SCIENCE in SOCIETY

WORLD SCIENCE FORUM BUDAPEST

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Embedding Science in Society

Science, Social Innovation & New Humanity

Brussels, 2-5 December 2007

2007@InteractionForum.eu
Hotel Métropole 31, Place de Brouckère 1000 Brussels Belgium tel +32 1 217 2300

"Science" in this context includes mathematics, medicine, geography, technology, engineering, sociology…

INTERACTION SESSIONS SCOPE (with Discussion Statements)

Registration is on invitation only. No Onsite Registration

PERSPECTIVE: General Questions addressed by the Meeting

Background

Ban?

The use of a ban or moratorium, as in the case of human cloning or gene therapy, may not always achieve the desired objective.

- What are the limits and possibilities of a ban?
- What alternatives do we have?

Focus

Humanity ?

Scientific and social developments change or may change what is typically human.

- To what extent does the notion of "Human Dignity Humanity" help us to guide and monitor this process?
- To what extent does the notion of "New Humanity" help us?

Focus

A collaborative process?

A collaborative process is required to guarantee the optimal social relevance and impact of science, science analysis and science outreach.

- What information/interaction does each stakeholder need from the others to optimize the impact and social relevance of his/her own work?
- What information/interaction does each stakeholder want to deliver to the others as a relevant contribution to the impact and social relevance of the work of the others

Draft

Session by session

The "Scope" and "Discussion Statements" described below are heuristic tools to compile relevant arguments and references.

The "Scope" and "Discussion Statements" should not be read as the proposed conclusions of the sessions.

SCOPE

Policymakers and advisory bodies worldwide do not support the use of the cloning-technology to get children, or, in more technical terms, they are against the use of "human reproductive cloning". They are even convinced that this technology is so dangerous or morally wrong, that it should be banned for ever or at least banned for the time being.

Policy makers and advisory bodies also banned technologies to change "the hereditary characteristics" of the future generations, even when applied with the intention to correct defective genes and in this way to prevent genetic disorders. In more technical terms, they are against "Human Germline Gene Therapy". Here too, they are convinced that such technologies are so dangerous or morally wrong that they should not be allowed, at least not in the current situation.

While the political situation appears to be clear -- there is a wide endorsement for the ban -- the justification of the ban is less clear. Many arguments are put forward to endorse such ban. Other arguments suggest that imposing a ban is not an adequate response because it is "too strong" and blocks the good aspects of technology as well as the bad aspects. Still other arguments indicate that a ban is "too weak" because it does not prepare society for the future that will come anyway and it cannot prevent science from developing other technologies that will offer society the same possibilities as the technologies that were banned.

DISCUSSION STATEMENTS

1 Banning a technology does not always help to meet social concerns.

POINT

When society wants to prevent doubtful social practices that are made possible by specific technologies, it may appear to be a strong strategy to ban that technology. Often, the opposite is true

A ban can be the weakest possible reaction. Science does not always develop in the straightforward way politicians or even scientists anticipated. Scientific work is developing in many directions and in a large variety of different theoretical and practical contexts. The same social practices that society wants to ban, will often become possible in different contexts and using different scientific developments than the technologies that are banned. This leaves society unprepared, because we believed that the situation was under control by endorsing a ban, and we did not spend attention to the analysis of the social and ethical concerns involved and the different contexts where they could occur.

When society wants to develop a cautious and responsible attitude towards cloning and gene therapy, other initiatives will be needed than imposing a ban on some technologies.

2 The notion of "Human Dignity" requires further clarification.

POINT

Human Reproductive Cloning must be banned, because it is a threat to "Human Dignity". This is the key message of the UN Declaration on Human Cloning (approved by the General Assembly on the 8th of March 2005). While intended as a strong condemnation of Human Reproductive Cloning, upon closer examination the UN Declaration is weak.

The UN Declaration on Human Cloning allows most if not all anticipated possibilities to apply cloning to humans and it does not provide any clarification to distinguish between the different contexts in which cloning may be used. In fact its prohibition is limited to "forms of cloning inasmuch as they are incompatible with human dignity and the protection of human life". As the Declaration does not explain what it means by "human dignity" and as this term has a large variety of meanings, whether or not a particular procedure is admitted depends on how the reader interprets the notion of human dignity.

When society wants to use the notion of human dignity to clarify the ethical acceptability or non acceptability of specific social and scientific behavior, it will be needed to develop a

Developments in Science. Human Dignity and New Humanity

Monday 3 December 2007
09.00-10.40
Room: Excelsior

Carlos Romeo-Casabona, Bilbao
John Harris, Manchester
Andras Dinnyes, Budapest
Rolando Meloni, Paris

deeper and more operational understanding of the meaning of human dignity.

REFERENCES

This statement is taken from an earlier contribution by Carlos Romeo-Casabona on page 756-757 of
Guido Van Steendam et al. (2006) The Budapest Meeting 2005. Intensified Networking on Ethics of Science. The Case of Reproductive Cloning, Germline Gene Therapy and Human Dignity *Science and Engineering Ethics* 12 (4):731-793.
Available at: http://www.embeddingethics.net/IMG/pdf/TheBudapestMeeting2005_SEE.pdf

United Nations Declaration on Human Cloning. Resolution 59/280.
Available at:
http://daccessdds.un.org/doc/UNDOC/GEN/N04/493/06/PDF/N0449306.pdf?OpenElement

3 The notion of "New Humanity" is an inspiring basis for ethical discussions.

Interaction Sessions

Science

SCOPE

Nanotechnology operates at the scale of single atoms and molecules. This new technology is not only expected to create new industries based on "molecular manufacturing" but also to transform medicine, for example by the development of tiny biosensors that can introduced in the blood stream and be active in human cells or tissues. These tiny biosensors could be used to monitor the body or to guide targeted drug delivery. Tiny "nanorobots" could travel through the human body and identify and isolate or kill cancer cells. In many ways, nanotechnology could allow to improve human performance far beyond what its normal limits.. Already in 1986 Eric Drexler wrote about "the coming era of nanotechnology" in which medicine would not only be able to tackle disease but to create health. Nanotechnology is now believed to link up with biotechnology in what Mihail C. Roco calls "Converging Technologies for Improving Human Performance." (NSF, 2002) .

REFERENCES

Mihail C. Roco and William Sims Bainbridge (2002) *Converging Technologies for Improving Human Performance. Nanotechnology, Biotechnology, Information Technology and Cognitive Science* 482 pages
Available at
http://www.wtec.org/ConvergingTechnologies/1/NBIC_report.pdf

K. Eric Drexler (1986) *Engines of Creation. The Coming Era of Nanotechnology* Anchor Books, 320 pages
Available at
http://www.e-drexler.com/d/06/00/EOC/EOC_Cover.html

For Nanomedicine in the context of a general overview of Gene therapy see page 124-125 of
Evelyn B. Kelly (2007) *Gene therapy,* Greenwood Press, 198 pages

DISCUSSION STATEMENTS

Nanotechnology

Tuesday 4 December 2007
09.00-10.40
Room: Excelsior

Bert Gordijn, Nijmegen

1 Nanoparticles do not cause unprecedented potential health and environmental impacts.
POINT Nanoparticles may have an impact on human health and environment. The use of nanoparticles should be carefully monitored. The issues at hand are not significantly from issues linked to the impact of biotechnology or chemistry.
2 Self-replicating nanomaterials would be a threat to humanity.
3 Nanotechnology will take away the taboo of the man-machine unity.

SCOPE

Nanotechnology has added new dimension to robotics. We can now expect that "nanorobots" will be at work everywhere, even in our body, for example to repair damaged cells. Also large size robots will be different from what they were before. They may be able to develop some intelligent decision making processes and to design and execute a "common plan". Robots may also be closely linked, even physically and biologically, to actions of bodily functions of humans.

REFERENCES

K. Eric Drexler (1986) *Engines of Creation. The Coming Era of Nanotechnology* Anchor Books, 320 pages
Available at
http://www.e-drexler.com/d/06/00/EOC/EOC_Cover.html

See also the Scope and Discussion Statements linked to the session on Nanotechnology

DISCUSSION STATEMENTS

1 Robotics will increase human possibilities more than genetic change.
2 Human-robot integration does not diminish but increase autonomy.
3 Robots can take over many tasks that we used to label "specifically human".

Robotics

Wednesday 5 December 2007
09.00-10..40
Room: Ambassadeur

Guglielmo Tamburrini, Naples

SCOPE

Biotechnology will continue to revolutionize Health Care.

Some expect that the "general human genome project" will be superseded by the "individual human genome projects" that will allow all individuals to know the sequence of their individual genomes. Medicine will no longer use drugs that have been tested for the average population, but develop a way to administer drugs that are appropriate to the individual human condition of each patient.

We can expect even more radical revolutions, when science starts to master the process of writing the genome.

DISCUSSION STATEMENTS

1 In the future, changing the human genome will be widely accepted.

POINT

When, in March 2001, it was announced that genetically altered babies were born, nobody appeared to be shocked. The US team of scientists involved confirmed and emphasized the fact that the babies were healthy. The news was not kept secret. In May 2001, the BBC announced the "Germline modification" on its homepage. Nor was it kept secret that germline modification was controversial. On its website, the BBC explained that in most countries this would be illegal and that the US government does not provide funding for any experiment that intentionally or unintentionally alters inherited genes. And yet, nobody was shocked. These announcements were not the beginning of an intensive national or worldwide debate.

REFERENCES

This statement is taken from an earlier contribution by Guido Van Steendam page 754 of Guido Van Steendam et al. (2006) The Budapest Meeting 2005. Intensified Networking on Ethics of Science. The Case of Reproductive Cloning, Germline Gene Therapy and Human Dignity *Science and Engineering Ethics* 12 (4):731-793.
Available at:
http://www.embeddingethics.net/IMG/pdf/TheBudapestMeeting2005_SEE.pdf

Erik Parens and Eric Juengst were the first to draw our attention to this situation. See e.g. Erik Parens and Eric Juengst (2001) Inadvertently Crossing the Germ Line *Science* 20 April 2001 292. (5516):. 397 DOI: 10.1126/science.292.5516.397

Available at
http://sciencemag.org/cgi/content/summary/292/5516/397

For the publication of the scientific work, see
Jason A Barritt, Carol A. Brenner, Henry E. Malter, and Jacques Cohen (2001) Mitochondria in human offspring derived from ooplasmic transplantation: Brief communication. *Human Reproduction* 16 (3): 513-516.
Available at:
http://humrep.oxfordjournals.org/cgi/reprint/16/3/513

For the announcement on the BBC website, see
Genetically altered babies born. BBC News, Friday, 4 May, 2001.
Available at:
http://news.bbc.co.uk/1/hi/sci/tech/1312708.stm

2 Medical treatment will be adapted to the individual DNA sequence of the patient.

Biotechnology and Health Care

Monday 3 December 2007
14.20-16.00
Room: Excelsior

Aurora Plomer, Sheffield

3 Health care has always tried to improve the human condition and was never limited to curing.

Biotechnology and Environment

Tuesday 4 December 2007
14.20-16.00
Room: Excelsior

Brian Wynne*, Lancaster

SCOPE

Biotechnology is often seen as a threat to biodiversity and to the environment.
On the other hand, it appears that biotechnology can also be used to fix problems associated with the contamination of air, water and soil. It can probably develop microbiological systems that prevent pollution and develop renewable resources. It is likely that it can be used for environment-friendly manufacturing processes and methods of food production.

DISCUSSION STATEMENTS

1 Genetically engineered crops may be favorable to the environment.

2 Many so-called environmental problems are in fact symptoms of our flawed cultural understanding of "uncertainty".

3 To fight hunger, we do not need biotechnology but social and political reform.

Information and Communication Technology

Tuesday 4 December 2007
16.40-18.20
Room: Excelsior

Hugo De Man, IMEC, Leuven

SCOPE

Information technology is often described as one of the "converging technologies for improving human performance" (Mihail Roco, 2002). It is expected to link up intimately with biotechnology and nanotechnology and to allow human beings to do much more than people have ever dreamt of. Information technology will become invisible, because it will be embedded in each and every tool we use.

REFERENCES

Mihail C. Roco and William Sims Bainbridge (2002) *Converging Technologies for Improving Human Performance. Nanotechnology, Biotechnology, Information Technology and Cognitive Science* 482 pages
Available at
http://www.wtec.org/ConvergingTechnologies/1/NBIC_report.pdf

DISCUSSION STATEMENTS

1 Internet use shows that people do not really care too much about privacy.

2 The electronics of our daily tools take over too many human decisions.

3 Like writing and printing before, new ICT technologies are the key enablers of democracy.

SCOPE

Few people expected that science would ever understand the chemistry and biology of higher brain functions. It is becoming clear now that science may not only be able to understand but also to manipulate…. and to improve the human performance. Cognitive Sciences and brain research form the last group of disciplines that are now often referred to as "converging technologies" or "NBIC" (Nano Bio Info Cogno). It is believed that those technologies will develop a multitude of cross links and strengthen one another. It is also believed that these "converging technologies" will drastically change the way many if not all sciences and technologies function in society.

REFERENCES

Mihail C. Roco and William Sims Bainbridge (2002) *Converging Technologies for Improving Human Performance. Nanotechnology, Biotechnology, Information Technology and Cognitive Science* 482 pages
Available at
http://www.wtec.org/ConvergingTechnologies/1/NBIC_report.pdf

DISCUSSION STATEMENTS

1 In the future brain scientists will be able to manipulate human behaviour.

2 Electronic implants in the brain will increase the decision making power and autonomy of people.

3 Brain research will give us a deeper understanding of who we are.

Cognitive Sciences and Brain Research

Wednesday 5 December 2007
09.00-10..40
Room: Excelsior

Rolando Meloni, Paris

SCOPE

Nanotechnology, Biotechnology, Information Technology and Cognitive Science are often referred to as the NBIC technologies. They are also described as the atomic bombs of the 21th century, because they give scientists or the politicians and industrialists who control them unprecedented power over nature and other men. Applying NBIC technologies appears to be or to become much easier than making an atomic bomb. In this way, breakthroughs in NBIC technologies are often associated with major threats to security. On the other hand, exactly the same technologies may also be used to promote security. Information technology allows us to trace the whereabouts of people and biotechnology is a strong new tool to identify criminals who left biological traces on the crime scene. But even this "good use" of NBIC to promote security raises a lot of questions.

REFERENCES

For a description of the NBIC technologies see

Mihail C. Roco and William Sims Bainbridge (2002) *Converging Technologies for Improving Human Performance. Nanotechnology, Biotechnology, Information Technology and Cognitive Science* 482 pages

Available at

http://www.wtec.org/ConvergingTechnologies/1/NBIC_report.pdf

DISCUSSION STATEMENTS

1 Only democratic countries should be allowed to develop gene technology.

2 Security must be guaranteed without infringing on the privacy of citizens.

3 New security threats force people to change their traditional life patterns.

Security Research

Tuesday 4 December 2007
11.20-13.00
Room: Excelsior

Emilio Mordini, CISC, Rome
Juliet Lodge, Leeds

Science Analysis

SCOPE

Since the development of the bioethics movement in the 1960s, ethics of science is on the way up. "Ethical reasoning" is often presented as a way of thinking that is opposed to "scientific rationality", or even as a human faculty that is superior to science and should be linked to law and regulation to control science. In this view, ethics comes in when

Ethical Aspects of Science

Monday 3 December 2007
11.20-13.00
Room: Excelsior

Aurora Plomer, Sheffield

science risks to go too far. Realizing the dangers of such approach, others defend that ethicists - who do not understand the technicalities of science and whose visions are often based on fantasies or dubious facts – should not be allowed to limit science. Only scientists can decide when and under which conditions some developments, if any, should be halted. Still others believe that this discussion is beside the point, because it is simply wrong to separate scientific from ethical rationality. They explain that scientists are not the cold detached thinkers who are not interested in good or bad. Scientists are described as people who are motivated by social concerns and develop their science as a contribution towards building a more human world. In this view, the social concerns of scientists and the way these concerns guide science should be the basis of any ethical debate about science. What others, including ethicists, can do is to join scientists in their search for the good things they can do. When ethicists cannot clarify the ethical discourse of scientists themselves, their ethical debate about science will remain empty and is doomed to fail.

DISCUSSION STATEMENTS

1 Ethical discussions should be part of the normal scientific work.

2 Ethical reflection does not coincide with sociological analysis.

3 Ethical discussions do not restrict but promote science.

SCOPE

Science is not merely the development of theories or neutral technologies. Science is one of the many cultural processes that is developed by society. Science is not developed on a theoretical island, but in interaction with real life social actors.

DISCUSSION STATEMENTS

1 Science should not only educate society. Society should also educate Science.

2 People are afraid of science because they are not well informed.

Social Aspects of Science

Tuesday 4 December 2007
16.40-18.20
Room: Ambassadeur

Alison Mohr, Notthingham

3 Desire and politics are the driving force behind social innovation, not science.

Science Outreach

SCOPE

Science policy started because 1945 did not really mark the end of the second world war but its transformation into a cold war. The atomic bomb was only one more proof that scientists can achieve impressive results when governments provide the means. During the cold war, governments decided to keep their scientists at hand, first for large projects of national prestige and national security. Later also to develop more welfare and health.

DISCUSSION STATEMENTS

1 The public at large should be more involved in science policy.

2 Each department of public policy should develop its own science policy.

3 Democratic input in science cannot be based on public understanding of science.
POINT Several experiments with “focus groups” have shown that a minimum of training and internal discussion is enough to enable members of the public at large to be an active partner in high level discussions on the social relevance of specific scientific developments. This does not prove that this approach will work for all members of the public at large, for all scientific developments and for all types of decisions that are required to optimize the social relevance of science. Quite often, even intensive training does not allow people to understand what is at stake. Surveys show that even people who went to high school are not always aware of elementary scientific facts. Furthermore many people are not aware of the way democratic decisions are made in other fields of policy making, where no knowledge of science is required.

Public Policy

Tuesday 4 December 2007
09.00-10.40
Room: Ambassadeur

Leo Hennen, Bonn

SCOPE

In the 19th century, industries already discovered the importance of developing their own science policy. They continue to be the largest investors in science. They developed tools to protect their investment and to translate the results into products that can be used and commercialized in daily life.

Businesses

Monday 3 December 2007
11.20-13.00
Room: Ambassadeur

DISCUSSION STATEMENTS

Tanja De Coster, Luxemburg

1 The creation of intellectual property can help developing countries.

2 Industry is only interested in people as customers not as human beings.

3 Without industry, even the best technology cannot help society.

SCOPE

Religious Traditions

Tuesday 4 December 2007
11.20-13.00
Room: Ambassadeur

Daniel Sinclair, Jerusalem
Ron Cole-Turner, Pittsburgh, PA

Religion is often presented or perceived as an alternative source of knowledge that competes with science and that is in fact superior to science. Many scientists and post-enlightenment people believe they should fight this view, and that religion is a threat to science. The situation may be different when religions would not simply be "sets of beliefs" but human traditions in search of the best for man.

DISCUSSION STATEMENTS

1 Arguments that sound religious are not necessarily the expression of the concerns of "religious traditions".

POINT

Sometimes people who may not be particularly religious themselves may object to science or to biotechnology or GM food or cloning. They will often manufacture "religious" arguments, or arguments that sound vaguely religious like "Oh, you know, scientist are playing God. They shouldn't do that. This does not mean that such arguments are the expression of religious traditions. These arguments may show that religion is often misused, just as – in other contexts – scientist get misused as well.

REFERENCE

This statement is taken from an earlier contribution by Daniel Sinclair and Ron Cole Turner. See page 781-182 of
Guido Van Steendam et al. (2006) The Budapest Meeting 2005. Intensified Networking on Ethics of Science. The Case of Reproductive Cloning, Germline Gene Therapy and Human Dignity *Science and Engineering Ethics* 12 (4):731-793.
Available at:
http://www.embeddingethics.net/IMG/pdf/TheBudapestMeeting2005_SEE.pdf

2 A major role for religious traditions is to generate inspiring questions.

3 Many religions invite people to develop themselves beyond their current limitations.

SCOPE

The conviction that science is a social process and is linked to the work and ambition of many stakeholders resulted in widespread attempts to educate people about the developments of science. Science communication should not only take away irrational fear and educate society. It should also provide society with the knowledge that allows them to make the right decisions about the type of science they would endorse. And yet, so many surveys show that many people do not even master the most elementary scientific knowledge. How could we ever belief that citizens will understand the details of for example Germline gene therapy in order to develop a justified opinion? Perhaps society should also emphasize the existence of other ways that help people to think about science, for example by reading novels that describe scenarios of future societies that makes use of new technologies.

DISCUSSION STATEMENTS

1 In general, the media do not provide the information people need to participate in the social debate on science.

2 Literature and science fiction can play a constructive role.

3 Literature and art reflects and influences what society accepts as normal.

Media, Art and Literature

Tuesday 4 December 2007
14.20-16.00
Room: Ambassadeur

Istvan Hargittai, Budapest

SCOPE

The world is becoming a local society. A European client may have dialled a local phone number and be connected to a call center based in India, which operates as the help desk of an American firm. In our daily meals, we combine the food of all continents. Environmental problems may also be linked to “global” change. Colonization of a foreign country does no longer require the physical presence of soldiers, and the victim of injustice may often be far away and invisible.

DISCUSSION STATEMENTS

1 Science and Innovation should be monitored on a global level.

Globalization

Monday 3 December 2007
14.20-16.00
Room: Ambassadeur

Mark Frankel, Washington DC
Bram Ramjiwan*, NRC, Canada
Maurizio Salvi, EC, Brussels

2 Europe should take the lead in a number of scientific developments.	
3 Scientific and technological superiority create new forms of colonization.	

❖

You can add additional

- arguments
- Ideas
- references (to publications, websites, your EU-projects, your own research results)

linked to

- any of the Discussion Statements
- any of the previous contributions to the discussion

The additional information will be available

- on a printout that will be distributed during the meeting (Brussels, 2-5 December 2007)
- online, when the web developer makes the discussion website available

Prepare?

0. IDENTIFY	the Discussion Statement or the previous contribution that you would like to complete.
1. Create SHORT TITLE	to indicate your point (max 64 characters)
2. Write YOUR POINT	(Preferably shorter than 300 words). Try to limit a contribution to one single idea. Split complex ideas into several shorter ones.
3. Add REFERENCES	(whose relevance is clearly indicated in your point) If needed add some introductory words to the reference

Submit ✉

You can submit your contributions by mail to 2007@InteractionForum.eu
or to Guido.vansteendam@biophilosophy.be

We will make sure that your contributions

- will be added to the Discussion Website (from the moment the web developer makes the website available)
- will be on the handout that will be distributed during the meeting in Brussels.

General Chair

Guido Van Steendam, IFB