does should be driven by good ideas supported by good experimental data.

What do you think about the move to 'open access' in science publishing? I fully agree with the principle that research funded from taxes should be able to be read by taxpayers at no further cost. A problem is that the current business plan of most open-access journals is based on authors paying the full publication costs. This will exclude the ideas of individuals who do not have grants or do not belong to a large team. I am also exasperated by the plethora of these new internet journals clogging my email inbox with daily requests to write articles on topics of which I have absolutely no knowledge, or even worse to join their editorial (in other words, promotional) boards.

Do you have any strong views on journals and the peer review system? Why do referees always want more experiments that generally take the study well beyond its original and defined objectives and would take an age (and a new skill set) to complete? Every paper can only be a partial picture; a whole story is rarely solved in one paper.

What is your greatest research ambition? I have never been driven by ambition beyond seeking to do the best research that I can — I hope that friends and colleagues will tell me when I am no longer achieving that aim. I have never wanted to sit behind a desk all day and be away from the bench. Even when I had what most regard as an administrative job (as head of department), I always managed to set aside afternoons for experimental work. Fortunately my colleagues allowed me that time and this has kept me sane(r). There are many problems that intrigue me so I hope I can still do experiments for some time yet. I have many papers that I want to write, but along comes another problem and experiments take over again.

What do you think are the biggest challenges to the scientific community? There are many aspects that currently make science an unattractive career to enter. We need urgently to make it more attractive to young people by enabling them to develop their own ideas, and that means giving them access to funding early in their career. The support of large groups should be tempered and more support given to individuals with great ideas and to those willing to tackle important and difficult ideas with uncertain outcomes.

Many problems that science currently faces are self generated. Why must we assign numbers to many of the evaluations we carry out? Can the convenience of such measures really outweigh the importance of reading the content of a paper or grant application? So much of the direction of science funding now seems to be driven by panels — often consisting of people who are increasingly distant from the face of experimental science — thinking up topics for priorities and the money then following these choices — even though good ideas may be few and far between. Such an approach is at the expense of great ideas that are either ahead of their time or deemed, by the very same panels, unlikely to work because they are too far from current fashion.

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