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Special
Supplement

'Contraction & Convergence'

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Reason and light



JOHN HOUGHTON tells **CASPAR HENDERSON** how he convinced the leaders of 30-40 million evangelical Christians in the US to get serious about climate change

How do you define yourself and the frame for your actions?

The Christian faith means a lot to me. I believe in God as creator and sustainer of the universe. He has given us the ability to understand creation and to find out about it in order to be creative within it. The first instruction in the Bible is that we are put on the earth to look after it, not to do what we please, but to take care of it on behalf of God. As scientists we work with an open mind to see how [creation] works and describe what might be occurring. We do that without assuming any prior ideology or belief other than absolute honesty and integrity.

As Christians we are told to love our neighbour, whether he's in the UK or the Congo. This is not only a Christian idea, of course.

All of us in the rich world have benefited enormously from fossil-fuel burning on the cheap. This is having a terrible impact on the planet, which will fall disproportionately on the poorest nations and, within those nations, on the very poorest people. There is an enormous moral imperative to try and right that wrong as far as we can. This should be obvious not just to people of faith, but to anyone with a social conscience.

So why isn't this obvious, especially in the US?

A misinformation campaign about climate change began in earnest in 1992, directly after the earth summit in Rio, when the first President Bush signed the United Nations Framework Convention on Climate Change and the Senate ratified it unanimously. Energy companies – Exxon and the coal industry – set up a very well-financed and professional organisation, staffed with top lawyers, to spread misinformation about the Intergovernmental Panel on Climate Change (IPCC).

As chairman of the Scientific Assessment Working Group of the IPCC, I recognised what they were doing of course. After all, they came to our meetings, which were very open to everybody, and commented on all our drafts. Some of it was not very sensible, but we took it all seriously. The IPCC was made better by them. Their challenges made our material far more clear than it would have been otherwise, and eliminated any inconsistencies.

Nevertheless, their influence on the Senate and the public in

general remains very strong. The average American still doubts the science of climate change, despite the IPCC and the unambiguous statement by the national science academies of the G8 nations (including the US), plus those of China, India and Brazil.

By and large the evangelical community is strongly Republican and very supportive of George W Bush. If he says the science is not firm, they believe him. Further, there is widespread suspicion of science, fostered by the feeling that science goes against the Bible. This is very unfortunate; it takes a very small view of God, and a very inadequate view of science.

Don't evangelists believe that evolutionary theory is inconsistent with the Bible and therefore find it unacceptable?

In science we're looking at the how of creation. We find continuous processes driven by natural laws, which have no status except as ways of describing the things we find. God is very good at making things that make themselves. You can see that in astronomy, for example, where stars are developing and evolve. I see nothing inconsistent between Darwinian evolution and the belief in the creator God.

The early chapters of Genesis do present problems of interpretation. But it was never written as a piece of science. It's poetry – a way of describing the creation very beautifully and wonderfully, and laying out certain basic theological precepts.

How did you help persuade the leaders of America's evangelical Christian movement to launch an initiative on climate change?

The process began in a meeting I organised in Oxford in 2001, after I happened to meet Calvin DeWitt, a distinguished professor of environmental studies at Wisconsin who also runs the Au Sable Institute, which educates students on the relation between ecology and the Christian faith.

I brought along some of the leading IPCC scientists, including Bob Watson. By no means all were Christians. The Bishop of Liverpool talked about theology. And Richard Cizik, the vice-president of the National Association of Evangelicals [in Washington DC], said he was very impressed with the honesty and the humility of all the scientists. He went away



determined to try and help Christians get to grips with the issue. The result was the Evangelical Climate Initiative, launched earlier this year.

Some evangelical leaders refused to join the initiative.

Given the misinformation campaign, I don't think that's surprising. A lot of work is going on within the evangelical community to try and get accurate information out, but it's hard when the people with the big resources are the ones spreading misinformation.

Nevertheless, with a large number of evangelical Christians coming on board, is the battle largely won?

No, and the situation is urgent for three reasons. First, the science: we're already committed to a lot more climate change

than we've seen so far. Even if we stopped emitting greenhouse gases tomorrow, we are committed to at least 30 or 40 years more change as, for example, the oceans warm up.

Second, the economics: many of the power stations we build today will be around for 40 or 50 years. To build them in a way we are not going to want them is economically stupid. Third, the politics: India and China are industrialising fast. A 1GW power station is being built in China every five days, for example. Senior Chinese people tell me they know climate change will hit China hard, but they insist that the rich world is responsible for making the first moves.

I should add that the science is getting more alarming. Some of the positive feedbacks that we didn't understand so well previously are becoming more certain. Take the case of carbon in the biosphere. There's more carbon locked up in the soil than there is in the atmosphere. If the soil warms up, we will get net emissions into the atmosphere. Some say this will cause vegetation to grow more rapidly. But the evidence from the field is that it will lead to a die-back that will cause more emissions. By the mid-century, the soil will be a source, not a sink.

Norman Kember's interpretation of his faith led him to what some would consider extreme action for peace in Iraq. Should Christians be locking themselves to the gates of new power plants?

Christians should be doing absolutely everything they can to ensure that everyone takes the problem extremely seriously. We have to improve energy efficiency and release as little carbon dioxide as we can, using all the technology available to us. And we must pressurise government and industry to act. We must also take on a real commitment to the underprivileged, to make sure that when they do get energy it is sustainable in ways that don't involve carbon-dioxide emissions. We should be prepared to use our personal, financial and political resources to that end.

Above all, Christians should share. We are still emitting far more per head in the rich world than we should. We should pay or make a gesture of some kind under the principles of "contraction and convergence" (C&C), which hold that everyone in the world should have the same allocation of carbon emissions, and there should be trading.

Sir John Houghton was director general and chief executive of the Meteorological Office (1983-91), chairman or co-chairman of the Scientific Assessment Working Group of the Intergovernmental Panel on Climate Change (1988-2002) and chairman of the Royal Commission on Environmental Pollution (1992-98). He is honorary scientist at the Hadley Centre for Climate Prediction and Research, and recipient of the 2006 Japan Prize (science)

The trillion-tonne challenge



What should come after the end of the first round of the Kyoto Protocol in 2012? **FRED PEARCE** makes a business case for idealism

There is a dangerous pessimism abroad which says no. Gaia guru James Lovelock and government chief scientist David King have both succumbed. Yet I say we can, and I'll tell you how. But first, some simple science and arithmetic. The atmosphere's temperature is largely set by the amount of the greenhouse gas carbon dioxide it contains. In the last ice age, when most of Britain was covered by a kilometre of ice, the atmosphere contained about 400 billion tonnes of the stuff. Then planetary process switched some 200 billion tonnes from the oceans to the atmosphere, and the world warmed up.

That's where things rested until the industrial revolution, when we started burning fossilised carbon fuels such as coal and oil. So far we have added another 200 billion tonnes, making about 800 billion tonnes in all, and raised temperatures by almost another 1°C. More will come once time-lags unwind. To prevent irreversible events, such as runaway warming or collapsing ice sheets, we have to stop this accumulation of carbon dioxide. Some scientists say the ceiling should be 850 billion tonnes. Most agree that, at the worst, we should keep below 1,000 billion tonnes. And, because most of our emissions stick around for centuries, that means we will

Carbon trading is working so well that some US fossil-fuel companies want to join

ultimately have to virtually halt our emissions. That is the trillion-tonne challenge.

Technically, we can do it. Take your pick from wind or nuclear power; solar energy or hydrogen; carbon burial or investment in energy efficiency. The world could quite quickly start reducing emissions and, eventually, kick the carbon habit entirely. Economically, most options are already competitive with likely future oil prices. But politically? There's the rub. How do we get organised? And how do we share out the task?

Right now, developing countries such as China would be entitled to point out that the rich world has already used up half the available "space" in the atmosphere for carbon dioxide, so it should stop emissions forthwith to allow the poorer nations some of what is left. But because they fear changing climate will derail their own development, they are being generous and have not played the historical card.

They just want the rich world to take a lead. Quite right, too. Current annual global emissions work out at a bit over one

tonne of carbon per head. But the US emits around five tonnes a year for every citizen, Europe averages under three tonnes, China is still below one tonne, and India and Africa are below half a tonne. So the route to progress is a more equitable share-out of the remaining pollution "space" – based on population.

This brings us to "contraction and convergence" (C&C). Advocated by a small British group called the Global Commons Institute, which is seeking a trademark for the term, this formula for future global emissions could, without exaggeration, save the world. The contraction half of the formula cuts global emissions year on year so we never go above the critical trillion-tonne threshold of carbon dioxide in the atmosphere. The convergence half brings about a gradual convergence of national emissions entitlements, according to population.

So, to meet the trillion-tonne challenge, national carbon-emissions targets might begin at about one tonne per person and then fall to half a tonne by 2050 and virtually nothing by 2100. Trading would be allowed, even encouraged. Especially early on, rich nations would buy permits from poor nations with spares. Corporations would trade their government-conferred entitlements, too. Trading would reward countries and companies with clean-up technology.

The logic is compelling, but some say it is fantasy politics. Big environment groups such as Greenpeace see the formula as a political dead end. I think they are profoundly wrong. For one thing, the business incentives for C&C are strong.

Carbon trading, based around the existing Kyoto Protocol targets, is already functioning well. So well that some US fossil-fuel companies want their government to sign up to Kyoto so they can join in. The idea of being excluded from a trading system where they can make money is anathema to them. C&C provides a fixed and predictable emissions formula ideal for making long-term business decisions. And its tough targets would mean more trading and more profit potential.

Politicians still don't like it. But a coalition of the willing to fight a war against climate change could develop very fast after, say, a rapid succession of Katrina-style hurricanes along the US coastline, or the catastrophic collapse of Antarctic ice sheets. And how else will every nation be persuaded to join in? There may soon, as someone once said, be no alternative.

Fred Pearce is an editor and writer at the New Scientist. His new book, The Last Generation: how nature will take revenge for man-made climate change, will be published by Eden Project Books in June