The Imperative of Scientific Responsibility, the Dual Use Biological Research of Concern and the Milano's Declaration on the Life Scientists' Oath

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- The DUBRC Problem
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The Philosophical Background

- **The Hippocratic Oath**. The secular version of the Hippocratic Oath demands the "utmost respect for human life from its beginning" and, while there is currently no legal obligation for medical students to swear an oath upon graduating, 98% of American medical students swears an oath.

- **The Ethics of Responsibility of Max Weber**. Weber suggested two sets of ethical virtues, the ethic of conviction (Gesinnungesethik) and the ethic of responsibility (Verantwortungesethik) . According to the ethic of responsibility, an action is given meaning only as a cause of an effect, that is, the ethical integrity is established in the causal relationship between an action and its consequences.

The Philosophical Background

- **The Imperative of Responsibility of Hans Jones**. Thinking to the modern science and technology developments, Hans Jones states that "only the beginnings of a new consciousness, awakened from the euphoria of the big victories to the harsh daylight of the dangers, learning again to know fear and trembling, give us hope that we shall voluntarily impose on us the barriers of responsibility and not allow our power, which has grown so large, to finally overwhelm ourselves or those who will follow us".

- **The Conclusion**. A flexible governance of science and technology, which means nor the science continues uncontrolled, nor is it damped or its development is prohibited.

The Dual Use Biological Research of Concern (DUBRC) Problem

- **Besides the Arms Control Paradigm.** It is generally recognized that the Life Sciences cannot be regulated by the usual Arms Control paradigm, due to the inescapable fact that any sector of the Life Sciences has the potential for a military/terrorist/criminal illicit use.

  These Bio-stemming challenges can be reduced and mitigated, but not resolved. A risk value-chain (RVC) perspective is something that will have to be adopted – a value chain is intended here as a chain of activities that extends from the R&D phase to the production of bio products that are based on it - and awareness and education should be a "must" in all acknowledged DUBRC.

The Dual Use Biological Research of Concern (DUBRC) Problem

- **A web of non-proliferation activities**. In multidisciplinary areas like the genetic engineering, synthetic biology, nanobiotechnology dealing with the dual use nature of their researches cannot be done by a specific scientific community, and no single sets of stakeholders can or should own that.

  Furthermore, any regulatory scheme developed to manage these issues of concern has an intrinsic degree of failure, due to the growing path of the DUBRC, their multi-disciplinary dimensions and the range of continuous new scientific directions that are shaping the modern Life Sciences.

  At the core of the dual use dilemma there is also the problem of the tacit knowledge-expertise involved and its global transfer.

The Dual Use Biological Research of Concern (DUBRC) Problem

- **The Hamlet-like dilemma on how to balance unquestionable benefits and responsibilities.** It is fully recognized that modern Life Science brings health benefits and can counter the appearance of new natural pandemic diseases. So, for instance, "to pursue or not to pursue" future DUBRC, like the one for producing recombinant H5N1 viruses?

  There is no "magic formula" to fix this dilemma, and the broader scientific community simply argues that a mix of code-of-conducts, professional responsibility (i.e. the Weber's Verantwortungesethik) and an in-depth "biosecurity culture and awareness", instilled from the beginning in the advanced courses and PhD in Life Science, can be the needed measures to reduce the potential bio dual use risks.

The “Milano Declaration”: Towards a Life Scientists’ Oath

It could sound like the following one:

“We, the bio scientists and technicians community, recognize the imperative of responsibility in pursuing activities that do not threaten human health and the environment, and we will strive to update on the ethics of Life Science”