



IGNAZIO TABACCO

Essential definitions and considerations for a speech on climate change

My presentation is not scientific in the strict sense of the word; my colleagues will present the main scientific arguments during the course of the day. I would like to talk to you about the meaning of this initiative and its objectives.

I will start with a brief chronological history. We began working at the Convention following the instructions of the General Director of the Museum, Fiorenzo Galli, more than a year ago. The small and cohesive team, set up by the Museum and directed by Salvatore Sutura, the Director of Scientific Coordination, asked itself a fundamental question before starting work: why have a convention on the climate? It was not a pointless question since the topics of the climate and global warming are the subject of endless scientific works, continual debate and political initiatives and are huge media subjects all over the world. Why have yet another convention; what further contribution could be beneficial?

One consideration formed a starting point: despite the high qualitative and quantitative levels of information the general picture appears confused, with radically different positions causing overwhelming divisions in the scientific field and above all in the economic and political arena. The resulting lack of direction has led to irrational behaviour becoming established and fears to arise. Fear of change, fear of catastrophes, both environmental and on the other hand, economic. Debate on the climate is dominated by aggressive subjectivity which in the end undermines the validity of the scientific method and confidence in reasoning. The arising of irrational behaviour is also widespread in other fields, from biology to the economy. The fear that we are heading for a general crisis in rational thinking which will be difficult to find a way out, is not unfounded. This was a warning bell for us. This was our starting point. Our objective was to seek to bring knowledge and reasoning to the heart of the debate.

Returning to the theme of the conventions, where do the confusion, opposing positions, fears and irrationality come from?

This is the first question. It should first of all be stated that global warming and climate change are extremely complex phenomena. The limitations in knowledge of the phenomena are certainly consistent, but doubts and uncertainties in science are innate to the knowledge process, not the exceptions. The job of the scientist is not to tell the truth but to seek it or, at least, get as close to it as possible. The limits to knowledge must not cause confusion or negation of the scientific approach but must provide the stimulus to finding out more.

This is the second question. Climate change results in a profound change in the balance between man and the environment. There are obviously conflicts of interest which arise with regard to the solutions to be adopted to establish a new equilibrium, since the relationship between man and the environment is in itself subjective and therefore conflictual. There are no true and absolute solutions, only reasonable solutions in which the typical categories of human "things" such as interests, the economy and politics come into play as well as scientific knowledge. These latter implicate analytical and decision-making systems based on principles, values and rules, which together define and make up the language of ethics. Climate changes and the relationship between man and the environment therefore require a dual interpretation of the world: ethics and science must work together because alone they can not summarize the understanding and solution of the problems. Dialogue and comparison between science and ethics is clearly not straightforward but, if they are handled clearly and strictly, must not and can not be an element of confusion.

In debates the two questions are often indistinguishable. Often scientists are guided in their conclusions, not just by scientific exactness, but by ethical reference values which are not declared or discussed; just as politicians often defend their decisions by referring to absolute scientific truths which do not exist. We believe that confusion and irrationality arise from the unstated overlap of the two matters, which on the contrary, ought to be presented with clarity, each with appropriate categories of approach.

For this reason we thought about a Convention in which Natural Scientists and Scientists of Man could be present and meet up. A Convention as a meeting place where different languages and

experiences could be compared.

For this reason we positively fulfilled the initial request and organized the Convention with the aim of introducing elements for reflection and seeking to bring reasoning back to the heart of the complex path of knowledge and decision-making. We proposed certain subjects to those presenting papers which appear particularly important without expecting them to be exhaustive, only a source of reflection in the tangled mass of information which rapidly pursues us and which is often confusing.

1. Climate warming.

In science magazines global warming is often identified with climate changes; this leads to serious confusion and must be corrected. Heat and temperature are two factors which affect the climate. The climate is an interactive system which is not linear and is the result of the redistribution of heat over the earth which is measured "locally" using numerous parameters: insulation, humidity, rainfall, the state of the continental and polar glaciers, air temperature, atmospheric pressure, winds and atmospheric circulation, temperatures and circulation of sea currents, average sea levels, etc. If we say that we are in a phase of global warming we mention the variations in temperature. If we say that we are in a phase of climate change we ought to mention the variations in amounts of all the parameters, (or at least the most important ones for the territories systems) which define the climate. This, often, does not occur. For example, details of variations in average temperatures in northern Italy during the past two centuries are dutifully circulated, but variations in average rainfall and their regimes are not provided with the same care. The absence of information on the variations in climate parameters is not due to ill will or forgetfulness, but also due to the difficulty of acquiring meaningful data which can fully describe the situation underway, and therefore provide clues about the possible evolution over time. This difficulty must not however be kept quiet, but explained and critically discussed, just as the complex retroactive relationship between temperature and climate should be carefully presented.

2. Global – Local.

There is often widespread conviction, in the mass media, that warming of between 0.8 and 1.0 °C measured over the past two centuries, is evenly distributed all over the planet. No! There are places which show more warming, others less warming, and others have stayed the same. Global facts are fundamental information but, both with regard to heat and the climate, its disassociation on a local level is necessary, at least at the level of the main climate regions, since the match between the climate and the man-environment relationship is played out on a "regional" level. It is important to be aware of the redistribution of heat on the earth and its driving forces, and whether the effect of global warming has led to visible or documentable changes in the circular flow of the atmosphere, in the circular flow of the oceans. This is obviously the most difficult question. Science today is able to build fairly reliable global circulation models. The next step, that of preparing regional climate models, is far from being resolved. To-date we are not yet able to collect specific evidence of climate change in the main climate regions of planet Earth, let alone make possible predictions for the future. What does the world of Science have to say then? What do we want to hear at the Convention? First of all, what results have been achieved, what is the state of play in each sector and how reliable is this. Secondly, what lines of research ought to be pursued, what structures are needed in the area to acquire data, and what undertakings should be requested from all countries to achieve an adequate level of awareness.

3. Natural or anthropical causes? Catastrophists and Revisionists.

The controversially sharp distinction between the two sides is clearly a schematic opposition which is perhaps not even entirely truthful. There is also a central body (which is more numerous) of those who "simply" work to understand what is actually happening on the planet. One thing has however caused a sense of worry whilst we have been organizing this convention: both sides, starting from the same data, that is from global warming and an increase in greenhouse gases, rather than ask what could happen, focus on the question "whose fault is it?". This question monopolizes debate, dissipates the cultural heritage in sterile diatribe and misdirects the knowledge and awareness of non-expert citizens. The task of science is not to seek to attribute blame, but to understand the mechanisms and dynamics underway on the planet, state possible scenarios in which we will find ourselves over the coming decades and provide scientific indications to political decision-makers who must find the most appropriate solutions to adapt man's way of life to possible climate variations. The question about whether, and to what extent, the changes in conditions are caused by human activities is certainly a central question since the solutions to be adopted will vary according to the answer, but this should not be a search for those at fault, but the search for solutions. If, as I personally believe, human emissions modify and alter natural mechanisms then it is necessary to aim to stop them; this does not mean punishing those who are "guilty", but simple common sense. The policies which began with Kyoto in 1997 are, I believe, to be followed as closely as possible. We

all know how difficult the journey will be: doing nothing may lead to environmental catastrophes whilst blocking emissions may lead to economic catastrophes. We must always bear in mind the two terms of the man-environment relationship and their continual interaction. The climate system is complex, but the human system is more complex today than ever before with rigid obligations which have difficult solutions. It is not possible to simplify. The level of knowledge both in the area of Natural Science and in Economics is not sufficient to provide "exact" solutions. We need to know more in order to decide, but knowledge and action are continual processes which feeds themselves and are not found ready made. Some state that "it is not possible to make decisions without sufficient, definite knowledge", but the timing of decisions is dictated by that which occurs on the planet, not what we know. Decisions must therefore be taken and taken immediately, even under conditions of partial "ignorance" in the hope that they are as reasoned as possible. We can not continue arguing, it is time to make decisions.

4. Global and local policies.

We would like the convention to consider one final matter. The debate on the climate is rightly dominated by the problem of greenhouse gas emissions and the choice of solutions to adopt. This is fundamental and can not be delayed. Nevertheless the problems are complex and are worthy of further attention. By way of example, let us simplify the two possible extremes. The first hypothesis: that of believing the anthropical contribution has no effect on global warming, and therefore not intervening with regard to emissions. In this case, global warming, whilst "natural" could continue to be the condition of the planet which we must consider. With regard to the possible dynamics of the short-term phenomenon (10 – 100 years), current scientific knowledge only provides possible generically different scenarios. The second hypothesis: that of considering the anthropical contribution decisive, and therefore implementing the Kyoto Protocol and its subsequent elaborations. In this case, two important aspects must be taken into consideration. The first involves the timing of the signing of the Protocol and its effective application at full speed. Timing, optimistically, is forecast as being at least a few decades. The second involves the reaction times of the Earth system to the reduction in emissions. Simply put, how much time is needed for the reduction in emissions to stop or reduce current trends in warming? Even in this case, current scientific knowledge can not provide certainties, but it is highly probable that during the next few decades we must live with current trends in warming; it is certainly unrealistic to think otherwise. Whether it is "natural" or "anthropical", warming is an actual fact which we have to deal with. We can not face the next few decades without doing anything while waiting to see the benefits of global solutions. We must be aware of this and act accordingly. It therefore becomes pressing to prepare ourselves for a new equilibrium in the relationship between man and the environment and check whether current environmental situations, furthermore already in considerable crisis in numerous countries, will be able to sustain the impact of possible climate changes in the present and in the immediate future. Climate changes are specifically manifested in local situations established by both physical conditions and human situations and their degree of fragility or flexibility. Global policies alone are not sufficient; at the same time, it is necessary to plan interventions on a "local" scale. The "global" and "local" must continue alongside each other because the general level alone is abstract, and the specific, not framed in the general planet trends, is destined to fail. What is to be done and what paths are to be followed? In order to clarify this, an example might be useful. Let us take the case of Italy. Some models predict the probability of changes in rainfall regimes: an increase in extreme episodes of intense rain and prolonged periods of dryness. How do we equip ourselves to deal with this possibility? Statistical data which is currently used to plan interventions in the territories is probably no longer reliable, we need methodological approaches in line with predictable changes. We need to find out which water mass can be discharged from the rivers without catastrophic overflows. We must check how the change in regimes could affect the stability of the slopes in mountainous and hilly areas. We need to check how the necessary resources for agriculture and the cities can be found for those areas already having difficulty providing water. And after these checks as priorities, what plans need to be drawn up for the territorial system, for the structures in the agricultural sector, costs, timing and flexibility of plans for possible updates to actual changes. Currently there are no plans of this nature only empty talk, since their preparation involves enormous difficulties. These difficulties do not just apply to Italy but are common to all countries. Some state that science is unable to provide suitable indications because models of complex systems can not provide timely indications, whereas others mention looming insurmountable economic difficulties. These are all understandable statements but the end result is immobility and fatality. It is the outcome of reason. It is instead necessary to react, work and face up to the challenges of new frontiers in knowledge and action. Starting from the world of science. A happy ending is not guaranteed, but those problems which we do not solve will only be those which we do not have the courage to face up to.

Thank you.