Conseil d'administration
du ***Fonds québécois de la recherche sur la nature et les technologies***

Québec, le 16 juin 2006

De la responsabilité sociale du chercheur

Bernard Sinclair-Desgagné

Chaire d'Économie internationale et de gouvernance,
HEC Montréal

CIRANO et CIRAIG

Chaire E.D.F. de Développement durable,
École polytechnique (Paris)

Plan de la présentation

- Science: la conquête de l’autonomie
- Fin de la tour d’ivoire
- «Junk science», manipulations et dérapages
- Le «bon» savant…
- Et le petit monde du scientifique

Science: la conquête de l’autonomie

Rome 1633

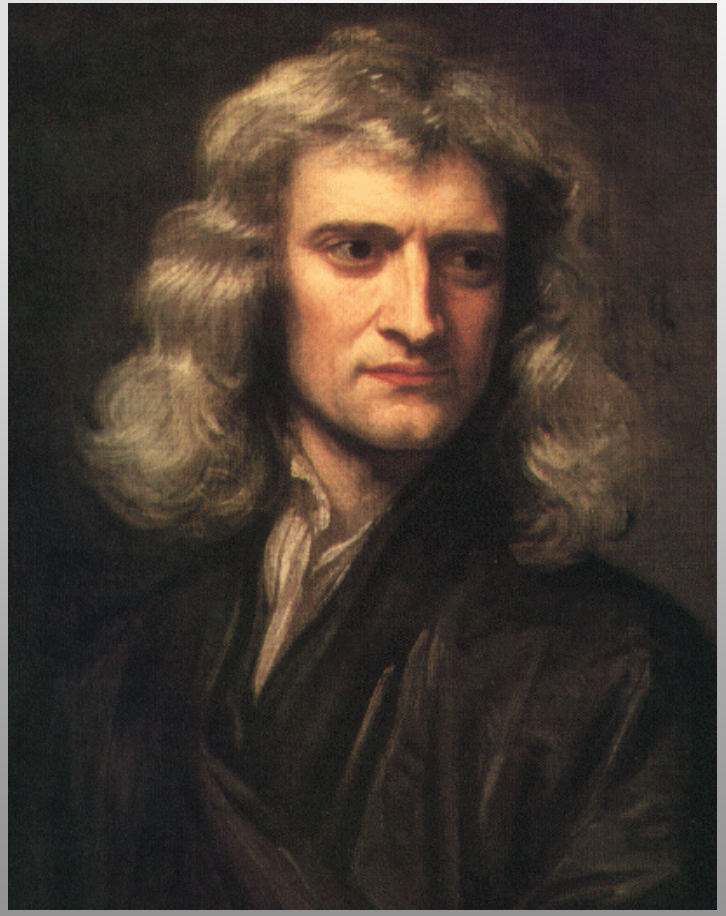
Le Tribunal du Saint-Office déclare Galileo Galilei véhémentement suspect d’hérésie, pour avoir tenu et cru une doctrine fausse et contraire à l’Écriture sainte; à savoir que le Soleil est le centre du monde et ne meut pas d’est en ouest, que la Terre se meut et n’est pas le centre du monde, et *que l’on peut tenir et défendre comme probable une opinion après qu’elle ait été examinée et déclarée contraire à l’Écriture sainte*.

(…) Non seulement il arme l’opinion copernicienne d’arguments nouveaux, que jamais aucun étranger n’avait évoqués, mais il le fait en italien, langue la plus propre à entraîner de son côté le peuple ignorant, chez lequel l’erreur a le plus facilement prise.

Science: la conquête de l'autonomie

Newton (1687)

Philosophiae naturalis principia mathematica



1. **Économie:** Il ne faut admettre de causes que celles qui sont *nécessaires* pour expliquer les phénomènes. (…)

4. **Primauté de l'expérience:** Dans la philosophie expérimentale, les propositions tirées par induction des phénomènes doivent être regardées, malgré les hypothèses contraires, comme exactement ou à peu près vraies, jusqu'à ce que quelques autres phénomènes les confirment entièrement ou fassent voir qu'elles sont sujettes à des exceptions. *Car une hypothèse ne peut affaiblir une induction tirée de l'expérience.*

Science: la conquête de l'autonomie

Wittgenstein (1918)

Tractatus logico-philosophicus

4.2 Le **sens** de la proposition est son accord et son désaccord avec les possibilités de l'existence et de la non-existence des états de choses.

5.632 Le **sujet** n'appartient pas au monde, mais il constitue une limite du monde.

6.41 Le **sens du monde** doit se trouver en dehors du monde. *Dans le monde toutes choses sont comme elles sont et se produisent comme elles se produisent: il n'y a pas en lui de valeur* (…).

6.42 C'est pourquoi **il ne peut pas y avoir non plus de propositions éthiques**.

Fin de la tour d'ivoire

- La **seconde révolution industrielle** et le mariage de la science et de la technologie.

  "The function of science after 1850 was primarily to show what could not work rather than what could. (…)
  Even the best « tinkerer » inventors felt increasingly the need to collaborate with persons with a systematic training. Thomas Edison, for example, hired the mathematician Francis Upton who translated Edison's ideas into rigorous calculations." [Joel Mokyr]

- Les **pratiques des sciences expérimentales**:

  - l'**expérimentatio**n sur les êtres vivants (**Mengele…**)

  - les «stran**gelets**» et la fin du monde

Sir Martin Rees (2004), *Our Final Hour* :
"Civilization has only a 50-50 chance of making it to the 22nd century."

Fin de la tour d'ivoire

- Le Conseil international pour la science rapporte une très forte croissance des standards et normes visant l'activité scientifique, de 6 avant 1970 à plus de 115 en 1999 (39 internationaux et 76 nationaux).

- **Après le 9/11:**

  "Relevant United Nations offices should be tasked with producing proposals to *reinforce ethical norms, and the creation of codes of conduct for scientists*, through international and national scientific societies and institutions that teach sciences and engineering skills related to weapons technologies, should be encouraged. Such codes of conduct would aim to prevent the involvement of defense scientists or technical experts in terrorist activities and restrict public access to knowledge and expertise on the development, production, stockpiling and use of weapons of mass destruction ands related technologies."

  [Recommendation 21 du Groupe de travail de l'ONU sur le terrorisme]

«Junk science», manipulations et dérapages

- Le clonage des cellules souches:

***Hwang Woo Suk**, the disgraced cloning expert, was indicted on fraud and embezzlement charges Friday. Hwang had never cloned embryonic stem cells from patients. His now discredited claim, however, had raises hopes that doctors one day would grow genetically matching tissues from embryonic stem cells to repair damaged organs or treat diseases like Alzeimer's.*

[International Herald Tribune, 31 mai 2006]

«Junk science», manipulations et dérapages

- La fusion froide:

"*Cold Fusion is a pariah field, cast out by the scientific establishment. Between Cold Fusion and respectable science there is virtually no communication at all.* ***Cold fusion papers are almost never published in refereed scientific journals****, with the result that those works don't receive the normal critical scrutiny that science requires. On the other hand, because the Cold-Fusioners see themselves as a community under siege, there is little internal criticism. Experiments and theories tend to be accepted at face value, for fear of providing even more fuel for external critics, if anyone outside the group was bothering to listen. In these circumstances, crackpots flourish, making matters worse for those who believe that there is serious science going on here.*“

[David Goodstein (1994), vice-président du Caltech]

«Junk science», manipulations et dérapages

- **Oops-onomics** [The Economist, 1er décembre 2006]

Abortion cuts crime. That claim – first demonstrated by John Donohue, of Yale Law School, and Steven Levitt, of the University of Chicago, in an academic article in 2001 – is the kind of provocative and surprising conclusion that has made Mr Levitt's book, "Freakonomics", such a runaway success this year. Unwanted children, the story goes, are more likely to become criminals in later life. Abortion, legalised throughout the United States by the Supreme Court's Roe v Wade *Ruling in 1973, prevents unwanted pregancies from becoming unwanted children. Higher abortion rates from the 1970s onwards thus helps to explain why crime rates fell in America about two decades later. (…)*

Of course, lots of people have always thought Mr Levitt was in the wrong. Even if abortion cuts crime, it is still immoral, they fulminate. But this is largely beside the point: Mr Levitt's research does not take a position on abortion's social virtues, but aims merely to uncover its societal effects. Besides, for someone of Mr Levitt's iconoclasm and ingenuity, technical ineptitude is a much graver charge than moral turpitude.

«Junk science», manipulations et dérapages

- Tchernobyl:

  Fin avril 1986, la présentatrice au bulletin météorologique de la chaîne de télévision M6 affirme que la France était protégée du nuage par l'anticyclone des Açores qui s'était déplacé. En fait, la télévision ne recevait pas ses informations de Météo France mais directement des services contrôlés par le Pr Pierre Pellerin, directeur du Service Central de Protection contre les Rayonnements Ionisants (SCPRI) sous tutelle du Ministère de la Santé.

  Le 1er mai 1986, le Pr Pellerin est invité par TF1 pour discuter des effets du nuage radioactif de Tchernobyl.

  Après plusieurs minutes de discussions techniques sur les unités de mesure, le Pr Pellerin finit par avouer que le nuage avait traversé la France. Les experts avaient effectivement observé une élévation générale du niveau de radioactivité sur le territoire français.

«Junk science», manipulations et dérapages

The term "**junk science**" is often used to deride scientific findings which stand in the way of special interests. More consonant theories may be praised using the term "**sound science**".

For example, the **tobacco** industry has used the term "junk science" to describe research showing negative effects of smoking and second-hand smoke.

Another example for discrediting disliked scientific findings is a large industry campaign to "reposition **global warming** as theory, not fact." Anti-global warming environmental scientists and spokespersons for corporations and government bureaucracies counter by saying that the scientific evidence used by their critics actually constitutes junk science and should not be used as a basis for policy.

Le «bon» savant

Extraits du texte de Kathinka Evers, “Standards for Ethics and Responsibility in Science,” Conseil international de la science – Standing Committee on Responsibility and Ethics in Science (SCRES), septembre 2001.

- The perceived need to formulate ethical standards for science arises in a variety of circumstances. Amongst the factors that have actually triggered such projects we find personal ones, such as (individual or communal) misconduct, and impersonal ones, notably general interest or concerns. Within the organizations that have posited standards, distinct groups have adopted them, e.g. the presidium of a scientific or a research ethical committee. **The standards (…) are usually enforced in a self regulatory manner:** by peer pressure when the standard is purely voluntary, or by explicit sanctions when they are more obligatory (e.g., official reprimands, suspension of membership in a given group, or withdrawn funding).

- Scope of standards: Freedom and responsibility in science; Animal welfare; Science in the internet era

Le «bon» savant

- The International Council for Science tried to identify some of the **core traits or virtues** that one expects to find in the standards and codes:

Honesty

Scepticism

Fairness

Collegiality

Truthfulness

Accuracy

Conscentiousness

Respect

Openness

Le «bon» savant

"*No one can conceive the variety of feelings which bore me onwards, like a hurricane, in the first enthusiasm of success. Life and death appeared to me ideal bounds, which I should first break through, and pour a torrent of light into our dark world. A new species would bless me as its creator and source; many happy and excellent natures would owe their being to me. No father could claim the gratitude of his child so completely as I should deserve theirs. Pursuing these reflections, I thought, that if I could bestow animation into lifeless matter, I might in process of time (although I now found it impossible) renew life where death had apparently devoted the body to corruption.*"

L'éthique (telle que dictée par la bonne conscience) ne suffit pas.

Le petit monde du scientifique

- **Retour sur le clonage des cellules souches:**

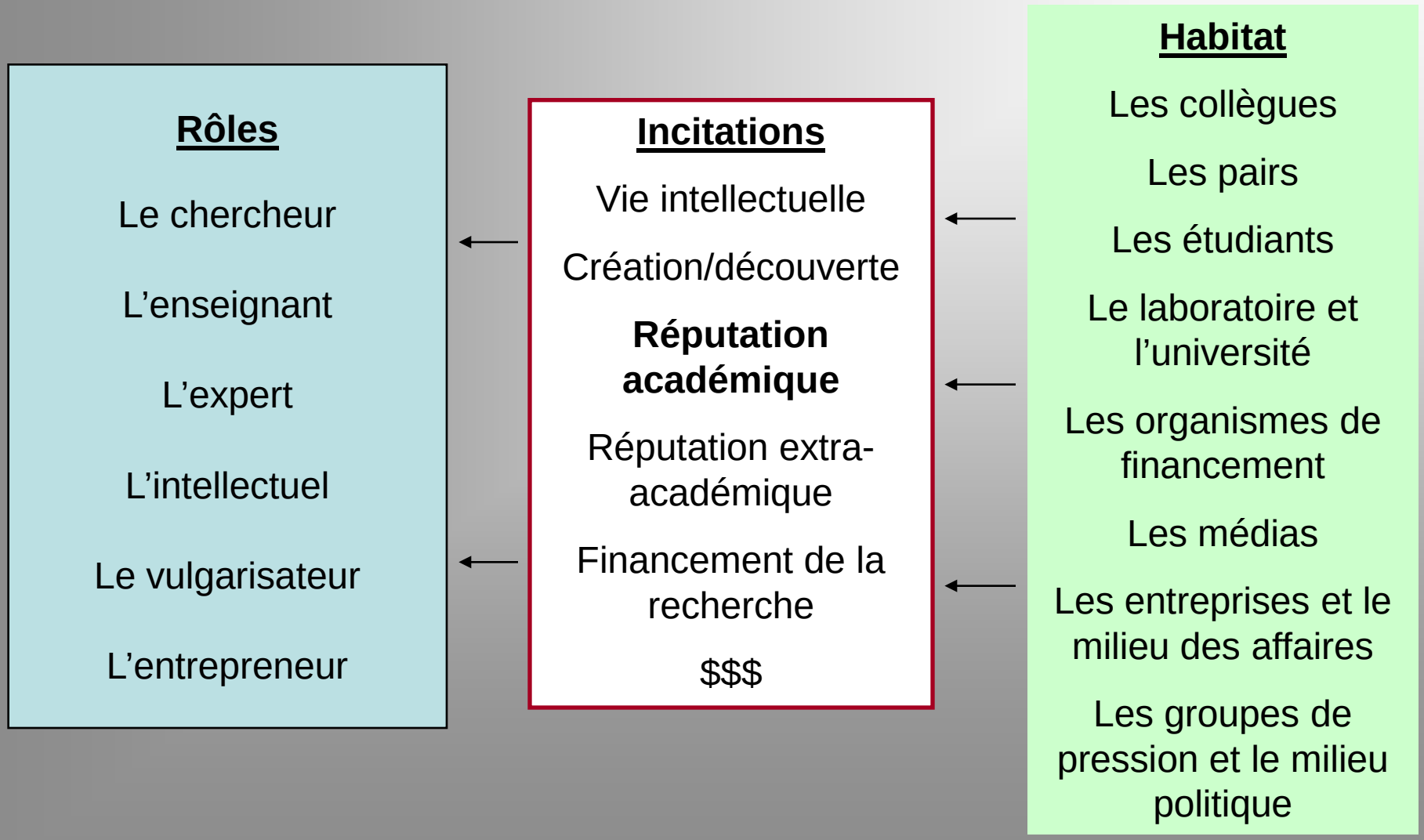
  Prosecutors blamed the scandal, one of the most notorious cases of science fraud in recent years, on ***a combination of elements****.*

  Junior researchers knew about the alleged wrongdoing but could not challenge Hwang. *One of the team members, Kim Sun Jong, stole a stem cell clump extracted from fertilized eggs in Seoul's Miz Medi hospital and "mixed" it with Hwang's cloned cells. While Hwang's cells continued to die, the one from Miz Medi grew. When nobody noticed his scam, Kim made five more cell lines. "Kim was under severe psychological pressure to extract stem cell lines and was also motivated by a* ***greed to win academic fame*** *by contributing to the research of a world-famous doctor," said one prosecutor.*

  The prosecutors, however, failed to clarify ***what role South Korean government officials had played*** *in the dramatic rise of Hwang as a national hero and as the government's first "supreme scientist," a title created for him that granted him millions of dollars in research funds. Hwang used part of the money to make donations to politicians, the prosecutor said.*

  [extraits du International Herald Tribune, 31 mai 2006]

Le petit monde du scientifique



Conclusions

Extraits du texte de Kathinka Evers, “Standards for Ethics and Responsibility in Science,” Conseil international de la science – Standing Committee on Responsibility and Ethics in Science (SCRES), septembre 2001.

- If the choice is made to introduce ethics into the scientific realm, it should be done *well*. Ethical standards must be formulated with great care, sincerity and courage. **Superficiality, vacuity, hypocrisy, corruption and impunity have here been suggested as five major pitfals** in the context of applied ethics of which the standards for scientific research is a particular instance. Naivety might have been added to that list.

- **Economic structures** have very close and multifarious connections to ethical issues in science.

- Strict political neutrality cannot be upheld without loss of credibility. There is no such thing as non-political socially responsible ethics in science.