

DISCUSSION AFTER PROFESSOR RAMANATHAN'S PAPER

CARDINAL PETER TURKSON: It's not really a question, just an observation. About two months ago I participated in a conference in Iceland on the Arctic Circle. It was a three-day event. The first day was devoted to a discussion on the melting and disappearance of the ice sheet. The second day, to my surprise, was devoted to business opportunities that the disappearance of the ice offers, and the third was devoted, of course, to the indigenous peoples who live in the area. So my surprise was that the disappearance of the ice was also seen as offering a lot of business opportunities, it wasn't considered a disaster. In that sense I just wonder how you reconciled those two states of mind to the issues approached.

PROF. V. RAMANATHAN: Yes, I'm aware of these discussions. It makes scientists like me even more sad, because basically what they're expecting is that if the Arctic sea ice melts completely, there will be an open passage. The problem with that is that ships, as we all know, put out black smoke which is one of the worst contributors to the melting of the ice, so my worry or nightmare is that there will be more ships putting out more soot, this dark stuff, and it will melt faster and the business will see it as we are really helping the business more. So it is a huge problem we are not even thinking about, the species that are living there and their fate. Yes, I see that as another disastrous development coming up.

MSGR. MARCELO SÁNCHEZ SORONDO: I would like to ask a question. Of course I know your answer from our meetings, but it's important because it's the most popular question. Many people say, "Yes, we agree, we have climate change and we have global warming but maybe it depends not on human activity but on the Sun or other things". What is the conclusive reason that leads you to say no, it depends on human activities?

PROF. V. RAMANATHAN: Thank you, Bishop Sorondo, that's in fact one of the major issues. They not only bring in the Sun, they bring in other factors but let me address the Sun issue. We have been monitoring the Sun – in fact, in 1976 I worked with NASA to put an instrument on a satellite to measure the Sun, and there have been rocket measurements – and it has been documented in several tens of studies, we have measured the variations

in the Sun's output, and with quantum mechanics we have calculated exactly how much heat has been trapped by these pollutant gases. The variation in the Sun's output is about ten times less than the additional heat we have trapped, and this has been published and documented. Unfortunately, this has not silenced the sceptics, because they argue that the Sun is influencing climate by other, mysterious, ways. So, as far as the physical arguments, that has been proved. As far as these metaphysical arguments, as you know, we don't know how to make such measurements to satisfy them.

FR. MICHAEL CZERNY: Professor Ramanathan, you said that the United Nations process is bogged down, and I think that's quite believable, and then you went on to talk about more local efforts, like California. Do you think that, let's say, the accumulation of local efforts can make enough of a difference or is that just a short-term distraction while we still absolutely must have global agreements and effective global programmes?

PROF. V. RAMANATHAN: The short answer is we need both, but what is less clear to the negotiators who are doing the negotiations and to many is that we have already lost the time to depend just on carbon dioxide decrease. The first step with respect to the carbon dioxide problem is, we don't have alternative technologies to maintain our big infrastructure or to capture the carbon dioxide. Even if we discover a scalable technology today, what scientists call "diffusion time", it takes about 20 to 35 years for that technology to propagate. If we don't take it to remote places in Argentina, India or China, it's not going to help. So that's the 35 years. So that is where this near term option of bringing these other pollutants would give us some time to bring down these other pollutants, because they come in the air pollution. China has a tremendous interest in cutting down its air pollution. The same thing in many parts of South America. So what I feel – I'm not a policy expert, I'm not a social scientist, so you should take what I say with caution – is that we need both. We need the UN effort on the top-down approach, but I feel we can't wait for them. We need to start from below and your question prompts me to say one more thing. What I have found is that scientists like me, or even politicians, we don't have the moral authority to tell the people to change their behaviour. After all, it needs a change of behaviour. That's what I discovered when I was elected to this prestigious Academy eight years ago, I discovered religion, and religious authorities have that moral authority to persuade people to change their behaviour. We have lost the luxury of waiting for one approach, we need all approaches.