Glass act: A likely new species of glass frog recently discovered in Colombia. (Photo: Copyright Conservation International Colombia/Marco Rada.)

highlight the biological importance of the South Nguru Mountains and place them among the most important sites for the conservation of herpetofauna in Africa," writes Menegon and Nike Doggart in the journal *Acta Herpetologica*.

The authors warn that this region is under threat from fire, logging, fuelwood collection and clearing for agriculture. But the Tanzanian Forest Conservation Group, a local NGO, is seeking ways to work with local stakeholders to improve conservation and planning in the region.

"Villagers and government have identified a series of actions required to address the issue of forest loss," the authors write. "This includes a combination of direct forest management activities such as developing and implementing forest management plans and boundary demarcation; and activities aimed at reducing local people's dependence on unsustainable activities such as the current cardamom cultivation."

While all three research teams have highlighted perceived threats to the new species, the prospect of climate change adds to them all. There is growing evidence that mountain ecosystems may be particularly sensitive.

A study just reported in the *Proceedings of the National Academy of Science* (published online) by I-Ching Chen at the University of York and colleagues in London, Taiwan and Malaysia reports on a survey of moth distributions on Mount Kinabalu in Borneo, which were first sampled and recorded by researchers in 1965. They re-examined the distribution of six moth assemblages at between 1,800 and 3,600 metres up the mountain. They estimated that the altitude of individuals of 102 moth species increased by a mean of 67 metres over the 42 years since the first recorded survey.

"These observed changes, in combination with the high diversity and thermal sensitivity of insects, suggest that large numbers of tropical insect species could be affected by climate warming," the authors write.

If similar results are found in other tropical regions, then other particularly temperature-sensitive species, such as amphibians and reptiles, may also be under the added pressure of climate change.

Q & A

Lamberto Maffei

Interviewed by David Burr

Lamberto Maffei is Professor of Neurobiology at the Scuola Normale Superiore Pisa, Italy and Vice-President of the Accademia dei Lincei (equivalent of the Royal Society). He studied Medicine at the University of Pisa, graduating in 1961. He worked in Tübingen, Cambridge, Boston, Paris, Oxford and Davis. In his early work he investigated the function of the mammalian visual system, pioneering research into spatial frequency selectivity in primary visual cortex, neural adaptation to contrast and extra-receptive field influences on visual neurons. He later moved on to study development and plasticity of the mammalian cortex, with major findings on the recovery of function after crushing of the optic nerve, the role of spontaneous discharge in pre-natal development, the importance of neural growth factors for plasticity, and how an enriched visual environment can improve visual performance and overcome induced amblyopia.

Why did you choose to study medicine? During school I read many of Freud's books and was profoundly impressed by his depth of thought and by his global, cultural approach to science. I was sure I wanted to become a psychiatrist.

But you became a neuroscientist: how did this come about? My medical studies brought me into contact with an eminent scientist, Professor Giuseppe Moruzzi, who taught me undergraduate physiology (for a recent account of Moruzzi's career see '*British roots of Italian neurophyiology in the early 20 century*', Curr. Biol. *18*, R51–R56). Moruzzi was a neurophysiologist, famous for his research on the reticular formation and the mechanisms governing sleep and wakefulness. His laboratory was international, with scientists frequently visiting from all parts of the globe. I was fascinated by both him and his work, and began hanging out in his laboratory. I found this intellectual, international lifestyle — devotion to

science, almost secluded from the world — 'poetically' attractive. At that time I thought that the approach of physics to science should be introduced in biology, and started following university courses in advanced mathematics and physics. My dream was to describe nervous functions by mathematical equations to establish general rules of function. Only later did I realize that this kind of approach can sometimes be overly reductive and naïve.

Can you name any particular paper that influenced you most? Certainly the paper on the frog's retina by Lettvin, Maturana, McCullock and Pitts (What the frog's eye tells the frog's brain, Proceedings of the IRE 47, 1959), as well as those of Hubel and Wiesel (for example Receptive fields, binocular interaction and functional architecture in the cat's visual cortex. J. Physiol. *160*, 106–154, 1962) on the visual cortex. As an electrophysiologist I was impressed by the attempts to explain the discharge of a single neuron in terms of visual function. This is why for many years I pursued parallel experiments in psychophysics and electrophysiology of the visual system with my life-long friend and colleague Adriana Fiorentini, one of the finest psychophysicists of the time, effectively asking the same question of a single mammalian neuron and of a behaving human being. I believe that Adriana and I were among the first to pioneer this multi-disciplinary approach, now common in many areas (often even mandatory, sometimes to the point of artificiality).

Who are your scientific heroes? In addition to my mentor Giuseppe Moruzzi, I admired very much William Rushton, Horace Barlow and, in particular, Fergus Campbell for his creativity and originality. For me, the Physiology Laboratory at Cambridge was an intellectual paradise. Meeting all these and other famous people — including Matthew (later Lord) Adrian and Sir Alan Hodgkin — at 'tea time' (morning and afternoon breaks often lasting hours) for scientific discussions was interesting and instructive, and sometimes a shear joy. Everybody showed a real interest in everybody else's research, not only out of scientific curiosity but, as I gradually learned, for scoring points by discovering snags with their experiments. There were three broad categories covering most research: it was either wrong, trivial or had been done before. It was a fun intellectual game, one that I learnt rapidly.

What was your biggest thrill in science? When very young, in the early sixties, I participated in an important discovery: that the responsivity of visual neurons decreases drastically when an animal falls asleep. I was working with Giacomo Rizzolatti, who smoked like a chimney, and amused us by waking the animal by blowing smoke in its face — causing the response to visual stimuli suddenly to increase tenfold. The second thrill I remember distinctly was with Lucia Galli, recording from retinal ganglion cells of embryonic rats, with a setup seemingly plagued by uncontrollable electrical artefacts; then suddenly realising that those enormous spikes on the screen were not artefacts but spontaneous action potentials (in an E16 embryonic rat whose photoreceptors had not yet developed). This was exciting for two reasons. First, Horace Barlow had asserted that spontaneous ganglion cell activity was caused by the breakdown of visual pigment: and it is not often a neuroscientist gets to prove Horace wrong! More importantly, it suggested a (later verified) mechanism for guiding retinal axons to their targets. And very recently, together with a group of students, we tested whether an enriched environment could cure amblyopia in an adult rat. To everyone's amazement, the experiment proved that we could; we all celebrated with much song and merriment well into the night.

What was your biggest mistake? To my knowledge, no major result of mine has been proven wrong (at least not yet). It was often the case during an experiment that the data were not in agreement with my working hypothesis: a clear suggestion to change my way of thinking. In the game of science it is always the other guy — the experiment — that is right, and you just have to accept this. But I do think that the conversation between the scientist and the data should be an exchange between gentlemen.

What have been the major changes in science since you started your career? The main change that has

taken place during my career concerns the organization of research. At the beginning of my career everybody worked either alone, or in pairs when the experiment required it. Of late research has become more industrial. More financial support, many people involved in a single experiment, typically with a boss giving the general direction of research lines (and raising money) while a squadron of young people do the actual experiments. This change is probably for the better in increasing the efficiency and production of papers, but it is for the worse from the human point of view. Much of the 'poetry' of research has been lost, and with the poetry goes the creativity.

In a field that is largely male-dominated, you have always mentored and collaborated with women: why do you think this is? The answer is simple: firstly, women are at least as intelligent as men; secondly, they tend to be much more careful in their experimental work; thirdly, although Italy is slow to move towards equal opportunities, I am very proud that five of my female students are now full professors; and lastly, if I could be forgiven a bit of male chauvinism, they are much more pleasant to look at!

Lamberto Maffei: Emeritus Professor of Neurobiology, *Scuola Normale Superiore*, Piazza dei Cavalieri, Pisa 56100.
David Burr: Department of Psychology, University of Florence, Via S. Nicolò 89, Florence 56125, Italy.
E-mail: maffei@in.cnr.it; dave@in.cnr.it