Sommaire / Table of contents

Dossier : Human Rights and Science
Droits de l'homme et science

Mapping the Issues

Introduction
Samantha Besson 403

The Right to Science : Ensuring that Everyone Benefits from Scientific and Technological Progress

Le droit à la science : assurer à chacun le bénéfice des progrès scientifiques et technologiques
Lea Shaver 411

The Right to Science – Whose Right ? To What ?

Le droit à la science : de qui est-ce le droit et sur quoi porte-t-il ?
Jessica M. Wyndham and Margaret Weigers Vitullo 431

Science without Borders and the Boundaries of Human Rights : Who Owes the Human Right to Science ?

Une science sans frontière face aux frontières des droits de l'homme – Qui est débiteur du droit de l'homme à la science ?
Samantha Besson 462

Balancing Interests : Limitations to the Right to Enjoy the Benefits of Scientific Progress and Its Applications

Une balance des intérêts – Les restrictions au droit de bénéficier du progrès scientifique et de ses applications
Yvonne Donders 486

Looking Back : How the Founders Considered Science and Progress in their Relation to Human Rights

Un regard rétrospectif : comment les fondateurs envisageaient science et progrès dans leur relation aux droits de l'homme
William A. Schabas 504

Sommaire / Table of contents

Chroniques / Columns

Environnement et droits de l'homme

Environment and Human Rights

Christel Cournil (sous la dir.), Catherine Colard-Fabregoule, Adélie Pomade, Armelle Gouritin, Julien Bétaille, Anne-Sophie Tabau, Despina Sinou 519

Droit pénal et pénitentiaire

Criminal and Prison Law

Frédéric Mégret et Damien Scalia 548

Actualités / News 563

Mapping the Issues

Introduction

Samantha Besson*

I. The General Issue

Until recently, the question of human rights in science had by and large been neglected by international human rights lawyers and international human rights institutions alike. It was once even referred to, very tellingly, as the "sleeping beauty" of international human rights law.[1]

Because international human rights lawyers have not yet focused on the issue much, discussions that have taken place in other fora have barely scratched the surface. They have often glossed over the freedom of scientists,[2] neglecting the concurring rights of everyone else to benefit from scientific progress, but also the other moral considerations in light of which the rights of scientists may have to be restricted including other human rights – except maybe for intellectual property rights that have attracted a lot of attention in recent years.[3] Additionally, debates have been mostly concerned with the human rights of scientists abroad, rather than at home, and usually in failed or dictatorial states.[4] They have also understated the concurrent human rights duties and/or responsibilities of other states, international organizations and private actors such as corporations but also private or semi-public research institutions. Finally, discussions have mostly focused on natural sciences, leaving the more subtle albeit sometimes more complex questions of human rights in human and social sciences aside.

* Many thanks are due to Odile Ammann for her assistance with the editing of this introduction and to Gaelle Mieli for her assistance with the editing of the other contributions in this special issue. Thanks also to Olivier De Schutter for hosting this special issue in his journal and to all anonymous reviewers for their comments and critiques.

[1] See E. Riedel, "Sleeping Beauty or Let Sleeping Dogs Lie? The Right of Everyone to Enjoy the Benefits of Scientific Progress and its Applications (REBSPA)", in H. Hestermeyer *et al.* (eds), *Coexistence, Cooperation and Solidarity, Liber Amicorum Rüdiger Wolfrum*, Leiden, Nijhoff, 2011, p. 503.

[2] There is a propensity to still identify many of the rights and duties related to the human right to science to the moral rights and duties of scientists that stem from science itself as a normative practice. See e.g. AAAS Science and Human Rights Coalition, "Defining the Right to Enjoy the Benefits of Scientific Progress and its Applications: American Scientists' Perspectives", Report prepared by Margaret Weigers Vitullo and Jessica Wyndham (October 2013).

[3] See e.g. L. Helfer and G.W. Austin, *Human Rights and Intellectual Property: Mapping the Global Interface*, Cambridge, Cambridge University Press, 2011, pp. 233-242; A. Plomer, "The Human Rights Paradox: Intellectual Property Rights and Rights of Access to Science", *Human Rights Quarterly*, vol. 35, nº 1, 2013, p. 143; C. Timmermann, "Sharing in or Benefiting from Scientific Advancement?", *Sci Eng Ethics*, vol. 20, nº 1, 2014, p. 111, at p. 125-127. See also, most recently, L. Shaver, "The Impact of Intellectual Property Regimes on the Right to Science and Culture", Background note submitted to the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed (20 May 2014); Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on copyright policy and the right to science and culture, presented at the twenty-eight session of the Human Rights Council (24 December 2014) (A/HRC/28/57).

[4] See e.g. the work done in the context of the International Human Rights Network of Academies and Scholarly Societies.

Prima facie, this state of affairs is very surprising as human rights in the scientific context have been guaranteed in international human rights instruments since the 1940s. Things have recently started to change, however. The interest in what is now commonly called the "Human Right to Science"[5] as shorthand for the "Right to enjoy the benefits of scientific progress and its applications" (REBSPA; Article 15(1)(b) International Covenant on Economic, Social and Cultural Rights [ICESCR][6]) is rising. So, one may say that the human right to science is at once an old right and a new topic.

First of all, the human right to science is an old right in international human rights law. It was guaranteed, first, by Article 27 of the Universal Declaration of Human Rights (1948) and, more recently, by Article 15(1)(b) ICESCR (1966). It is also a right that has long been protected in regional and domestic instruments,[7] and in various UN (e.g. 1975) and UNESCO (e.g. 1974 and 2005) declarations and statements on biotechnology and human rights in particular.[8]

A first reason one may venture for the neglect of the right both in practice (e.g. there has been no or very little State reporting and international monitoring on that right) and scholarship, however, pertains to the meaning of science itself and the difficulty to define it. This indeterminacy and the controversies surrounding it have actually had a chilling effect on the practice of the right to science,[9] including its monitoring by the Committee on Social, Economic and Cultural Rights [CESCR].[10] Secondly, science and technology are "inextricably linked" with the means of protection of other human rights[11] (see e.g. Article 2(1) and 23 ICESCR

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[5] See for this expression, e.g. Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on the right to enjoy the benefits of scientific progress and its applications, presented at the twentieth session of the Human Rights Council (14 May 2012) (A/HRC/20/26), p. 3; P. Saul, D. Kinley, and J.F. Mowbray, "Art. 15: Cultural Rights", in B. Saul, D. Kinley, and J.F. Mowbray, *The International Covenant on Economic, Social and Cultural Rights: Commentary, Cases and Materials*, Oxford, Oxford University Press, 2014, p. 1175, at p. 1212; J. Ringelheim, "Cultural Rights", in D. Moeckli, S. Shah, and S. Sivakumaran (eds), *International Human Rights Law*, 2nd edition, Oxford, Oxford University Press, 2013, p. 286, at p. 296-297.

[6] Most of the contributions in this special issue focus on Article 15(1)(b) ICESCR only, but it is important to realize that this (mainstream) choice of source of the right to science affects their approach to the right.

[7] See e.g. Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*; and B. Saul, D. Kinley, and J.F. Mowbray, "Art. 15: Cultural Rights", *op. cit.*, for a full survey of those domestic and regional instruments.

[8] See e.g. UN Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind, Proclaimed by UN General Assembly, Resolution 3384 (XXX) (10 November 1975) (A/RES/30/3384); UNESCO, Recommendation on the Status of Scientific Researchers (20 November 1974); UNESCO Universal Declaration on Bioethics and Human Rights (19 October 2005).

[9] See e.g. A. Chapman, "Towards an Understanding of the Right to Enjoy the Benefits of Scientific Progress and Its Applications", *Journal of Human Rights*, vol. 8, nº 1, 2009, p. 1; A. Müller, "Remarks on the Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications (Article 15(1)(b) ICESCR)", *Human Rights Law Review*, vol. 10, nº 4, 2010, p. 765, at p. 766.

[10] There are very few traces of the right in the practice of the CESCR and when there are, they are very brief. See e.g. CESCR, Report on the 7th Session (23 November-11 December 1992) (E/1993/22), § 73 (Belarus).

[11] See e.g. B. Saul, D. Kinley, and J.F. Mowbray, "Art. 15: Cultural Rights", *op. cit.*, pp. 1223-1224; Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, pp. 8, 16-23; UNESCO, Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications (Article 15(1)(b) ICESCR) (16-17 July 2009), at 12(d). See also W.A. Schabas, "Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and its Applications", in Y. Donders and V. Volodin (eds), *Human Rights in Education, Science, and Culture: Legal Developments and Challenges*, Aldershot, Ashgate, 2008, p. 273, at p. 302; Timmermann, "Sharing in or Benefiting from Scientific Advancement?", *op. cit.*, pp. 125-127.

in general ; Article 11(2) ICESCR with respect to the right to food[12]). Most of their protection by international human rights law has occurred through those other channels, therefore.

Secondly, and at the same time, the human right to science also amounts to a new topic since practical and academic interest for the right has increased recently.[13] This has been the case both at UNESCO with the 2009 Venice Statement[14] and, more recently, at the UN. Thus, on 14 May 2012 the UN Special Rapporteur in the field of cultural rights published a report on the meaning and application of the right to enjoy the benefits of scientific progress and its applications (Article 15(1)(b) ICESCR).[15] On 3-4 October 2013, a two-day seminar was organized by the Office of the High Commissioner for Human Rights in Geneva to discuss the meaning and application of the human right to science. The goal now is for the CESCR to publish recommendations and prepare a General Comment on how to implement the human right to science (Article 15(1)(a) and (c) already have General Comments 17 and 21). The Special Rapporteur has since then led another consultation on the impact of intellectual property regimes on the enjoyment of the rights to science and culture. On that basis, she published a first report on copyright policy and the right to science and culture on 24 December 2014[16] and will present a second one on patent policy and the right to science and culture in 2015. Finally, in July 2014, the UNESCO decided to launch an open consultation to guide the revision of their 1974 Recommendation on the Status of Scientific Researchers.

There are various reasons one may venture for this renewed interest in the human right to science. And to mention just a few here : heightened sensitivity for global justice and equality, and hence stronger reactions to the technological divide and innovation injustices that have caused great poverty, famine and illness in some parts of the world ;[17] greater technological capacities, and new linkages being

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[12] On the right to science and the right to food, see e.g. O. De Schutter, "The Right of Everyone to Enjoy the Benefits of Scientific Progress and the Right to Food : From Conflict to Complementarity", *Human Rights Quarterly*, vol. 33, n° 2, 2011, p. 304 ; H.M. Haugen, "Human Rights and Technology : A Conflictual Relationship ? Assessing Private Research and the Right to Adequate Food", *Journal of Human Rights*, vol. 7, n° 3, 2008, p. 224. On the right to science and the right to health, see e.g. Y. Donders, "The Right to Enjoy the Benefits of Scientific Progress : In Search of State Obligations in Relation to Health", *Medicine, Health Care and Philosophy*, vol. 14, n° 4, 2011, p. 371 ; S.P. Marks, "Out of Obscurity : The Right to Benefit from Advances in Science and Technology and Its Implications for Global Health", Proceedings of the 3rd Conference on Law, Science and Technology : Health and Science – Human Rights and Legal Issues, Taipei 2012, p. 1.

[13] See e.g. A. Chapman and J. Wyndham, "A Human Right to Science", *Science*, vol. 340, n° 6138, 2013, p. 1291 ; Müller, "Remarks on the Venice Statement", *op. cit.* ; L. Shaver, "The Right to Science and Culture", *Wisconsin Law Review*, n° 1, 2010, p. 121 ; A. Chapman, "Towards an Understanding", *op. cit.* ; W.A. Schabas, "Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and its Applications", *op. cit.* ; R.P. Claude, "Scientists' Rights and the Human Right to the Benefits of Science", in A. Chapman and S. Russell (eds), *Core Obligations : Building A Framework for Economic, Social and Cultural Rights*, Antwerp, Oxford, and New York, Intersentia, 2002, p. 247.

[14] Venice Statement 2009, *op. cit*.

[15] Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit*.

[16] Report of the Special Rapporteur on copyright policy and the right to science and culture, *op. cit*.

[17] See e.g. T. Pogge, "The Health Impact Fund : Enhancing Justice and Efficiency in Global Health", *Journal of Human Development and Capabilities*, vol. 13, n° 4, 2012, p. 537 ; A. Buchanan, T. Cole, and R.O. Keohane, "Justice in the Diffusion of Innovation", *The Journal of Political Philosophy*, vol. 19, n° 3, 2011, p. 306.

made between science and technology; greater sensitivity to the power of private actors including corporate actors and new legal tools to curtail those threats, especially in the context of social, economic and cultural rights;[18] and greater institutional capacity at the international level, and means to cooperate internationally as a result.

Whatever the reasons for this renewed interest, the human right to science also offers interesting features that may be of interest to any scholar in international human rights law and theory. First of all, the dual holdership of the right. Because it is a right held both by scientists and by everyone else at the same time, it cannot be protected like any other right.[19] This also has consequences for the resolution of what may at first seem like conflicts of rights, but may not be.[20] Secondly, the complexity of science as object of a human right. The difficulty to define it and its relationship to other related endeavours and notions such as innovation or progress makes for a very indeterminate right. One should also mention the complex ties between science, moral and social progress, economic prosperity and democratic legitimacy, and the potential advantages and disadvantages in this context of conceiving of science in human rights terms.[21] Thirdly, the interest protected by the right pertains to a global public good, and hence is such that it can only be effectively protected if all its duty-bearers coordinate in fulfilling their collective duties. This makes for interesting prospects in terms of the supply-side of the right and devising actual duties of international cooperation between the various duty-bearers of the right to science.[22] Fourthly, Article 15(1) ICESCR protects the right to access the benefits of science (b)) together with the moral and material interests of the author resulting from the scientific production of those benefits (c)). This dual object of the right to science, i.e. "access" of everyone and "protection" of the author, provides for a promising framework to alleviate the alleged tensions between the human right to science and intellectual property regimes.[23] Finally, one should mention the basic nature of the human right to science and the necessity of its implementation for the respect of many other human rights, such as the right to health or to food. This has interesting consequences for the stringency of the corresponding duties and their relationship to other rights' duties that may not be as conflictual as they seem to be at first.[24]

[18] See e.g. O. De Schutter, *International Human Rights Law*, 2nd edition, Cambridge, Cambridge University Press, 2014, p. 187 ff.; M. Langford *et al.* (eds), *Global Justice, State Duties – The Extraterritorial Scope of Economic, Social, and Cultural Rights in International Law*, Cambridge, Cambridge University Press, 2012.
[19] See e.g. W.A. Schabas in this volume.
[20] See e.g. J. Wyndham and Y. Donders in this volume.
[21] See e.g. W.A. Schabas in this volume.
[22] See e.g. S. Besson in this volume.
[23] See e.g. L. Shaver in this volume.
[24] See e.g. Y. Donders and L. Shaver in this volume.

II. This Special Issue

In the wake of this renewed interest for human rights in science and in view of the difficult issues the topic raises, the University of Fribourg and the Chair for Public International Law and European Law decided to pursue the debate in a small scientific setting and organized a workshop on the topic on 23-24 May 2014. The workshop was organized with the financial support of the Swiss National Science Foundation and the Public International Law Directorate of the Swiss Department of Foreign Affairs.

This workshop brought together a group of academic human rights lawyers and human rights theorists specialized in the field and interested in delving deeper into some of its hard questions. By drawing in both international lawyers and philosophers, the hope was to map and address those questions in a more comprehensive fashion and to suggest ways of guiding and reforming the current practice and institutional framework of human rights in science. The small, intimate and informal setting allowed for longer and freer exchanges than in more politicized national and international frameworks. Discussions further benefited from the participation of three general discussants : Mylène Bidault from the Office of the High Commissioner for Human Rights ; Amrei Müller from the University of Oslo ; and Olivier De Schutter from the Catholic University of Louvain and the Committee on Economic, Social and Cultural Rights. Last but not least, Allen Buchanan from Duke University and King's College, London presented a paper at the workshop that is not published in this special issue : *Justice in Innovation and Human Rights in and to Science*.

The workshop was organized around seven questions :

1) Which are the human rights that apply in the field of science (e.g. is there a "human right" *to* "science" and what could it mean ? How do some of them differ from the moral and legal rights of creators and intellectual property rights in particular ?), and what are their objects (e.g. what are the interests protected ? How do they relate ?) and their potential linkages (e.g. are some more basic than others ?) ?
2) What are the (individual or social) justifications or grounds for the human rights that apply to science and how do they relate to other rights' justifications or grounds and are they sufficiently universal ?
3) What is the content of the human rights that apply in the field of science, what kind of (positive or negative ; substantive and procedural ; immediate or progressive ; minimal or maximal) duties do they give rise to and what is their (material) scope ?
4) Who are the (individual or collective) subjects of human rights in the field of science ?

5) Who are the corresponding (individual or institutional; territorial or extra-territorial) duty-bearers and responsibility-bearers, and what are their relationships?
6) How should one resolve human rights "conflicts" (e.g. with the right to food, the right to health, the right to education, the freedom of speech, the right to property, etc., but also within the "human right to science" itself [e.g. Article 15(1)(b) ICESCR's right to enjoy the benefits of scientific progress and 15(1)(c) ICESCR's right to the protection of the moral and material interests resulting from scientific authorship]) and conflicts of human rights in the field of science with other (non-human rights-based) moral and legal considerations (e.g. intellectual property and other similar moral rights)?
7) How should one implement human rights effectively in the field of science (e.g. judicially or not; globally or not), and how may one justify their restrictions?

Most of those questions are addressed by the five articles presented in this special issue. Here is a brief survey of the content of those contributions and their articulation.

In her article *The Right to Science: Everyone Benefits from Scientific and Technological Progress*, Lea Shaver (Indiana University McKinney School of Law) contends that the right to enjoy the benefits of scientific progress and its applications has long been neglected, both in theory and in practice. Even scholars, advocates, and jurists deeply involved in the human rights field are likely to express uncertainty as to what the right to science concretely requires, if they are even aware of its existence. She seeks to remedy that obscurity, providing a highly accessible account of the right to science that is both philosophically grounded and very practical. In short, the right to science calls for treating science and technology as global public goods, to be cultivated for the benefit of humanity and made accessible to all, just as with other socioeconomic rights such as education and healthcare. She then elaborates what that broad vision means for minimum core content. Particular emphasis is given to reconciling the potential tension between the right to science and intellectual property regimes.

In their contribution *The Right to Science: Whose Right? To What?*, Jessica Wyndham (American Association for the Advancement of Science and George Washington University) and Margaret Weigers Vitullo (American Sociological Association) write about the meaning of the right to enjoy the benefits of scientific progress and its application, as well other corresponding duties set out in Article 15 of the International Covenant on Economic, Social and Cultural. Focusing on the three pillars of the right – access, participation and protection – their contribution is to build on existing literature by introducing the perspectives of the scientific community, both as specifically elicited through a multi-disciplinary focus group process involving US-based scientists, and as reflected in parallel debates and discussions occurring within the scientific community as they bear on the right to science.

In her article *Science Without Borders and the Boundaries of Human Rights : Who Owes the Human Right to Science ?*, Samantha Besson (University of Fribourg & Human Rights Delegate of the Swiss Academies of Arts and Sciences) contends that what is specific about the supply-side or duty-side of the right to science is two-fold. First of all, by virtue of the interest protected by the right to science, i.e. the access to the benefits of science and hence an individual interest in a universal public good, and of the universal scope of the threats to that interest, the duties relative to the right to science are collective duties States and/or international institutions of jurisdiction bear together, and not only concurrently. This has consequences for their feasibility and hence for their recognition in the first place, but also for their co-allocation among States and institutions of jurisdiction and not only within each of them. Secondly, this also has an impact on the other private actors', States' and international institutions' responsibilities for the right to science, since those responsibilities are borne together as well and should, as a result, be coordinated in their primary allocation. In short, the "unbounded" nature of science should not be too quickly defeated by the "bounded" nature of human rights. If the human right to science and hence to innovation is to be protected effectively, one should be ready to innovate institutionally in order to "unbound" their corresponding duties and responsibilities.

In her contribution *Balancing Interests : Limitations to the Right to Enjoy the Benefits of Scientific Progress and Its Applications*, Yvonne Donders (University of Amsterdam) contends that while several studies and reports have been elaborated on the normative content and state obligations of the right to enjoy the benefits of scientific progress and its applications, one of the legal aspects that has not yet been fully explored are the possible limitations of this right. The right to enjoy the benefits of scientific progress is, just as most other human rights in international law, not absolute. States may, under certain circumstances, limit the enjoyment of human rights. For instance, States may or even must limit the conduct of science or the dissemination of scientific results in order to prevent harm or disrespect of other human rights. Her contribution analyses the legal framework of limitations of the right to enjoy the benefits of scientific progress, based on the different regimes in international human rights law. In international human rights law, the possibility of and criteria for limitations are laid down in treaty provisions, so-called limitation clauses. The scope of these clauses has been elaborated by international supervisory bodies and academics. Limitations form part of the more general doctrine of State obligations, which in the case of the right to enjoy the benefits of scientific progress is characterized by the ICESCR regime of progressive realisation of this right and the prohibition of retrogressive measures.

In his contribution *Looking Back : How the Founders Considered Science and Progress in their Relation to Human Rights*, William A. Schabas (University of Middlesex, London and University of Leiden) contends that Article 27 of the Universal Declaration of Human Rights enshrines the right of everyone to share in scien-

tific advancement. The word "advancement" may imply a value judgment on the content of science. However, the drafting history of the Declaration shows that a more robust effort to frame and define the nature of science, promoted by the Soviet Union and some of its allies, was not successful. This is in contrast with a similar and more successful effort in Article 26 which concerns the right to education. The paper analyses the *travaux préparatoires* of the Universal Declaration. These materials are inconclusive, although subsequent application and interpretation of Article 27 lends support to the view that its interpretation is not entirely neutral as far as the direction and content of scientific research are concerned.

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Lea Shaver

The Right to Science: Ensuring that Everyone Benefits from Scientific and Technological Progress

The Right to Science: Ensuring that Everyone Benefits from Scientific and Technological Progress

Lea Shaver

Abstract

The right to enjoy the benefits of scientific progress has long been neglected, both in theory and in practice. Even scholars, advocates, and jurists deeply involved in the human rights field are likely to express uncertainty as to what the right to science concretely requires… if they are even aware of its existence. This article seeks to remedy that obscurity, providing a highly accessible account of the right to science that is both philosophically grounded and concrete. In short, the right to science calls for treating scientific research, scientific knowledge, and technology as global public goods, to be cultivated for the benefit of humanity and made accessible to all, just as with other socioeconomic rights such as education and healthcare. This article then elaborates what that broad vision means for minimum core content. Particular emphasis is given to reconciling the potential tension between the right to science and intellectual property regimes.

Résumé

Le droit de bénéficier du progrès scientifique et de ses applications a pendant longtemps été négligé, tant en théorie qu'en pratique. Même les chercheurs, avocats ou juristes profondément impliqués dans le domaine des droits de l'homme expriment une incertitude quant à ce que le droit à la science requiert concrètement … si tant est qu'ils aient connaissance de son existence. Cette contribution a pour but de remédier à cette obscurité en apportant des précisions, tant philosophiques que pratiques, relatives au droit à la science. En résumé, le droit à la science appelle à appréhender la science et la technologie en tant que bien public global, à développer au bénéfice de l'humanité et à rendre accessible à tous, au même titre que d'autres droits économiques, sociaux et culturels tels le droit à la santé ou le droit à l'éducation. Cette contribution élaborera par la suite ce que cette vision large du droit à la science aura comme effet sur le contenu obligatoire minimum de ce droit. L'accent sera ainsi mis sur la réconciliation d'une tension potentielle entre le droit à la science et les régimes de propriété intellectuelle.

Lea Shaver

I. Introduction and Summary

Thinking about the right to science is at once very old and very new. It is old, in the sense that the textual basis for this right, and the debates about its inclusion in the Universal Declaration of Human Rights (UDHR), date back to the 1940s.[1] During the 1960s and 1970s this debate was rekindled in the context of the Covenant on Economic, Social and Cultural Rights. But in another sense the debate is also still new. The right to science remains today at a very early stage of conceptualization compared to the right to education or the right to health – and even more so compared to freedom of expression or the right to privacy. Even people deeply involved in the human rights field are frequently unaware of the existence of a right to science, much less of its meaning. Thus the right to science is a human right whose conceptual content needs to be both recovered and further developed.

Recognizing this need, the Office of the High Commissioner for Human Rights (OHCHR) organized a Seminar on the Right to Enjoy the Benefits of Scientific Progress and its Applications in October of 2013.[2] This Seminar implemented one of the recommendations made by Farida Shaheed, the UN Special Rapporteur in the field of Cultural Rights, in her Report to the Human Rights Council the prior year.[3] Shaheed had suggested a participatory process to improve the conceptual clarity of "the right to science and related obligations," as an area of human rights law that had long been neglected as a matter of both theory and practice. The Seminar proved to be lively and generative, bringing together a global group of experts to share perspectives over two days. This essay reflects some important new insights that came out of that seminar, as well as a later academic workshop hosted by the University of Fribourg, at which the papers of this symposium were presented and developed.

This essay seeks to do two things to contribute to greater conceptual clarity regarding the right to science.

Part II establishes a theoretical foundation for the right through a discussion of its fundamental principles. Toward this end, the discussion emphasizes the animating spirit of science as a public good, with both instrumental and intrinsic value, to be directed toward the service of humanity, guided by values of participation and inclusion. Science and technology have significant power as a means to the end of improving the human situation, but the scientific endeavor also has inherent value as a way in which individuals and communities give expression

[1] UN General Assembly, Resolution 217 A (III), 10 December 1948, (A/RES/3/217 A). Article 27(1) state that "Everyone has the right…to share in scientific advancement and its benefits."

[2] Report of the United Nations High Commissioner for Human Rights the seminar on the right to enjoy the benefits of scientific progress and its applications, presented at the twenty-sixth session of the Human Rights Council (1 April 2014) (A/HRC/26/19).

[3] Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on the right to enjoy the benefits of scientific progress and its applications, presented at the twentieth session of the Human Rights Council (14 May 2012) (A/HRC/20/26).

to a unique aspect of the human personality, much like the arts and other forms of culture. To bring life to these values, however, not just any science will do. Realizing the human rights potential of the science and technology requires a philosophical and practical commitment to science and technology in service of humanity, rather than in service of state power or private profit. In particular, the human rights approach requires a conception of science and technology as public goods, which must be supported and cultivated and made accessible to all people – as with education and health care. To achieve this goal, scientific norms and innovation policy must consciously prioritize broad public participation in the scientific and technological process, and ensure widespread access to new technologies, particularly for the poor and other vulnerable populations.

Yet it is one thing to talk about the general principles and spirit of the right to science, and quite another to define the specific legal obligations and concrete standards it entails. Particularly in the context of socioeconomic rights, it is often difficult to make this translation from abstract principles to concrete legal obligations. To take a contrasting example, freedom of expression also began its legal life as an abstract principle or aspiration. Over the course of centuries, however, this right has benefitted from extensive advocacy, debate, and clarification. The resulting clarity gives us greater confidence today that we understand what "freedom of expression" actually means : that this human right is more than just a rhetorical claim, but is capable of judicial review and carries specific content… even though reasonable people may disagree about some aspects of that content. This much-needed process of advocacy, debate, and clarification, however, is still at an early stage when it comes to the right to science.

To advance this goal of concretization, Part III then proceeds to speak more specifically about what States must do to honor the right to science, by exploring what "minimum core content" might be attributed to this right. Four conceptually distinct approaches to elaborating the minimum core content of human rights are deployed, seeking to translate the high-level principles elaborated in the first part of the essay into more concrete legal obligations. The discussion begins by highlighting the problematic nature of a "core consensus" approach to defining the content of the right to science, at a time when the right still struggles for recognition. Next, the "normative essence" approach is identified as a more promising method, suggesting a concept of "essential technologies" to which all people should enjoy affordable access. Third, the "minimum obligations" approach focuses more explicitly on the duties of States in respect of the right to science, highlighting universal access to clean water, sanitation, electricity, the Internet, and other essential technological services ; academic and Internet freedom ; protection against the use of technology to abuse privacy or other human rights ; public access to publicly funded research ; and intellectual property rules that are adopted through a publicly transparent process enabling an appropriate balancing of interests in protection and in access. Finally, the essay proposes a fourth, "pragmatic approach" to minimum core content, which responds to particular issues

and challenges of our time. This section discusses the relevance of the right to science to current battles over access to medicines for addressing the HIV/AIDs crisis, other key conflicts between the right to science and the current expansionist trend in regulation of intellectual property, and debates over Internet governance and freedom.

Throughout this work, I will use the phrase "the right to science" rather than the more formal phrase "the Right to Enjoy the Benefits of Scientific Progress and its Applications" or its common abbreviation "REBSP". The task before us is one of promoting dialogue and discussion about this right and advancing conceptual clarity; these goals are best facilitated when we have a simple and straightforward way to name what we are talking about. Not so long ago, the human rights community dutifully spoke of "the right of everyone to the enjoyment of the highest attainable standard of physical and mental health." Fortunately we have by now exchanged that awkward phrasing for the shorter and simpler phrase "the right to health," without losing sight of the rich complexity of meaning behind this convenient shorthand. The time has come to similarly speak of "the right to science."

This of course still begs the question of what we mean by "science." As with any powerful concept – such as "rights," "equality," or "law" – the word "science" is subject to many different usages. Indeed, this essay intentionally draws upon multiple meanings of the term. Perhaps the best definition I can offer of the term "science" as I use it in this essay would be: the systematic application of the human powers of inquiry, observation, and reason to better understand the world; often, but not necessarily, with the aim of finding ways to improve it. In the broadest sense, the term "science" is a placeholder for the scientific endeavor, the body of knowledge produced by science, and its technological applications. "Science" in this conception includes anthropology and philosophy as much as medicine and engineering. It is broad enough to encompass traditional knowledge systems and other epistemologies foreign to the university.[4] It also holds room for the efforts of amateurs as well as professional scientists who are highly trained in specific traditions. This approach to the concept of science specifically rejects as too narrow the common usage of the term to refer only to specific branches, disciplines, or methods of modern academic enquiry that are empirical, quantitative, or positivist; for example defining "the sciences" in contrast to "the humanities" or "the arts." Science is a form of human culture, a complex collaborative endeavor of meaning-making and creativity. It inevitably relies upon subjective interpretation and even metaphor, as much as some might like to pretend it can be purely objective, mathematical, or centered in laboratories.[5] Whether you come to this essay as a philosopher, a lawyer, or a student, or even

[4] B. de Sousa Santos (ed.), *Cognitive justice in a global world: Prudent knowledges for a decent life*, Lantham, Maryland, Rowman & Littlefield, 2007.
[5] D. McCluskey, "The Rhetoric of Economics", *Journal of Economic Literature*, vol. 31, nº 2, 1983, p. 481.

simply an activist who wishes to be thoughtful and reflective about your work, you are in my estimation, a scientist.

II. Foundational Principles

This section develops four ideas about the foundational principles underlying the right to science. First, it emphasizes the instrumental and intrinsic value of science – both as a means to a technological end, and as a process or activity in which human beings individually and collectively give expression to an important aspect of our humanity. Second, the discussion juxtaposes three conceptions about the aims of science and argues that the human rights vision requires a prioritization of science in service of humanity. Third, the essay emphasizes the importance of recognizing science and technology as global public goods, to be cultivated and encouraged by States, civil society, and the international community for the benefit of all. Fourth and finally, the discussion highlights attention to the touchstone values of inclusivity and participation, both for conducting the scientific process and for ensuring access to its technological fruits.

A. The Value of Science: Both Instrumental and Intrinsic

Why should science and technology find a place in the international bill of rights? Occasionally, access to science and technology may be fundamental to human survival. This is the case, for example, when we are talking about vital health research, essential medicines, or the technology that supports sanitation services and clean water. These most essential aspects of science and technology, however, are already referenced by other human rights, including the right to health, the right to education, and the right to food. The separate recognition of the right to science implies a further purpose for science well beyond providing for these basic human needs.

The key to uncovering that further purpose lies in looking at the context in which the right to science was enshrined in the international human rights texts. The right to science always appears right beside the right to culture, within the very same article.[6] These two concepts are deeply intertwined, so much so that I generally prefer to speak of "the right to science and culture" in a unified sense, because there is so much overlap between the scientific and cultural aspects.[7] In the human rights treaties, the right to science and culture always follows immediately after the right to education. This placement is also significant. Unlike the rights to health, housing, or food, access to science and technology is not usually

[6] Article 27(1) Universal Declaration of Human Rights; article 15(1-4) International Covenant on Economic, Social, and Cultural Rights.
[7] L. Shaver, "The Right to Science and Culture", *Wisconsin Law Review*, vol. 2010, nº 1, 2010, p. 121.

a matter of life and death. It does, however, go to the heart of what kind of life we live. Like education and culture, science and technology hold particular power to improve human life, raise standards of living and promote other human rights. The rights to education, culture, and science have in common a vision of dignified human life and community engagement that goes well beyond mere survival and security needs. Through education, culture, and science, human beings collaborate to realize values of beauty, creativity, the search for truth, and realization of a better tomorrow.

The value of science then, is not purely instrumental. Yes, science and technology also have significant utilitarian value. They can be deployed to solve social problems and improve our material situation. But there is also a value inherent in the process itself, as with the educational process. Engaging in cultural manifestations such as art, literature, music, and theatre helps us to realize and express parts of our shared humanity, which has value from the perspective of individual development and the shared life of the community. Engaging in scientific discovery and technological innovation does as well. Human beings are naturally curious about our world. We seek to understand it. We seek to solve the problems we perceive in it. This is a beautiful and precious part of the human personality. The right to science envisages the scientific and technological endeavor as a process that every person is entitled to participate in – a collective and collaborative process that can help to unite a frequently fragmented world.

B. Science in Service of Humanity

Although science will ideally reflect and serve these humane values, it is important to acknowledge that scientific inquiry and technology are not inherently good. They are rather vehicles that will serve whatever values they are guided by, for good or for evil. The international bill of rights is not neutral as to these values. When the international community first came together to recognize and enshrine a right to science in the post-WWII moment, historical circumstances made them keenly aware of the immense harm that can come from the misuse of science. Science in service of authoritarianism had advanced the ends of violence, torture, murder, and genocide. Nazi scientists had declared the biological inferiority of non-Aryan races and provided the ideological support for "social cleansing" campaigns that would target Jews, homosexuals, and the mentally and physically handicapped, among other minority populations. American scientists had perfected the means to annihilate cities through nuclear attack. Fire bombing, chemical gassing, the atom bomb, and many other technologies for mass murder… these were among the fruits borne through the vision of science in service to the State.

Bearing in mind these bitter lessons, the Universal Declaration of Human Rights articulated a decidedly different vision : that of science in service of humanity. A science that is deployed to alleviate human suffering and to improve the human

condition. A science that is committed to high ethical standards, conducted always in ways that are respectful of other human rights. By enshrining this right in the Declaration and by establishing UNESCO, the international community articulated an alternative vision for scientific and technological development, one which recognizes and honors our common humanity by advancing norms of dignity, equality, and freedom. When these humane values are placed at the heart of the scientific process, it becomes more likely that the resulting applications will enhance, rather than threaten, the enjoyment of the full range of human rights.[8]

C. Science as a Public Good

In our own time, however, this vision of science in service to humanity is threatened by a new competing vision : that of science in service of profit. In much of our contemporary public discourse, financial profit and economic growth have come to be seen as both the purpose of science and technological innovation, as well as its primary incentive. This shift in philosophical emphasis corresponds with a decline in public investment in science and increasing support for the privatization of research and the commodification of innovation. To be sure, there are many things that markets and for-profit businesses do more efficiently than governments or the social sector, and private entrepreneurship is an essential pillar of economic welfare and human freedom. Yet the philosophy of science in service of profit seems to me to have the ordering of means and ends backward. Harnessing private enterprise to advance scientific research and technological development is all for the good. But to view scientific research and technological development as the servant to enterprise is to put the cart before the horse, and to unwisely divorce science from its much-needed ethical grounding. Science in service of profit is likely to deliver on its promise of delivering a return on private investment, but it is likely to fail in realizing the larger potential of service to humanity.

What is needed is a renewed political and ethical commitment to the pursuit of science as a public good. To call science a human right is precisely to insist that the supply of scientific knowledge and the development of technology must not be left entirely – or even primarily – to market forces. This is true, in the first instance, because science and technology are dependent upon state support to realize their fullest potential.[9] Just as important is the need for distributive justice. As with health care and education, there is a moral as well as economic value in making science and technology accessible to all, regardless of any particular individual's ability to pay. To claim the right to science is to insist that both the process and the products of science must be understood as public goods intended for the benefit of all, not merely the already privileged, who are best positioned to purchase access in a marketplace. This implies that scientific and

[8] R. Claude, *Science in the service of human rights*, Philadelphia, Pennsylvania, University of Pennsylvania Press, 2002.
[9] M. Mazzucato, *The entrepreneurial state : Debunking public vs. private sector myths*, New York, Anthem Press, 2014.

technological research should be the target of public funding, and that innovation policy should prioritize socially valuable ends and the widespread diffusion of technological benefits, especially to benefit vulnerable populations. Science in pursuit of profit will not accomplish this end; science must be ethically grounded in a vision of service to humanity.

D. Inclusivity and Participation

Ensuring that everyone benefits from scientific and technological progress, however, cannot be a top-down effort. Achieving this goal depends instead upon broad participation in the process of science. Because the forces shaping scientific advancement are complex, technological progress is often mystified. To outsiders, it may seem that scientific progress is a natural process that simply "happens." To the casual observer, it may seem that a new technology simply "appears," and a short while later, everyone seems to have one. Scholars in the field of Science and Technology Studies offer an important corrective perspective. This discipline investigates science and technology as products of social processes engaged in by real people. Science and technology, like politics and culture generally, do not proceed inevitably in a predetermined direction. Rather, the path they follow in any particular social and historical context is the product of both the individual choices of scientists and larger social forces. Public policy and legal regulation shape which technologies are pursued and set the conditions under which their spread may be accelerated or delayed. These individual and collective choices can and must be guided by ethical judgments, including a commitment to widespread public benefit.

When these normative choices are obscured or neglected, the scientific process can easily drift from its mission of service to humanity. Technological development may end up catering to only a narrow elite, failing to serve those most in need. The challenge of ensuring that everyone benefits from scientific and technological progress requires broader participation and ethical accountability. The ethical emphasis on participation extends not only to ensuring universal access to the ultimate technological fruits of the scientific endeavor; public participation must also inform the values that guide the scientific process itself. Scientific disciplines and technological fields must ensure that they are truly open to equal participation by women and minority populations. Scientists and technologists should also take up the responsibility to ensure that their work is responsive to social needs, informed by outside perspectives and knowledge, and translated to reach beyond "the ivory tower." As the scientific process is guided by such values, it becomes more and more likely that the technological results will in fact be useful and accessible to all, promoting lives with dignity, especially for the most vulnerable.

III. Minimum core content

So far this essay has offered a view of the right to science as shaped by four foundational principles: recognition of the intrinsic as well as instrumental value of science, an ethical insistence upon science in service of humanity, a political commitment to science as a public good, and an emphasis on the importance of broad participation. The second half of this essay explores what these general principles underlying the right to science imply, in terms of specific legal obligations and policy priorities.

One important tool that scholars and jurists have used to concretize the legal obligations corresponding to various human rights is the concept of "minimum core content." Socioeconomic rights are subject to the logic of "progressive realization" in the context of resource constraints. Yet the Committee on Economic, Social, and Cultural Rights has repeatedly emphasized that it is also possible to identify a "minimum core obligation to ensure the satisfaction of, at the very least, minimum essential levels of each of the rights."[10] "Minimum core" approaches to human rights interpretation identify specific standards around which there is widespread agreement, which apply even in contexts of very limited resources, or which a nation's failure to honor will be subject to legal censure. The explicit understanding is that these minimum standards are not meant to limit broader understandings of the right. They serve as a baseline or floor, from which upward movement should be continuously pursued. This "minimum core content" approach has been deployed by juridical bodies such as the Committee on Economic, Social, and Cultural Rights (CESCR) and national courts, as well as by human rights scholars, as a method of translating human rights principles into concrete obligations.

One such scholar Katherine Young, has sought to clarify the concept of minimum core content by delineating multiple possible approaches to defining the minimum core content of a right, each of which has precedent in human rights law and Committee practice.[11] One approach seeks to locate the "core consensus" content of the right, distinguishing this from marginal aspects of the right, upon which disagreement is to be honored. A second approach seeks to identify the "normative essence" of the right, defining a minimum level of the right that is necessary to honor fundamental principles of dignity, equality, and freedom. The third approach attempts to define "minimum obligations" that States must implement as a matter of priority, or be judged to have violated the right through omission. Each of these approaches has a unique emphasis and offers a unique perspective. Efforts to clarify the right to science should draw on all three of these approaches, ideally with an explicit awareness of their complementarities and limitations.

[10] Committee on Economic, Social and Cultural rights, Report on the Fifth Session, 26 November-14 December 1990, (E/1991/23).
[11] K. Young, "The Minimum Core of Economic and Social Rights: A Concept in Search of Content", *Yale Journal of International Law*, vol. 33, nº 1, 2008, p. 113.

The sections that follow apply each of these three approaches to help identify minimum core content for the right to science. This discussion will first highlight some problems with utilizing the "core consensus" approach for the right to science. Next I will recommend the "normative essence" approach as a more promising starting point for this particular human right. Finally, the discussion will examine how to translate the right to science into "minimum obligations." The article then concludes with a proposed fourth "pragmatic approach" to defining the minimum core content of the right to science.

A. The "Core Consensus" Approach

The essence of the "core consensus" approach is to locate a minimum core content of a right upon which there is widespread agreement, whereas debate may still exist at the margins of a right. Young describes the "core consensus" approach as being more positivist in nature, since it looks to State practice to identify areas of agreement.[12] Because it builds upon consensus, this approach has political advantages for institutions that must carefully tend to their legitimacy. A drawback of this approach is that it may be overly conservative, tending toward the "lowest common denominator," and thereby failing to adequately defend the interests of vulnerable individuals. Normative consensus can shift to become either more or less accommodating of human rights claims; it can also reflect political considerations at odds with human rights norms.

For example, there was long a stable political and juridical consensus in Brazil that all citizens were entitled to receive prescribed medications free of charge.[13] This consensus went hand-in-hand with an administrative and regulatory structure that emphasized public-sector pharmaceutical research and development and forbade the granting of patents on products important to human health. During international trade negotiations in the 1990s, pharmaceutical industry groups successfully pushed for new international patent rules. As a result, Brazil and many other countries were required to revise their domestic laws to extend patent protection to pharmaceuticals. The prices of medicines have risen significantly as a result, and Brazil's health budgets are now under significant strain. Reflecting this new financial pressure, the political and judicial consensus in favor of free provision of medicines as a basic human right now shows signs of unraveling.[14]

This story of access to medicines illustrates several problematic results of the "core consensus" approach as applied to the right to science. First, the consensus on how to balance patent protection and access to medicines has shifted and

[12] K. Young, *op. cit.*, pp. 142-144.
[13] S. Monica, R. Guise, D. Wang, T. de Campos, "Access to Medicines: Pharmaceutical Patents and the Right to Health", in L. Shaver (ed.), *Access to Knowledge in Brazil: New Research on Intellectual Property, Innovation and Development*, New Haven, Connecticut, Information Society Project, 2010, p. 103.
[14] *Ibidem*, pp. 103-132.

continues to shift over time…a nd not always in the direction of expanded sensitivity to human rights. Were this discussion of the right to science taking place thirty years ago, we would naturally have pointed out that there was no international consensus in favor of patent protection for pharmaceutical technologies. Yet today there is as a matter of positive law a strong international consensus that patents must be granted in all fields, including pharmaceuticals. This legal consensus has emerged because multinational companies successfully leveraged international trade negotiations to advance their own financial interests… often at the expense of public interests.[15] It would be a mistake, however, to bless a consensus of State practice produced in this manner with the human rights stamp of approval.

The Brazilian example also highlights a second dynamic : the troubling tendency of an emphasis on consensus to empower restrictive interpretations of human rights. The Venice Statement emphasizes that the right to science is often in tension with intellectual property protections, "which should be managed in accordance with a common responsibility to prevent the unacceptable prioritization of profit for some over benefit for all".[16] The Special Rapporteur in the field of cultural rights has similarly recommended States to "guard against promoting the privatization of knowledge to an extent that deprives individuals of opportunities to take part in cultural life and enjoy the fruits of scientific progress, and consequently to reconsider the current maximalist intellectual property approach…."[17] Given the economic value of patent rights to politically powerful actors, however, it is highly unlikely that we will ever observe a consensus in favor of restricting them, no matter how strong the public policy arguments for doing so might be. Emphasizing a consensus approach to defining the minimum core content of the right to science, therefore, could empower powerful groups to successfully oppose recognition of the human rights of the vulnerable.

On the other hand, some aspects of the right to science do already have a stronger consensus behind them. For example, calls to respect academic and scientific freedom, and to enforce safeguards for human research subjects, are ones that admit little disagreement, at least in principle. There is also widespread support in scientific fields for the desirability of open access publishing. Thus in certain areas it may be possible to point to some minimum core content on the basis of a consensus principle. Care must be taken, however, to ensure that the emphasis on consensus does not become a tool for limiting rights, particularly where intellectual property regimes are concerned. The "minimum core" of the right to science should not be confined only to respect for academic freedom and ethical safeguards on research – both of which are already justifiable on other

[15] S. Sell, *Private Power, Public Law : The Globalization of Intellectual Property Rights*, Cambridge, Cambridge University Press, 2003.
[16] United Nations Economic, Social and Cultural Organization, Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications, 16-17 July 2009.
[17] Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit*.

human rights grounds, such as freedom of speech and the right to health. The potentially unique contributions of the right to science, for instance in underscoring the need to cultivate scientific knowledge and research as a public good, and addressing the problems of inequitable access to technology, require looking beyond easy consensus.

In sum, the core consensus approach is problematic when it comes to the right to science, because the recently dominant approach to technology policy so relentlessly emphasizes market orientation, privatization, and exclusivity of access-values antithetical to the grounding principles of the right. The right to science is an area of human rights law where the gap between right and reality looms particularly wide. If we seek to locate the right within an existing political consensus, we may miss it entirely. The project must be understood as one of building consensus around the right to science, rather than recognizing and formalizing a consensus already present.

B. The "Normative Essence" Approach

The "normative essence" approach reasons from foundational normative values of dignity, equality, and freedom, to specify a minimum core of each human right that is essential to upholding these values. This may take the form of a "basic needs" emphasis, seeking to define the degree of enjoyment of the right that is necessary and generally sufficient to preserve human life. Or the approach may be more expansive, seeking to guarantee not only survival but also to provide conditions for a broader conception of human flourishing-protecting not just life, but life with dignity. In this second vein, the "human capabilities" approach seeks to define a set of basic entitlements well beyond mere survival, to which every individual has a strong moral claim. Either way, both approaches have in common the desire to specify a degree of enjoyment of the right to which no individual should be denied, which is defined with regard to underlying universal values.

In the area of the right to science, the "normative essence" approach can be applied in several ways.

First, we might define certain "essential technologies" as fundamental to a dignified life, and require States to ensure that these technologies are accessible to all. It would, for example, be easy to place water purification technology, sanitation, and essential medicines on this list. These technologies are understood as important to basic survival. Moving beyond mere survival to include criteria of dignity, equality, and freedom would expand the list of essential technologies further. Electricity, telephone service, and Internet access probably qualify for this more inclusive list of technologies essential for realizing human capabilities. This approach to a minimum core already finds support in the Special Rapporteur's Report on the right to enjoy the benefits of scientific progress and its applications, which has emphasized that : "A core principle is that innovations

essential for a life with dignity should be accessible to everyone, in particular marginalized populations."[18] The Report recommends that this goal be achieved through consultation to identify the priority needs of marginalized populations for public subsidies and targeted research,[19] as well as through public utilities to ensure universal access to electricity, telephone, and Internet services.[20]

Second, beyond the emphasis on access to specific technologies – the concrete benefits of scientific progress – the right to science also emphasizes sharing in the process of scientific progress itself. Here, the essential minimum approach points to minimum core content such as access for all to basic scientific education, access to the tools for continually studying the world around them (such as literacy, books, and the Internet), protection of their safety and dignity when they participate as research subjects or are otherwise subjected to new technologies in a context of vulnerability, and consideration of their needs and priorities in shaping the direction of scientific research and technological development. These aspects of minimum core content, too, already find recognition in the Report of the Special Rapporteur.

One virtue of the essential minimum approach to defining a minimum core content is that it works well to focus attention on the basic needs of vulnerable populations. Emphasizing universal access to water and electricity will deliver the greatest benefit to the poorest groups within each society. Yet poverty is not the only dimension of social vulnerability that can be addressed by this approach. From a gender perspective, access to certain technologies can also greatly relieve the disparate psychological, physical, and health burdens placed upon women. Technologies fundamental to gender equality include family planning methods to reduce the health burdens of high-multiples pregnancy, an easily accessible water supply to relieve girls and women of the burden of water-carrying, and modern systems of fuel delivery for cooking food to avoid unhealthy daily exposure to smoke. Women's rights advocates have also pointed out the importance of access to a simple yet often socially taboo technology: the sanitary pad. Women and girls who lack the resources to purchase this modern technology tend to endure shame, miss school, and be socially isolated. Disability advocates could likewise identify certain adaptive technologies as essential to ensuring lives of dignity and equality for persons with special needs.

A unique challenge in applying the "essential minimum" approach to the right to science lies in the special nature of technology as the object of this right. We must take care to guard against two common errors. The first is related to our conception of what counts as technology. The second is related to which technologies

[18] Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*
[19] *Ibidem.*
[20] *Ibidem.*

qualify as essential. Both of these pitfalls can tempt us to take too limited a vision of the scope of essential technologies.

First, we must not be too narrow in our concept of what qualifies as technology. There is an incredible gap in the level of access to technology enjoyed by the most privileged sector of humanity and the least privileged sector. This might cause us to conceive of technology too narrowly as only the latest and most "cutting-edge" innovations, such as sophisticated smartphones and gene therapy. The technologies of greatest relevance to vulnerable groups, however, are likely to be much more basic and may even be decades old. I have in mind examples such as indoor electricity for lighting, systems for delivering running water to homes and containing waste, and oral rehydration salts to treat acute gastrointestinal illnesses. These are technologies in the sense that they are tools developed by human ingenuity to solve particular problems. Individually and collectively they have improved and saved many millions of lives. To leverage the right to science in a way that is actually useful for marginalized groups, we will need to be broad and inclusive in our conception of technology, both old and new.

Second, we must resist the temptation to be too stingy in our concept of which technologies are essential. Technology advances, and the list of technologies deemed essential to a life of dignity and freedom must expand accordingly.[21] It may feel particularly awkward to recognize newer technologies – such as Internet access – as essential ones. After all, until very recently, everyone made do without that particular technology, and we would not say that the lives we led then were lacking in dignity or freedom. But if "the right to enjoy the benefits of scientific progress and its applications" means anything, it is precisely that these new innovations and technologies are to be enjoyed by all. Fifty years ago, we could not have said that there was a universal human right to antiretroviral therapy for HIV infection ; neither antiretrovirals nor HIV was known at the time. Yet today it is not difficult to recognize such medicines as an essential innovation from a human rights perspective.[22]

These two cautionary principles operate in a complementary way. The first reminds us not to overlook technologies that might seem too old. The second reminds us not to rule out technologies that might seem too new. An essential technology, from the view of human rights, may be very old or very new. The limiting principle is not the age of the technology, but its importance for promoting human freedom, dignity, and equality.

This last *caveat* points to one final challenge in applying the "essential minimum" approach to the right to science or any human right : it often remains difficult

[21] M. Land, "Toward an International Law of the Internet", *Harvard International Law Journal*, vol. 54, n° 2, 2013, p. 393.
[22] Tribunal Supremo de Justicia (Supreme Tribunal of Justice – Venezuela), 15 July 1999, *Cruz del Valle Bermúdez y otros vs. MSAS s/amparo*. Expediente N°. 15.789. Sentencia N°. 196. This case recognized access to state of the art HIV medications as required by the right to life, the right to health, and the right to science.

to get very specific in defining the content of the right. To translate the right to science as universal access to essential technologies is to replace a very abstract principle with an only somewhat less abstract one. It still remains to be defined which technologies are essential to dignity, freedom, and equality. It also remains to be defined what exactly States must do to ensure that access, ranging from subsidies for research and commercialization to direct procurement or provision. This remaining ambiguity may be a fault or a virtue. On the negative side, we may be left with less clarity and specificity than had been sought. On the positive side, it may be appropriate to leave this clarification and concretization to domestic processes of advocacy, policy-making, and adjudication, in light of particular national priorities and needs.

C. The "Minimum Obligations" approach

In contrast to the "normative essence" and "consensus core" approaches, the "minimum obligations" approach has been more explicitly focused on defining not the right itself, but the corresponding duties of States. This emphasis is intended to make human rights particularly useful for guiding public policy, to facilitate more effective international supervision, and to enable domestic and regional rights adjudication. The "minimum obligations" approach goes hand-in-hand with the "violations approach" to human rights, which seeks to define human rights and their corresponding State duties specifically enough to enable their justiciability in particular cases. It may also serve as a framework for priority setting in national policymaking and international cooperation. The minimum obligations approach often builds on the normative essence or consensus core approaches, translating the rights identified there into duties, and identifying which corresponding State duties are most appropriate to insist upon.[23]

The "minimum obligations" approach can also be related to the effort to distinguish between positive obligations requiring States to act in certain ways that promote the enjoyment of human rights versus negative obligations requiring States to refrain from activities that would prejudice human rights. A more elaborate three-part approach, conceiving of government duties to respect, protect, and fulfill human rights, is often used to elaborate different ways in which government actions or inactions relate to the right. For example, governments have a duty to respect the right to science by refraining from activities that would interfere with academic freedom.[24] Mere inaction in respect of the right to science, however, will not go very far to ensuring its enjoyment ; active steps are also required. Governments can protect the right to science by ensuring that intellectual property rules are well designed to promote creativity and innovation without unduly sacrificing

[23] K. Young, *op. cit.*
[24] Y. Donders, "The Right to Enjoy the Benefits of Scientific Progress : in Search of State Obligations in relation to Health", *Medicine, Health Care and Philosophy*, vol. 14, n° 4, 2011, p. 371.

participation and access,[25] and by using effective regulatory procedures to protect the safety and dignity of human research subjects.[26] Governments can fulfill the right to science by funding research and development, establishing mechanisms that enhance popular participation in science and providing science education through public schooling and publicly supported media.

Another way to think of the minimum obligations approach is in tandem with the principle of progressive realization. It is well understood that the realization of socioeconomic rights is often significantly constrained by limits on government resources, which differ greatly from country to country. Yet the principle is also well established that certain priority aspects of human rights require immediate implementation by all countries. This may be so because implementation of that priority aspect does not require great resources. Alternatively, even if the resource investment may be substantial, the cost-to-benefit calculus is nevertheless compelling. For example, in the area of the right to housing, minimum obligations include the government duty to respect the right to housing by not conducting illegal evictions. A government can hardly claim that it is too poor to grant due process and consideration for human rights before evicting people from their land or homes.[27] Minimum obligations with respect to the right to education have similarly been defined to include providing free and universal primary education.[28] No doubt, significant financial resources must be mobilized to comply with this duty. Yet the normative and utilitarian justifications for universal primary education are so overwhelming that a State's failure to do so simply cannot be reconciled as reasonable priority setting.

Applying this approach, the minimum core content of the right to science would include efforts to expand access to technology and opportunities for scientific participation that are highly cost-effective. Access to clean water, sanitation services, electricity and other essential technologies should be universalized. Academic freedom and Internet freedom should be respected. Technology should not be used in ways that abuse privacy or other human rights. Governments should ensure that intellectual property rules are adopted through a publicly transparent process that allows the concerns of authors and the public to be addressed.[29] Scientific publications subsidized by government funding should be made available to the public at large, rather than only through private services

[25] Committee on Economic, Social and Cultural Rights, Statement by the Committee on Economic, Social and Cultural Rights (14 December 2001) (E/C.12/2001/15).
[26] Y. Donders, *op. cit.*
[27] Committee on Economic, Social and Cultural Rights, Report on the Sixteenth and Seventeenth Sessions, 28 April-16 May 1997, 17 November-5 December 1997, (E/1991/22).
[28] Article 13(2)(a) International Covenant on Economic, Social and Cultural Rights.
[29] Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on copyright policy and the right to science and culture, presented at the twenty-eighth session of the Human Rights Council (24 May 2014) (A/HRC/28/57) ; United Nations Office of the High Commissioner for Human Rights, Independent expert calls for an end to secret negotiations of free trade and investment agreements until public consultation and participation is ensured and independent human rights impact assessments are conducted (30 March 2015).

that restrict public access.[30] These are just a few examples of highly cost-effective ways of respecting, protecting, and fulfilling the right to science.

IV. A Pragmatic approach

Katharine Young's work delineating the three major approaches to defining the minimum core content of human rights points out that there are multiple methods and purposes to defining a minimum core. As Young herself suggests, a self-conscious examination of those purposes may help to guide the process. Some familiar motivations for defining a minimum core are to focus public pressure on the most urgent issues, to prioritize the needs of vulnerable populations, to deflate excuses of "limited resources" and "progressive realization," or to advance human rights along the lines most compatible with preserving institutional legitimacy. Bearing these or similar goals in mind, we may work backward to guide our definition of minimum core content in a way that most effectively addresses these needs. Young does not offer a label for this alternative approach to defining a minimum core, but I propose we think of it as a "pragmatic approach" to minimum core content.

In line with this recognition, I suggest that it is natural and appropriate for efforts to elaborate the minimum core content of a right to be responsive to the particular challenges and issues of the time. An emphasis on particular content of urgency today need not limit efforts to recognize and emphasize other aspects of the right in the future, as new needs and challenges are encountered. For instance, the current emphasis on access to essential medicines is an appropriate and necessary response to a particular human rights crisis of our own time : the deaths of millions of people in the prime of their lives from diseases for which effective treatments exist, but which are being denied in the name of intellectual property. A focus today on assuring access to essential medicines today need not mean that the right to science is inherently tied to pharmaceuticals more so than other forms of technology. It is simply the emphasis of a particularly important and timely aspect of the right. The right to science perspective helps to emphasize that the human rights issue is not only one of ensuring universal access to the drugs that exist today, but also reorienting pharmaceutical policy to better meet the needs of vulnerable populations through future research and development.

The arena of copyright law also reveals urgent conflicts between the privatization of knowledge and the right to science. Digital technology today offers the ability to reproduce and share written works at extremely low cost, unimpeded by traditional geographic barriers or the weak state of book publishing and retail in developing countries. We finally have the tools to end the "book famine" that has

[30] Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on copyright policy and the right to science and culture, *op. cit.*

traditionally plagued higher education and scholarly research in many countries of the world. Yet there is a conflict between scholars and students who wish to access these works easily and affordably, and the companies that hold the copyrights in them, who wish to obtain as much revenue as possible. One study calculated that to legally purchase the required readings for the first year of university studies in Brazil would cost six to ten months' income at the minimum wage.[31] Such a large gap between price and the ability to pay is not sustainable. Solutions must be found that better balance the needs of authors and readers to promote broader access to scientific knowledge.

Also related is the call to require that scientific research be published on an Open Access model, ensuring its ability to be legally distributed and shared. This call responds to the increasing financial pressures faced by academic libraries even at institutions as wealthy as Harvard University. But it is particularly important to the ability of scholars in developing countries to participate in the scientific process. Because academic works in particular are produced according to incentive structures based on university employment, public subsidy, academic reputation, and the individual desire to contribute to shared knowledge, this is an area in which it makes particular sense to emphasize openness and intellectual freedom over treatment as private property. Similarly, Open Access initiatives for primary and secondary textbooks can help address the textbook shortage that critically undermines education in many developing countries, particularly for children from poorer families. These calls have recently found support in the report of the Special Rapporteur on copyright policy and the right to science and culture.[32]

There are also positive developments that need encouragement to be carried forward. The World Intellectual Property Organization (WIPO) recently concluded a treaty designed to expand access to copyrighted works : The Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired, or Otherwise Print Disabled. Previously international treaty-making had focused only on expanding protection for intellectual property. This is the first international instrument designed to ensure that copyright law does not act as a barrier to access and participation. There is great potential in continuing this approach to further advance the right to science. Already debate is underway on international instruments to facilitate additional exceptions and limitations to copyright to assist the work of educational and research institutions and libraries.

The several examples presented above all reflect a common theme. One of the great challenges of our time, to which the right to science must respond, is the privatization of the scientific enterprise and the neglect of public welfare in the name of intellectual property. The emphasis has come to be placed too strongly

[31] P. Mizukami *et al*., "Exceptions and Limitations to Copyright in Brazil : A Call for Reform" in L. Shaver (ed.), *Access to Knowledge in Brazil : New Research on Intellectual Property, Innovation and Development*, New Haven Connecticut, Information Society Project, 2010, p. 103.

[32] Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on copyright policy and the right to science and culture, *op. cit.*

on the prioritization of profit and the logic of the market, too often to the neglect of the moral imperative for science to serve human needs. The tendency to regulate intellectual property in the sphere of international trade has aggravated this imbalance. A human rights perspective is urgently needed in this debate. The call to reinvigorate the orientation of the scientific enterprise as a public good in service of humanity and the call to insist upon universal access to the benefits of technology will come from human rights institutions or it will not come at all. The right to science offers a particularly apt and timely framework for reasserting this ethical perspective in the international sphere. Human rights institutions may feel that they have lesser expertise or lesser competency to speak about intellectual property law. That competency must be acquired, just as it was when human rights institutions began to participate in conversations about global public health.

Of course, the challenges of today are not only about intellectual property. The age-old struggle between freedom and despotism continues to play out, in the arena of science and more broadly. Many States are tempted to restrain the academic enterprise or to control their citizens' Internet use as a means to repress political criticism. This too, must be condemned from the perspective of the right to science. We must ensure that the Internet remains a force for promoting freedom, and that controls are not imposed in the name of national security or intellectual property, which will later be abused to restrict the free exchange of ideas. We also continue to face the challenge of expanding access to education, improving its quality at all levels, and protecting academic independence. The right to science can offer a normative framework for guiding respect for intellectual freedom both online and offline.

V. Conclusion

By now we are well accustomed to viewing education and health care as public goods, to be publicly supported and made available for the benefit of all. The right to science encourages us to approach science and technology in a similar way. Technology has a great capacity to save and improve lives, when it is directed to those ends. Beyond the utilitarian value of technology, participation in the collective process of scientific and technological development has an intrinsic value – as an opportunity to give expression to our human nature, cultivate the human personality, and build international understanding. For both sets of reasons, it is vital that active efforts be taken to ensure that all people enjoy opportunities to participate in the scientific process and benefit from essential technologies, both old and new.

Translating this broad vision of science in service of humanity into minimum core content is both fruitful and challenging. In some areas, such as academic freedom and protection of research subjects, substantial consensus exists on specific

norms. In other areas, particularly with respect to access to technology, the challenge remains one of building consensus. Indeed, the modern direction of international rulemaking around intellectual property has tended to be one that marginalizes and undermines the right to science, rather than respecting and fulfilling it. Here the problem of pharmaceutical patents and access to essential medicines is merely a particularly high-stakes example of the broader tension between the right to science and intellectual property regimes. This tension presents both a challenge to enjoyment of the right to science and an opportunity for human rights institutions to make a difference. The essence of the right to science is to insist that scientific learning and essential technologies be made available to all. Patent and copyright rules must be designed to strike an appropriate balance between incentivizing innovation and creativity and ensuring broad access to scientific knowledge and new technologies. Public funding must fill the gap to ensure that the needs of marginalized groups are being addressed, despite the necessarily lower profit potential. Leveraging the human rights perspective can help these goals to become a reality.

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The Right to Science – Whose Right? To What?

Le droit à la science : de qui est-ce le droit et sur quoi porte-t-il ?

Jessica M. Wyndham and Margaret Weigers Vitullo

Abstract

This paper explores the meaning of the right to enjoy the benefits of scientific progress and its applications, as well as corresponding duties set out in Article 15 of the International Covenant on Economic, Social and Cultural Rights. Focusing on the three pillars of the right – access, participation and protection – this paper contributes to the existing literature by introducing the perspectives of the scientific community, both as specifically elicited through a multi-disciplinary focus group process involving US-based scientists, and as reflected in parallel debates and discussions occurring within the scientific community as they bear on the right to science.

Résumé

Cet article explore la signification du droit de bénéficier du progrès scientifique et de ses applications, ainsi que d'autres obligations correspondantes résultant de l'article 15 du Pacte international relatif aux droits économiques, sociaux et culturels. En se concentrant sur les trois piliers du droit – accès, participation et protection – cette contribution se fonde sur la littérature existante en introduisant la perspective de la communauté scientifique elle-même, d'abord par le biais des résultats d'un groupe de discussion multidisciplinaire composé de scientifiques américains et ensuite en tant que reflet des débats et discussions parallèles ayant lieu au sein même de la communauté scientifique.

I. Introduction

The scientific enterprise sometimes appears to stand apart from society, cloaked in technical specificity and guarded by an apparently impenetrable lexicon, and different schools of thought exist about the extent to which each should have a role in guiding or informing the other. Government serves as a regulator and facilitator, while the private sector may facilitate but can also hinder the bridging of scientific development and societal needs. Tensions arise among the actors, as their roles and boundaries continue to be explored and defined with the burgeoning involvement of non-traditionally trained scientists in science, increased recognition of the inequalities that cause and reflect imbalances in access to the fruits of science and technology, and a growing demand by society for increased accountability in science. These relationships are not static, changing depending on a variety of factors including need, motivation, risk, power and priorities. Introducing a right to enjoy the benefits of scientific progress and its applications fundamentally challenges the view of science as standing apart from society as a whole. Conceptualizing the meaning and implications of this right

requires consideration of the inter-related, tightly bound rights, roles and responsibilities of each of these actors and the interplay among them.

An expansive approach is needed to answer the specific questions, "Who has the right to science? And to what do they have a right?" The right to science[1] is a necessary prerequisite for the full realization of many other human rights, from the rights to food, water, health and education to the rights to freedom of information and expression. However, the scope of enquiry must go beyond the parameters set by other human rights in order to take into account all that is encompassed in the word 'science'. As such, the starting point in this arch of inquiry is the scientific enterprise as a whole, consisting of the processes and practices of science, the scientific community as a loosely organized professional network, and scientists themselves, as both right-holders as well as duty-bearers. The end point is a framework for the enjoyment by everyone of the fruits of science, both in terms of knowledge as well as services and products. In the middle are the governance of science and the role of science in the process of governing. The role of society as a whole is not just as passive recipient of the fruits of science, but is increasingly as an active player in the development and direction of scientific progress.

The current dominant narrative about the meaning of the right to science has focused too narrowly on the end point – on the products of science, be they food, medicines, or cell phones – a narrative that is primarily driven by the human rights community.[2] Scientific knowledge is also increasingly recognized as a valuable product of science. Scientific knowledge is testable and refutable[3] and, as such, is distinguishable from other forms of information by the process through which it is generated, a process that is iterative, logical and empirically based and that relies on rigorous and constant peer review.[4] Thus, conceptualization of the right to science requires consideration of both the policies, practices and priorities that influence how and when the "benefits" and the "applications" of science are enjoyed and by whom as well as the various steps and phases in the process of scientific knowledge generation.

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[1] While recognizing they are not synonymous, for reasons of brevity, the "right to science" will be used as a short hand in this article, in place of the right to "enjoy the benefits of scientific progress and its applications."

[2] See, for example, H.M. Haugen, "The Right to Food, the Right to Benefit from Science and the TRIPS Agreement", in W.B. Eide and U. Kracht (eds.), *Food and Human Rights in Development*, Intersentia, 2005, p. 425; O. De Schutter, "The Right of Everyone to Enjoy the Benefits of Scientific Progress and the Right to Food: From Conflict to Complementarity", *Human Rights Quarterly*, vol. 33, n° 2, 2011, p. 304; Y. Donders, "The right to enjoy the benefits of scientific progress: in search of state obligations in relation to health", *Medical Health Care and Philosophy*, DOI: 10.1007/s11019-011-9327-y; S.P. Marks, "Out of Obscurity: The Right to Benefit from Advances in Science and Technology and Its Implications for Global Health", in *Proceedings of the 3rd Conference on Law, Science, and Technology: Health And Science: Human Rights And Legal Issues*, Academia Sinica, Taipei, 2012, p. 1; H.M. Haugen, "Technology and Human Rights – Friends or Foes? Highlighting Innovations Applying to Natural Resources and Medicine", *Human Rights Series* 2 (Library of Human Rights 2), 2012.

[3] See, for example, Report of the Special Rapporteur in the field of cultural rights, Farida Shaheed on the right to enjoy the benefits of scientific progress and its applications, Twentieth Session of the Human Rights Council (14 May 2012) (A/HRC/20/26), § 24.

[4] AAAS Science and Human Rights Coalition, "Defining the Right to Enjoy the Benefits of Scientific Progress and Its Applications: American Scientists' Perspectives" (Report prepared by Margaret Weigers Vitullo and Jessica Wyndham), October 2013, DOI: 10.1126/srhrl.aaa0028, p. 4.

The following analysis is not intended to offer a definitive answer to the question of what the right to science means; that answer cannot be discerned without further exploration and consideration by the full range of relevant stakeholders. Rather, this article seeks to explore the breadth of the question to what the right to science should encompass by drawing from the existing literature and expanding upon it with reference to how scientists and engineers perceive the right, incorporating their assessment into the larger discussion.

II. A Critique of the Existing Literature

The general nature and potentially vast scope of the language of the right to science as articulated in both the Universal Declaration of Human Rights (Article 27) and the International Covenant on Economic, Social and Cultural Rights (ICESCR) (Article 15) has made it difficult to clearly define the state obligations that the right creates and may explain why the right has garnered limited attention, including by human rights monitoring and adjudicatory mechanisms. The vagueness of the language was explicitly recognized by the drafters of the ICESCR and, at least from the perspective of the Norwegian delegate, was considered a strategic choice. "It was unadvisable," he said, "to attempt to specify rights and obligations in too great details; it would be better to lay the foundations for future progress in simple terms and to proceed further step by step."[5]

Indeed, a step by step approach in determining the practical significance of the right to science did begin about four decades ago and is revealed in the limited, if now expanding, body of literature about the right. Four strands can be identified in the literature, unfolding in roughly chronological order: first, summary consideration of the right as it relates to other rights; followed at the turn of this century by an in-depth consideration of the right as a whole from the perspective of the scientific community; returning to the human rights community's assessment of the right as a prerequisite for other rights; and, now a cautious coinciding of concerns among both human rights practitioners and scientists.

Before the turn of this century, scholarly consideration of the right to science was limited and disconnected. In the ICESCR, the right to science articulated in Article 15(1)(b) is sandwiched between two other rights, the right to culture (Article 15(1)(a)) and the rights of authors and creators in the moral and material interests resulting from their creations (Article 15(1)(c)). As these other rights gained attention, the right to science received passing mention.[6] To the extent that the right to science was given any focus, it was to support the recognition

[5] UN General Assembly, "Draft International Covenants on Human Rights", Twelfth Session, Third Committee, 799th Meeting, UN Doc. A/C.3/SR.799, (4 November 1957), § 7.
[6] See, for example, J. Symonides, "The Implementation of Cultural Rights by the International Community", Gazette, vol. 60, n° 1, 1998, p. 7; P.K. Yu, "Reconceptualizing Intellectual Property Interests in a Human Rights Framework", *University of California Davis Law Review*, vol. 40, 2007, p. 1039.

of complementary rights, particularly those that were not yet well developed in international law, such as environmental and reproductive rights.[7] As such, referencing the right to science in the ICESCR was perhaps hoped to give some, if limited, credence to calls for the recognition of these other emerging rights.

In the early part of this century, the right to science came to the attention of two United States-based scholars already concerned with the interface of science and human rights. Richard Pierre Claude and Audrey Chapman were unique among commentators on the right to science as they brought the perspective of the scientific community to the process of elucidating the meaning of the right, including an awareness of both the benefits of science to the pursuit of human rights work and society and the potential dangers of scientific developments to human rights. Their work also considered the threats to scientific freedom that existed in many different socio-political contexts, and the need for a positive commitment to ensuring that the scientific enterprise was allowed to flourish. While acknowledging the importance of the right in ensuring equitable distribution of the products and knowledge of science, Claude and Chapman, through their joint and individual writings, introduced to the literature an understanding and concern for the implications of the right for the scientific enterprise, including with regard to science education, science funding, scientific freedom and international cooperation.[8] They were the first to demonstrate that support of the scientific enterprise was vital for the right to science to have meaning.

In the last ten years, there has been a significant expansion in the literature seeking to understand how the right to science could be used to support and supplement other human rights. Schabas conducted a thorough textual analysis of the right based on the *travaux préparatoires* of both the Universal Declaration of Human Rights and the ICESCR.[9] He maintains that to implement the right to take part in cultural life, the state must respect the freedom of scientists to conduct research, build facilities for research, preserve the right to culture of minorities, and also protect the rights of indigenous peoples.

Most other recent scholars have focused on the relationship of the right to science with other rights. Yvonne Donders and Stephen Marks are two of the key commentators concerned with the relationship of the rights to science and

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[7] See, for example, L.E. Rodriguez-Rivera, "Is the Human Right to Environment Recognized Under International Law? It Depends on the Source", *Colorado Journal of International Environmental Law and Policy*, vol. 12, 2001; R.J. Cook, "International Human Rights and Women's Reproductive Health", *Studies in Family Planning,* vol. 24, 1993, p. 73; M.R. Hilbert, "Latin America on its Path into the Digital Age: Where Are We?", Desarrollo productivo series, No. 104 (LC/L.1555-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), June. United Nations publication, Sales No. E.01.II.G.100.

[8] R.P. Claude, "Scientists' Rights and the Human Right to the Benefits of Science", in A. Chapman and S. Russell (eds), *Core Obligations: Building a Framework for Economic, Social and Cultural Rights*, Intersentia, 2002; A. Chapman, "Towards an Understanding of the Right to Enjoy the Benefits of Scientific Progress and Its Applications", *Journal of Human Rights*, 2009, p. 8.

[9] W.A. Schabas, "Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and Its Applications", in Y. Donders and V. Volodin (eds), *Human Rights in Education, Science and Culture: Legal Developments and Challenges*, UNESCO, 2007, pp. 273-308.

health.[10] These and other commentators have focused on the right to science as it relates to accessing the products of science, and particularly the relationship between access and intellectual property protections, as well as concerns about the allocation of science funding, and the creation of technology transfer mechanisms.[11] Similar issues are addressed by Olivier de Schutter and others focused on the right to food,[12] by Lea Shaver who seeks a unifying theory to encompass both the rights to science and culture,[13] and receive particularly in-depth treatment by Hans Morgan Haugen in his book dedicated to the right to science as it relates to the development of medical and agricultural technologies.[14] With the exception of Haugen, these recent scholars draw little upon the expansive conceptualization of the right developed by Claude and from Chapman refer almost exclusively to her analysis of the right as it relates to intellectual property.

There remain important gaps and conceptual and theoretical limitations in the literature to date: (1) while good faith efforts are often made to reflect the needs of the global South, the voices that dominate are primarily Western; (2) the scientific and engineering communities have been largely absent from discussions about the meaning of the right which has been dominated by human rights experts; (3) as a result, the scope of concern has been largely limited to the relationship of this right to other human rights, rather than focusing on the scope of the right to science as a standalone right; (4) an unhelpful dichotomy is implied between creators and consumers of science that fails to reflect the ways these categories blur, and increasingly so; (5) little consideration has been given to the limitations of the right; and (6) the literature is largely uninformed by related discussions occurring within the scientific community that tie the goals and activities of the scientific enterprise to larger social aims such as those reflected in human rights.

One other significant gap in the literature, which may be tied to the third point raised above, has been the general insistence of commentators on divorcing Article 15(1)(b) of the ICESCR, the right to "enjoy the benefits of scientific progress and its applications", from Article 15 sub-paragraphs (2)-(4) which, *inter alia*, establish the basis upon which science can actually progress. Specifically, these sub-paragraphs require the conservation, development and diffusion of science (Article 15(2)), respect for scientific freedom (Article 15(3)), and encouragement of international contacts and cooperation in science (Article 15(4)). It

[10] See, for example, Y. Donders, "The right to enjoy the benefits of scientific progress: in search of state obligations in relation to health", *Medical Health Care and Philosophy*, DOI: 10.1007/s11019-011-9327-y; S. P. Marks, "Out of Obscurity: The Right to Benefit from Advances in Science and Technology and Its Implications for Global Health", in *Proceedings of the 3rd Conference on Law, Science, and Technology: Health And Science: Human Rights And Legal Issues*, Taipei, Academia Sinica, 2012, p. 1.
[11] See, for example, L.R. Helfer and G.W. Austin, *Human Rights and Intellectual Property: Mapping the Global Interface*, New York, Cambridge University Press, 2011.
[12] O. De Schutter, "The Right of Everyone to Enjoy the Benefits of Scientific Progress and the Right to Food: From Conflict to Complementarity", *Human Rights Quarterly*, vol. 33, n° 2, 2011, p. 304.
[13] L. Shaver, "The Right to Science and Culture", *Wisconsin Law Review*, 2010, p. 121.
[14] H.M. Haugen, *op. cit.*

is respect for these requirements that provides the necessary foundation for the scientific enterprise to function and to flourish.

Two important exceptions to the foregoing critique constitute the fourth and most recent strand in the literature on the right. In 2012, Farida Shaheed, then Special Rapporteur in the field of cultural rights, presented to the United Nations (UN) Human Rights Council a report on the right to enjoy the benefits of scientific progress and its applications.[15] Her report represented the first comprehensive effort by a UN human rights mechanism or mandate holder to give specific attention to the right. In her report, Shaheed built on the analysis of Claude and Chapman, richly incorporating the interests and concerns of the scientific enterprise in her assessment. Emphasizing access, Shaheed also gave focus to the right as it relates to participation and the creation of an enabling environment for science. She touched on potential limitations of the right, while acknowledging that further analysis was required before limitations and exceptions to the right could be clearly defined.

Coinciding with Shaheed's report was a unique empirical study based on 16 disciplinary-specific focus groups that was undertaken by the American Association for the Advancement of Science's (AAAS) Science and Human Right Coalition, under the direction of Jessica Wyndham and Margaret Weigers Vitullo.[16] The Coalition process was aimed at directly capturing the perspectives of United States-based scientists and engineers as to the meaning of the right to science and bringing these perspectives to the ongoing efforts to define the right. Among the contributions made by this study was the identification of a broad set of shared benefits of science articulated by scientists across highly diverse scientific disciplines, including not only scientific products and knowledge, but also the provision of an empirical basis for policy as well as modeling and teaching a systematic data-centered discovery process based in critical thinking. The study also provided a "continuum of access" as a conceptual framework for understanding the meaning of access as it applies to the right, and demonstrating the link between science education (both formal and informal) with the realization of the benefits of scientific progress, while also highlighting the link between scientific freedom and scientific responsibility as they relate to human rights.[17]

This most recent strain in the literature on the right to science reflects and is, in part, driven by the current efforts being undertaken to develop a comprehensive and authoritative definition of the right to science, leading to the adoption of a General Comment on the right by the UN Committee on Economic, Social and Cultural Rights. At the same time, the continued focus by some commentators on discrete elements and applications of the right, for example, with regard to

[15] Shaheed, *op. cit.*
[16] The AAAS Science and Human Rights Coalition is a network of scientific and engineering membership organizations that recognize a role for scientists and engineers in human rights (http://www.aaas.org/program/science-human-rights-coalition).
[17] AAAS Science and Human Rights Coalition, *op. cit.*, p. 4.

food, is a reflection of the importance of operationalizing the right. In order for this to occur, much work is still required to demonstrate the strategic benefit of appealing to the right to science in human rights advocacy and litigation, and for using this human rights framework as leverage in science policy debates. The following discussion aims to contribute to both goals.

III. The Right to Science is a Right to What?

The right to enjoy the benefits of scientific progress and its applications, taken together with the protections recognized in sub-paragraphs (2)-(4) of Article 15, has significance for and relevance to everyone in society, including but not limited to scientists specifically. With a view to elucidating the breadth of the right, the following analysis draws from the language of Article 15 as a whole and the existing literature and related science policy debates to explore three overarching concepts associated with the right to science: access, participation, and protection. The discussion of access is the broadest and most detailed because it establishes the conceptual range of activities to which the right to enjoy the benefits of science applies. The discussion of participation addresses the factors that influence who can take part in those activities and the human rights and scientific implications of their participation. When turning to protection, the discussion shifts away from the benefits of science to a consideration of potential misuse and abuse of science and technology, including violations of the human rights of scientists themselves. The section ends with a brief consideration of the need to more fully understand and articulate the responsibilities incumbent upon scientists to guard against the misuse and abuse of science.

A. Access

Access is core to the conceptualization of economic, social and cultural rights and no less so with regard to the right to science. Indeed, Shaver describes access as "the touchstone concept of the right to science."[18] Article 15 (1)(b) refers to the right to enjoy "the benefits of scientific progress and its applications." The "benefits" to which everyone should have access, according to Shaheed, are both the knowledge and the products of science.[19] Accepting that the scientific process underpins the creation of such knowledge and the development of products, then consideration must also be given to that to which scientists, in particular, require access in order for scientific research and development to occur. This expansive approach raises the question of whether meaningful access to science connotes something different depending on the person seeking access. Should everyone have the same access to information, products and tools of science by right? Are there risks associated with providing the same access? Can these risks be miti-

[18] Shaver, *op. cit.*, p. 169.
[19] Shaheed, *op. cit.*, § 26.

gated through education and training, whether formal or informal? And what are the underlying tools and mechanisms required to ensure meaningful access?

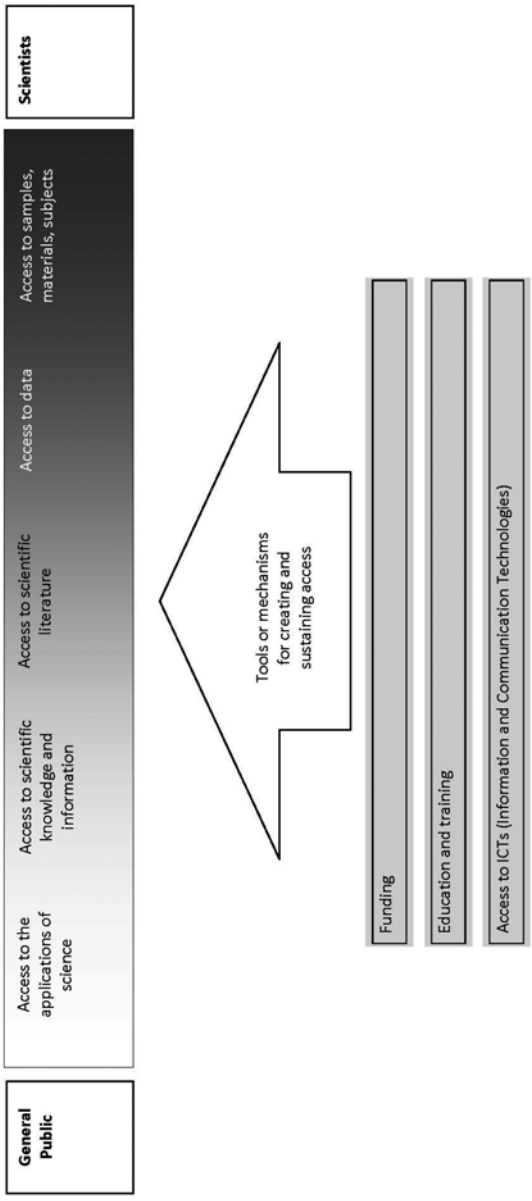
The continuum of access that emerged from the AAAS Science and Human Rights Coalition study goes some way to helping answer these questions. As Diagram 1 below demonstrates, the framework that emerged from the Coalition study consists of a "fluid and bi-directional continuum of access, defined at one end as 'access for general public' and on the other as 'access for scientists'".[20] A person's location along the continuum depends on two variables: (1) personal characteristics including technical training, personal interest and motivation; and (2) societal risks and responsibilities associated with providing access, including risks to individuals' well-being and national security. Do these variables represent limitations on the right of access to science? That is certainly arguable and will be explored in the discussion that follows.

The first variable includes the recognition that to 'do science' requires access to information, data and samples of a much more technical, disaggregated and unfiltered nature than is necessary for the lay person. The first variable also recognizes that the role of 'scientist' is not only filled by individuals formally trained, but that individual motivation, experience and informal training may also give a person specific skills in a given technical area and interest in further developing those skills in order to analyze data and draw conclusions for themselves. Such a person may include a rural farmer with expertise in effective crop rotation methods in a given ecosystem just as it would include a high school student who is self-taught in computer software development.

While the first variable is focused on the knowledge of the individual, the second variable is focused on the nature of that to which someone seeks access, recognizing that there may be acceptable limitations placed on providing access when individual privacy and/or legitimate national security concerns are at stake. For example, as a matter of both government regulation and widely accepted ethical practice, data that includes personally identifiable information collected through research is protected and only made available in limited circumstances.[21] A question yet to be satisfactorily answered is where the line should be drawn in determining when access to data or scientific literature can be legitimately limited for reasons of national security. The controversy that erupted in 2012 surrounding publication of a research paper about airborne transmission of the influenza H5N1 virus demonstrates the uncertainties and conflicting positions that exist on this question.[22] It is also worthwhile noting that these potential limitations

[20] AAAS Science and Human Rights Coalition, *op. cit.*, p. 6.
[21] See, for example, The Health Insurance Portability and Accountability Act of 1996 (HIPAA) *P.L.* No. 104-191, 110 Stat. 1938 (1996) (United States of America); Directive 95/46/EC of the European Parliament and Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data *O.J.* (L 281) (23 November 1995).
[22] See, for example, M.S. Frankel, "Regulating the Boundaries of Dual-Use Research", *Science*, vol. 336, 22 June 2012, p. 1523.

Diagram 1: Continuum of Acces



on the right to science, while broadly addressed within the scientific community as questions of law and regulation, are seldom, if ever, addressed as human rights questions (UNESCO's Universal Declaration on Bioethics and Human Rights of 2005 is one of few exceptions). Elaboration of the meaning of the right to science offers an opportunity to explore these issues within a human rights framework.

1. *Access to the Applications of Science*

The left side of the continuum of access starts at the same point as the framers of the ICESCR. The UNESCO representative to the negotiations, Mr. Havet, identified the characteristics of science that gave it importance as "scientific discoveries in the theoretical field [that] might lead ... to practical applications of cardinal importance for the improvement of human welfare".[23]

Applications of science may be services or products including technologies and treatments. Shaheed and other commentators emphasize the requirement that scientific applications essential for a life with dignity should be accessible to everyone.[24] Specific examples that have arisen in the literature on Article 15 include access to birth-control methods[25] and medical treatment for tuberculosis.[26] An example of government recognition of the right is found on a fact sheet on energy published by the German Ministry for Economic Cooperation and Development in 2008 that specifically identifies electricity and renewable energy as "benefits of scientific progress".[27] In Venezuela, in the only known example of litigation in which the right to science was a basis for the decision, a national administrative law court found a violation of the right in the case of 37 patients who were denied access to HIV/AIDS treatment by the Venezuelan Social Security Institute (Instituto Venezolano de Seguros Sociales).[28]

The applications of science with which we are familiar today are far beyond the scope of what could have been imagined when Mr Havet made his comment in 1951. From the contraceptive pill to in vitro fertilization, the internet to cell phones, cochlear implants to lasic eye surgery, solar energy to cognitive enhancement, science has progressed and continues to progress at a rapid pace. Given the vast scope of what science has made possible, challenging questions emerge when grappling with how to implement this right in practice : given all the many, varied and (often) expensive applications of science that exist, to what should everyone

[23] Commission on Human Rights, Seventh Session, Summary Record of the Two Hundred and Twenty-Eighth Meeting, held at the Palais des Nations, Geneva, Seventh Session, UN Doc. E/CN.4/SR.228 (5 May 1951), p. 11.
[24] Shaheed, *op. cit.*, § 29.
[25] R. J. Cook, "International Human Rights and Women's Reproductive Health", *Studies in Family Planning*, vol. 24, 1993.
[26] P. Farmer, "Pathologies of Power : Rethinking health and human rights", *American Journal of Public Health*, vol. 89, n° 10, 1999, pp. 1486-1496.
[27] German Ministry for Economic Cooperation and Development, "Fact sheet : Energy. A Human Rights-Based Approach in the Energy Sector", in Applying Human Rights in Practice : Fact sheets on a human rights-based approach in development cooperation, 2008.
[28] E. G. MacDowell, "Juridical Action for the Protection of Collective Rights and its Legal Impact : A Case Study", *The Journal of Law, Medicine & Ethics,* vol. 30, n° 4, 2002, pp. 644-654.

have access as a right? To what applications of science does a person need access to live a dignified life? Certainly, there are applications of science that are so basic and pervasive that they should be considered essential for human welfare and dignity, for example, birth control, electricity, potable water, and latrines, but how might the answer differ depending on the available financial resources from which the state can draw based on their domestic financial resources or available international development assistance?

In their book *Human Rights and Intellectual Property: Mapping the Global Interface*, Helfer and Austin lament that "the poorest and most vulnerable members of the human family do not always, or ever, benefit from the most sophisticated or advanced technologies."[29] They describe the current reality as one based on "trickle-down effects". In the absence of targeted policies and programs aimed at ensuring that the poorest and most vulnerable members of society benefit from scientific progress, such benefits will only accrue as a result of a general increase in aggregate societal welfare. When targeted policies to provide access to vulnerable populations exist, the inventors and producers of scientific applications may receive below-market rates. This reality reflects a characteristic of Article 15 that has confounded commentators and advocates. While recognizing the right to science in Article 15(1)(b), the right to the protection of the moral and material interests of authors and creators is simultaneously recognized in Article 15(1)(c).

In practice, protection of the moral and material interests of authors is often conflated with intellectual property protections and has been viewed as creating an inherent tension within Article 15, with the two provisions considered to be in competition and conflicting with each other.[30] According to this view, the correct "balance" must be struck between the protection of intellectual property interests and affordable access to drugs and other products, a balance which currently does not exist. An alternative approach is to explore the shared human rights objectives of Articles 15(1)(b) and (c), and from there develop a conceptual and analytical frame that allows for the protection of both rights, consistently with each other and with fidelity to their grounding in human rights. As Helfer and Austin point out, however, little focus has been given to developing such an approach. Shaver is one of few scholars to do so, suggests a "public goods" approach to knowledge innovation and diffusion which emphasizes universal access and protection of authors' *interests* rather than intellectual property *per se*.[31]

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[29] L.R. Helfer and A.W. Graeme, *Human Rights and Intellectual Property: Mapping the Global Interface*, Cambridge University Press, 2011, p. 237.

[30] [29] See, for example, M. Green, "Drafting history of Article 15(1)(c) of the International Covenant on Economic, Social and Cultural Rights", Committee on Economic, Social and Cultural Rights, Twenty-fourth Session, UN Doc. E/C.12/2000/15 (9 October 2000); Secretariat of the WTO, "Protection of Intellectual Property Under the TRIPS Agreement", Committee on Economic, Social and Cultural Rights, Twenty-fourth Session, Item 3 of the provisional agenda, UN Doc. E/C.12/2000/18 (29 November 2000); H. Lim, "Trade and human rights: What's at issue?", Committee on Economic, Social and Cultural Rights, Twenty-fifth Session, Item 5 of the provisional agenda, UN Doc. E/C.12/2001/WP.2 (10 April 2001).

[31] Shaver, *op. cit.*, pp. 121, 183.

Shaver's work extends the classic approach to economic, social and cultural rights, which states that 'access' in the abstract is insufficient in ensuring that the right to benefit from the products and services of scientific progress is realized--affordability, availability and quality must also be addressed. Resolving the existing imbalance between intellectual property protections and human rights protections will go part of the way to achieve that, but more is required. An approach to addressing access challenges beyond the intellectual property discussion is based on the language of Article 15(4) which stipulates that States Party "recognize the benefits to be derived from international contacts and cooperation" in the scientific field. This provision should be read in conjunction with Article 2(1) of the Covenant, which recognizes the need for "international assistance cooperation" in ensuring implementation of the rights set out in the treaty. Taken together, these provisions can be interpreted as creating two complementary obligations : (1) the obligation for developing countries to prioritize the development, importation and dissemination of simple and inexpensive technologies that address the needs of their population, including marginalized communities ; and (2) the obligation for industrialized States to provide direct assistance, financial and material, to developing countries and to facilitate international research and development collaborations that benefit the populations of developing countries, including marginalized populations. This is the interpretation adopted by Chapman and by Farida Shaheed and one that deserves further conceptual and legal exploration.[32]

2. *Access to Scientific Knowledge/Information*

Moving to the next point on the continuum brings the discussion to the right of all people to access scientific knowledge and information. High quality basic scientific education is a prerequisite for this type of access, empowering lay persons to understand technical knowledge that has been translated so as to be comprehensible and potentially actionable. Disclaimers for medicines, nutrition labels on processed food and public health announcements about air quality are all examples of how scientific knowledge is translated for a general audience that must then have a basis for understanding it and deciding how to act in response.

Government's obligation is to provide quality education at all levels, including through public science communication initiatives, such as science museums.[33] Governments are also obligated to refrain from interfering with the diffusion of scientific information. The National Coalition Against Censorship (NCAC) is a US-based coalition of organizations committed to defending the free speech protections articulated in the First Amendment to the United States Constitution. In 2006, NCAC issued a report titled "Political Science : A Report on Science & Censorship" which identified several examples of censorship by the U.S. government of government scientists, including in areas such as the environment, agri-

[32] Chapman, *op. cit.*, p. 28 ; Shaheed, *op. cit.*, § 68.
[33] Shaheed, *op. cit.*, § 27.

culture, climate change, sexual health, stem cell research, energy and evolution.[34] The motivations for censorship may be economic, political, religious/moral or national security, reasons that also drive the deliberate promulgation of misinformation. In a report from 2004, Human Rights Watch documented examples of misinformation concerning HIV/AIDS transmission and condom use in several countries.[35] The report demonstrated that deliberate manipulation of science-based evidence can and does occur in both developed and developing countries, independent of the form of government or general levels of education.

The translation and dissemination of scientific knowledge can be viewed as a responsibility of not only the state but also the scientific community.[36] It is arguable that the responsibility of the scientific community, in this regard, is particularly strong when a government either refuses to communicate or deliberately manipulates scientific information to its own end. Thus, for example, when the Ugandan legislature drafted a bill aimed at criminalizing homosexuality, several psychological associations from around the world came together in writing a public letter to Ugandan President Museveni explaining the scientific findings concerning homosexuality which conflict with the purported science used to justify the adoption of the bill.[37] In a similar effort related to climate change, in 2010, a group of 255 eminent scientists, including 11 Nobel Laureates published a letter in *Science* decrying government attacks on climate scientists and stating briefly and succinctly what is known and accepted among experts about climate change and its causes.[38]

One challenge that arises in the translation and dissemination of scientific knowledge is that such knowledge is not always absolute or definitive. Available scientific information may be incomplete or open to multiple interpretations, findings may be ambiguous, and conclusions preliminary. In Italy, following the L'Aquila earthquake in 2009, the Italian government prosecuted seven seismologists and engineers for allegedly failing to properly conduct their duties and inform the government of the impending threat of an earthquake leading to the deaths of scores of individuals. The final judgment was resoundingly condemned by the scientific community as being "unfair and naïve" for its suggestion that the science of seismology was at a stage that allowed for earthquake prediction that could unfailingly be used to inform and warn citizens.[39] The judgment, it was asserted, "had a chilling effect" on the seismology community and caused "harm to interdisciplinary efforts to mitigate loss of life and property from earthquakes."[40] Thus,

[34] National Coalition Against Censorship, Political Science: A Report on Science & Censorship, 2006, pp. 5-7.
[35] Human Rights Watch, "Access to Condoms and HIV/AIDS Information: A Global Health and Human Rights Concern", December 2004.
[36] AAAS Science and Human Rights Coalition, *op. cit.*, p. 7.
[37] American Psychological Association, Letter Urging President of Uganda to Reject "Anti-Homosexuality" Bill, 14 February 2014.
[38] P.H. Gleick (*et al.*), "Climate Change and the Integrity of Science", *Science*, 7 May 2010, p. 689.
[39] Letter from Alan I. Leshner, Chief Executive Officer of the American Association for the Advancement of Science to Giorgio Napolitano, President of the Republic of Italy, June 29, 2010.
[40] Geological Society of America, "Italian Court Judgment Likely to Harm Efforts to Mitigate Earthquake Losses", 22 October 2012.

in defining the information to which everyone should have access, consideration needs to be given to the degree to which there is sufficient understanding and consensus about a topic for information to be generated that is clear and accurate and this process of consideration must be guided by science rather than politics.

3. *Access to Scientific Literature*

For a lay audience, access to translated information will generally have greater value than access to scientific literature, which requires a level of technical expertise that is traditionally acquired through specific training, whether formal or informal. So it is that as we move further to the right along the continuum of access, the technical knowledge underpinning access increases. Scientific literature consists mainly of the peer-reviewed professional journals in which scientists publish their research findings.[41] The intended audience of such publications, therefore, are other scientists in related fields.

Access to scientific literature currently takes various forms, from individual journal subscriptions, to institutional access usually acquired through site licenses. The principal barriers to accessing scientific journals are cost and the delivery method, which increasingly relies on access to the Internet.[42] In an effort to address the cost barrier, programs have been set up by international organizations to facilitate the dissemination of scientific literature to individual researchers in non-profit institutions living in developing countries. Such programs include AGORA (Access to Global Online Research in Agriculture) established by the United Nations Food and Agriculture Organization and HINARI (Health InterNetwork Access for Research Initiative), which was established by the World Health Organization. Based on a variety of economic and human development measures, these programs determine the countries to which free access to journals will be provided and those that will receive access at low-cost.

Over the past fifteen years a parallel effort aimed at more comprehensively addressing economic barriers to scientific literature has produced mounting pressure for publishers to adopt open access on-line models of distribution.[43] Beyond arguments based on general principles of equity, open access is seen as vital in specific fields, including biomedical research, where it is argued failure to provide access can have negative consequences for public health.[44] "Open access" can mean anything from immediate and free access to a scientific article upon publication, to delayed but free access after a given period of time, usually six or 12 months. The model of delayed open access has been adopted by several coun-

[41] AAAS Science and Human Rights Coalition, *op. cit.*, p. 7.
[42] See, for example, European Commission, "Online survey on scientific information in the digital age", Directorate-General for Research and Innovation, 2012.
[43] See the Budapest Open Access Initiative 2002, a statement that emerged from a meeting on open access that served as a catalyst for further efforts in this area.
[44] G. Yamey, "Excluding the poor from accessing biomedical literature: A rights violation that impedes global health", *Health and Human Rights*, vol. 10, nº 1, 2008, pp. 21-42.

tries, including India and the United States, as they have introduced open access requirements for research resulting from federal funding. These policies have been largely supported by the scientific community.[45] Many scientific publishers support the principle of open access, but raise the question of how to reconcile the costs of publishing,

One challenge is to determine how to maintain rigorous peer review – which is essential to the scientific process – while providing access to scientific knowledge as laid out in Article 15(2) of the ICESCR.[46] For an article to enter the scientific literature the procedure among respected scientific publishers is for the piece to undergo a process of double-blinded peer review, that is, a managed process of evaluation by experts in a similar field of competence to consider the quality and value of the study conducted and its findings, irrespective of the renown or credentials of the authors. Only once an article has been peer reviewed may it then be published. The benefits of this system are multiple, from ensuring the quality of the science that enters the literature to providing an opportunity for insightful critique of research and findings at an early stage.[47] But peer review is not the only cost associated with scholarly scientific publishing. Other expenses include maintaining editorial offices that routinely accept and peer review ten times more manuscripts than are selected for publication, copy editing and preparing accepted manuscripts, and building and maintaining electronic platforms that preserve and deliver published articles in perpetuity while also linking them to related bodies of literature. In short, open access publishing is not cost-free publishing.[48]

Given the costs associated with managing this process, the question remains how such costs should be met. Open access options can be categorized broadly into access provided by the author, called 'green' access, and access provided directly from the publisher, called 'gold' access. The 'green' open access model allows for authors to self-archive some version of a peer reviewed and published manuscript in open access repositories. According to a study reported in *Nature* in 2013, more than 60 percent of journals allow for this form of open publication.[49] However, few authors choose to place their articles in these repositories, and searching across the multitude of archives to find relevant materials can be difficult. Articles in journals that provide gold access are made freely available online by the publisher. In gold access, the costs of production are moved from the consumer of scientific information (usually institutional libraries, but also individual subscribers) to the producers of that information – the authors. Hybrid models provide immediate

[45] See, for example, M. J. Charbonneau DH, "Faculty experiences with the National Institutes of Health (NIH) public access policy, compliance issues, and copyright practices", *J Med Libr Assoc*, vol. 101, n° 1, 2013, pp. 21-25 ; and European Commission, "Online survey on scientific information in the digital age", Directorate-General for Research and Innovation, 2012.
[46] Potomac Institute for Policy Studies, "The Economics of Open Access : International and Domestic Implications", Seminar Report, 22 January 2014, pp. 9-13.
[47] "Overview : Nature's peer review trial", December 2006, DOI : 10.1038/nature05535.
[48] S.T. Hillsman, "Socius, Open Access, and the Future of Scholarly Publishing", *Footnotes*, vol. 43, n° 4, 2015, p. 2.
[49] R. Van Noorden, "Open access : The true cost of science publishing", *Nature,* vol. 495, 28 March 2013, pp. 426-429, DOI : 10.1038/495426a.

open access for selected articles within a journal when the author has chosen to pay a publication fee; delayed open access is still another model, where articles become freely available after an embargo period. In some cases the authors' fees associated with gold and hybrid open access models are paid by governments, employing institutions, or grant agencies, but concern remains that that the author-pay model may create new barriers to the production of scientific knowledge, including potentially introducing new forms of institutional bias regarding what is funded for publication.

In addition, both the consumer pay model and the author pay model raise important equity issues that require further exploration. Under the current reader pay model, access to scientific literature is restricted to those who can afford subscriptions to journals, or are housed within an institution that can afford access. The HINARI, AGORA and related programs mentioned above represent growing efforts to address the equity issues inherent in this model. HINARI, for example, provides schools and universities in 119 countries with free or low-cost access to 42,000 information resources. The registered institutions must have high-speed Internet. Scientific researchers, educators and other science enthusiasts who would desire access to the scientific literature and who fall in the gaps are those that cannot afford subscriptions, do not have access to high-speed Internet, do not work for an institution eligible to be a part of one of these programs, or reside in countries excluded from these programs.

Science publishing for some is primarily a profit-making enterprise while for other organizations it is core to their larger scientific and social mission. This is particularly the case among the professional and scholarly scientific organizations that are also publishers of leading journals in their field. The challenge for these publishers, some of which support the goal of open access,[50] is to be able to implement an appropriate model that ensures that standards of scientific knowledge generation and dissemination are maintained through a rigorous process of peer review, while also considering long-term organizational sustainability as well as broader societal equity issues that persist in the models promoted to date.

The Internet is clearly a central driving force behind the open access movement, but its potential has yet to be fully understood or exploited by the science publishing enterprise. At minimum, the Internet is a fast and effective tool for dissemination of scientific information (to those who have access to electricity, a computer and reliable Internet). The Internet also has the potential to revolutionize the system of scientific knowledge generation, validation and dissemination, as proposed by Jensen who in 2007 published an article in the *Chronicle of Higher Education* advocating for a system he dubbed 'authority 3.0' which established new metrics of scholarly authority based on a series of data-driven

[50] Potomac Institute for Policy Studies, *op. cit.*, p. 10.

metrics derived from online networks, connections and comments.[51] Furthermore, expanding modes for collecting, consolidating and communicating online information may offer greater flexibility to science publishers in how they structure their payment systems, but will need to be assessed to determine the extent to which they provide the financial basis necessary to maintain the peer review process and scholarly publishing more generally, which underpin scientific progress.

A further challenge is language. English is the established language of scholarly communication, though the extent to which scholars from non-English speaking backgrounds publish in English varies by country.[52] This can create barriers to the professional advancement of scientists from low and middle-income countries. It also constrains the broad dissemination of scholarly literature. The lack of access to "operational research publications" is particularly detrimental.[53] Both the development of well-supported indigenous scientific capacity and publishing opportunities are required to redress the current situation, as well as the exploration of online tools for translation that would allow research by scholars from around the globe to be published and disseminated broadly.

4. *Access to Data and Access to Samples, Materials and Subjects*

The final two points along the continuum – 'access to data' and 'access to samples, materials and subjects' relate to the central activity of the scientific process: systematic empirical investigation. At this end of the continuum, those for whom access is necessary becomes more limited, and the necessary restrictions on access increase with the increase in associated risks.

Data serve multiple purposes and are collected on a multitude of subjects from global climate change to individual genetic make-up. Access to data is critical to the progress of science generally: (1) as the basis for further research; (2) to allow for the reproduction of results; (3) to contribute to longitudinal comparisons; (4) to facilitate training and education of the next generation of scientists; and (5) for its historical value. In addition to researchers, data should be available to governments to improve services, to policy-makers in designing strategies, to public organizations that can use the information to inform advocacy campaigns, and to the general public. Given the many uses of data and its importance as the basis for policy and programmatic design, implementation and monitoring, ensuring the quality of data is important as well as the conservation of data in public repositories, as appropriate. Open and transparent data collection methods contribute to ensuring such quality and, just as has occurred in the domain of

[51] M. Jensen, "The New Metrics of Scholarly Authority", *Chronicle of Higher Education*, vol. 53, n° 41, June 2007, p. B6.
[52] D. van Weijen, "The Language of (Future) Scientific Communication", *Research Trends,* n° 31, 2012.
[53] R. Zachariah *et al.*, "Open access for operational research publications from low – and middle – income countries: who pays?", *Public Health Action*, vol. 4, n° 3, 21 September 2014.

science publishing, so, too, open data policies are becoming increasingly prevalent.[54]

At the same time, unrestricted access to some data is inadvisable, unethical and, in certain circumstances, may constitute a violation of human rights. Privacy and confidentiality are two key concerns with regard to data that may be personally identifiable, whether in the context of survey responses or stem cell research. Personal security may also be at stake depending on the nature of the data collected. Thus, reasonable limitations may need to be placed on the sharing of data, including the form in which it is stored and made available, and the circumstances in which it will be shared.

When turning to samples (scientifically gathered portions of the object of scientific study, such as tissues or geological core samples), materials (historical documents, videos, or animals used as model systems) and subjects (the ethically and legally distinct category of humans who agree to participate in a scientific study), all require a high level of training to assure their protection, preservation and ethical use.

5. *Tools and Mechanisms for Creating and Sustaining Access*

The continuum of access is supported by a foundation of tools or mechanisms necessary for creating and sustaining access: funding, education and training, and access to basic information and communication technologies.[55] Each is a facilitator, if not a necessary prerequisite, for access at each point along the continuum, without which access is either rendered meaningless or simply impossible.

Funding for research and development (R&D) ensures that science continues to progress and it is those countries and private industries that fund R&D that ultimately determine the directions in which science progresses as defined by their priorities. According to *R&D Funding Magazine*, five countries account for over two-thirds of funding for R&D in the world, they are the United States (31.1%), China (17.5%), Japan (10.2%), Germany (5.2%) and India (2.7%). Beyond the Americas, Asia and Europe, funding for R&D in the rest of the world accounts for 5.3% of total global spending.[56] The result has been a clear imbalance between investments made in priority areas of research for the developed world and neglect of research needed to address pressing needs in the developing world. This imbalance is evident in the much-touted 90/10 disparity, in which 90% of investments in health go towards addressing the health concerns of 10% of the world's population.

[54] Potomac Institute for Policy Studies, *op. cit.*
[55] AAAS Science and Human Rights Coalition, *op. cit.*, pp. 8-9.
[56] "2014 Global R&D Funding Forecast", R&D Magazine/Batelle, December 2013.

Adding an extra element of complexity and challenge is the increased funding dominance of the private sector. In the United States, 62% of R&D funding comes from private industry, a trend which has developed since the 1980s and has resulted in serious concerns ranging from the ethics of how research is conducted, to the costs associated with accessing the products and services that arise from that privately funded research.[57] Three distinct and ongoing efforts in related fields may help inform how best to address this issue: the first are efforts to develop a human rights-based approach to government budgeting through which prioritization of funding to address human rights obligations can be identified and pursued; second, are efforts focused on using Article 2 of the ICESCR, which obligates all States Party to work toward the progressive realization of all the rights within the covenant, to encourage, if not require, international assistance and cooperation in order to support less well resourced States Party in meeting their obligations; and third, are innovative approaches being promoted by the access to medicines movement to encourage the private sector to adopt differential pricing, humanitarian licensing, patent pooling and other approaches that reduce costs of research and medicines.

In addition to funding, education and training in science both create and enhance access to the benefits of science. As Shaheed states in her report, "At the juncture of the right to education and the right to information, it implies right to science education, understood as a right to be introduced to and informed about main scientific discoveries and their applications, regardless of frontiers."[58] Whether formal or informal, education should be of good quality and appropriate to the local context as it is the gateway through which access to science is gained for the general public.[59] Furthermore, education is a prerequisite for accessing science at the increasing levels of complexity represented as one moves along the continuum.

Every four years, the International Association for the Evaluation of Education Achievement conducts a global study concerned with the level of science and mathematics education attained by fourth and eighth graders. The study, known as TIMSS – the Trends in International Mathematics and Science Study – in addition to ranking countries based on the performance of over 600,000 students, correlates additional information about the students' educational context to discern reasons for varying degrees of knowledge attainment. Among the measures for success identified in the most recent TIMSS of 2011 were higher socio-economic background, whether the child spoke the language of the test as their first language, a well-resourced school, a safe environment, and greater preparation of teachers.[60] Such an assessment is helpful to inform policies and

[57] National Science Board. *Science and Engineering Indicators 2012*. Arlington, National Science Foundation (NSB 12-01), 2012, Ch. 4, Section 5.
[58] Shaheed, *op. cit.*, § 27.
[59] Chapman, *op. cit.*, p. 35.
[60] M.O. Martin and I.V.S. Mullis (eds), *TIMSS and PIRLS 2011: Relationships Among Reading, Mathematics, And Science Achievement At The Fourth Grade – Implications For Early Learning* Chestnut Hill, TIMSS & PIRLS International Study Center, Boston College, MA, 2013.

programs aimed at creating and maintaining high standards of science education. Even in countries without the capacity and resources to meet the highest standards of science education, Chapman suggests that the minimum requirement is to develop a scientific workforce capable of evaluating discoveries and technologies developed elsewhere for the purposes of directing their importation for the benefit of their populations.[61]

Not mentioned in the TIMSS report but of increasing importance in education specifically and in accessing the benefits of science generally, is access to information communication technologies, whether as a means of accessing scientific information or journals, to facilitate data collection and analysis, or to support cooperation and collaboration. Given its importance, Shaheed emphasized in her report that, "freedom of access to [the Internet] and maintaining its open architecture are important for upholding the right of people to science."[62]

6. *International Cooperation and Access to Science*

The entire continuum of access and the tools and mechanisms for sustaining access do not exist within the confines of any one region or state party. Thus, the final foundation on which access to the benefits of scientific progress rests must be international cooperation. Responding to pressing scientific challenges in a global age depends upon international exchange of ideas and collaboration. As mentioned earlier, Article 15(4) specifically recognizes the obligation on states to encourage international contacts and cooperation in science, implying an obligation to not simply refrain from impeding, but to actually facilitate international communication and collaboration among scientists.

International cooperation also encompasses responding to global inequalities in access to science across the full continuum. This provision also complements Article 2, which directs states party to take "steps, individually and through international assistance and cooperation, especially economic and technical, to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized."

During the negotiations of the ICESCR, Mr D'Souza of India stated that, "Undoubtedly, scientific discoveries should benefit not only all individuals but all nations regardless of their degree of development." To achieve this end implies obligations on the part of both countries that are innovators as well as those that are adopters. As Shaheed points out, the obligation set out in Article 2, when read in concert with Article 15(4), requires of adopters "the prioritization of the development, importation and dissemination of simple and inexpensive technologies that can improve the life of marginalized populations, rather than innovations

[61] Chapman, *op. cit.*, p. 35.
[62] Shaheed, *op. cit.*, § 36.

that disproportionately favor educated and economically affluent individuals."[63] This obligation relies on innovating countries to provide or facilitate the transfer of the specific knowledge, resource and products required.[64]

The obligation to encourage international cooperation is also tied closely to the requirement of funding to support access to the benefits of scientific progress. In addition to the facilitation of technology transfer, what is needed is the creation of funding mechanisms as well as incentive mechanisms, given the significant role of industry, to support the R&D necessary to address the specific needs of countries and regions that do not themselves have the technical capacity nor the resources to address these needs.

Economic disparities among nations and between communities are just one of the challenges that exist when attempting to define the right to science in a way that gives it practical significance. What 'access' means in the context of the right to enjoy the benefits of scientific progress and its applications is, at its core, both complex and highly nuanced. The continuum of access that emerged from the AAAS Science and Human Rights Coalition's consideration of the meaning of the right serves to disentangle some of the complexity and shed light on the specific questions that still require consideration in the process of defining the right.

B. Participation

If a person's role along the continuum is – at least at the theoretical level – fluid and changeable, and depends upon their technical training, personal interests, and motivation, as well as the societal risks associated with providing access at each specific level, then further discussion is needed to consider the factors that impact real levels of participation in science.

The language of Article 15(1) is interesting in its nuanced differences. It speaks of the right of everyone to "take part" in cultural life, suggesting an active engagement in culture. Yet, with regard to science, Article 15(1) speaks of the right to "enjoy" the benefits of scientific progress, that is, the passive possessing of the benefits of science. However, to limit the interpretation of the right to science in this way would be to ignore both well-established principles that underpin all human rights, including principles of participation and empowerment, and to overlook the language of "conservation, development, and diffusion" in Article 15(2) which implies an active engagement of society in science. Consequently, across the literature on the right to science is the recurring theme that

[63] *Ibidem*, § 68.
[64] Chapman, *op. cit.*, p. 28.

participation, in concert with access, lies at the heart of the right.[65] That said, the right to share in scientific benefits should not be predicated on participation.[66]

Participation in science can take various forms, starting with participation in decision-making processes of a personal nature informed by science. Everyone's daily life involves constant choices of an individual and personal nature that demand knowledge and understanding of science if they are to be informed, from diet, to alcohol consumption, exercise, smoking, and taking medication. To be active participants in these individual choices, rather than passive and ill-informed consumers of information, misinformation and marketing, requires individual access to basic scientific information which, in turn, necessitates the ability to understand the information provided, as discussed above. The obligation on government, therefore, is to ensure that clear and accurate information is diffused to the general public and to regulate private sector activity equally to ensure transparency, clarity and accuracy in messaging.

Flowing from the traditional conception of participation reflected in the human rights framework, other forms of participation in science include: participation in political processes based on access to and understanding of scientific information; participation in decision-making about issues pertaining to science policy and funding priorities; participation of scientists in policy-making; and participation in doing science, both as a research subject as well as a researcher.[67] In each case, participation should be encouraged on the basis of non-discrimination, with particular concern paid to ensuring participation among marginalized and vulnerable populations.

Participation in public affairs requires an understanding of the scientific basis for issues debated in the political arena, principally the data underpinning policy proposals, from economic reform to migration policies. The right to participation in this sense is tied directly to the right recognized in the International Covenant on Civil and Political Rights (ICCPR) to participate in political processes. According to Article 25 of the ICCPR, "every citizen shall have the right and the opportunity … to take part in the conduct of public affairs." That this right requires the sharing of information about issues of political relevance is supported by the Human Rights Committee General Comment No. 25 regarding Article 25 which emphasizes the need for free communication of "information and ideas about public and political issues."[68]

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[65] See, for example, Shaver, *op. cit.*, p. 171.
[66] See, for example, UNESCO, "The Right to Enjoy the Benefits of Scientific Progress and its Applications", 2009, p. 17.
[67] This typology for consideration of "participation" in the context of the right to science was first presented by the first author at a meeting organized by the UN Office of the High Commissioner for Human Rights on October 4, 2013 (Geneva, Switzerland). The presentation was entitled "Realizing the Benefits of Scientific Progress and Its Applications Through Participation."
[68] Human Rights Committee, *General Comment No. 25: Article 25 (Participation in Public Affairs and the Right to Vote), The Right to Participate in Public Affairs, Voting Rights and the Right of Equal Access to Public Service*, UN Doc. CCPR/C/21/Rev.1/Add.7 (12 July 1996).

Participation in public affairs based on an informed understanding of the underlying empirical justification for a policy can be differentiated from participation in political decision-making processes about the scientific enterprise itself, including whether and how to proceed with certain forms of research and how to set funding priorities. Shaheed identifies two key reasons for ensuring participation of individuals and communities in decision-making related to science: (1) given the obligation to protect all persons against the potentially negative consequences of scientific testing and applications; and (2) "the need to ensure that scientific research is conducted on key issues, including for the most vulnerable."[69] Claude encapsulates the principle this way, "the constituencies associated with science and technology decisions must be represented without the invidious barriers of discrimination."[70]

Participation of lay individuals in decision-making about science, just like participation in the doing of science itself, has been the subject of much discussion among science policy commentators.

The concept of "the democratization of science" provides an umbrella for initiatives aimed at broadening the scope of public engagement in science. Such initiatives span the gamut from democratizing the process of science policy making, and democratizing knowledge production, to democratizing knowledge accessibility.[71] In each case, the objective is to open up science to the lay public, and create for interested individuals a role that has traditionally been reserved for formally trained scientists and/or policy makers.

Under the umbrella of "democratization of science", different proponents suggest different roles depending on their point of focus in the scientific process. Linda Silka provides a neat summary of current science democratization efforts:

> Some have been directed at looking at how the research is done while others on how the research is used. Some have focused on creating processes by which knowledge is jointly produced whereas others have focused on how knowledge, created by whatever means, can be made more widely available. Some are concerned with who decides on the focus for the research whereas others have focused on ensuring that the research, whatever the emphasis, is done in ethical ways.[72]

There are risks associated with opening up science policy decision-making to broader participation. Current reality demonstrates that the direction of scientific research may be determined by political pressure groups with a stake in

[69] Shaheed, *op. cit.*, § 43.
[70] R.P. Claude, "Scientists' Rights and the Human Right to the Benefits of Science", in Chapman and Russell (eds.), *op. cit.*, p. 268.
[71] See, for example, D.L. Kleinman, "Beyond the Science Wars: Contemplating the Democratization of Science", *Politics and the Life Sciences*, vol. 17, n° 2, September 1998, p. 133.
[72] L. Sila, "'Silos' in the Democratization of Science", *International Journal of Deliberative Mechanisms in Science*, vol. 2, n° 1, p. 11, Doi: 10.4471/demesci.2013.06.

the outcomes of research and the power and resources necessary to seriously influence priorities, the risk being that the interests of such groups may not be aligned with broader societal goals and objectives.[73] While proponents of open science recognize that eliminating such influence is not realistic, they argue for improving the current model of incorporating the interests of society through "politically mediated feedbacks" rather than the alternative approach of removing science policy decision-making from societal influence altogether.[74]

The broad argument proffered in favor of opening up science to the influences and interests of a broader range of societal actors is that such reorganization of science will increase the quality, effectiveness, and legitimacy of solutions to societal and environmental problems.[75] It was to that end that the consensus conference approach was first tested as a mechanism to directly engage lay people in decisions related to science research and funding. Started in Denmark through the Danish Board of Technology, consensus conferences provide a mechanism for educating a sample of citizens about a scientific issue of policy significance and learning from that group the questions, concerns and points of consensus about the topic. The outcome is not necessarily binding upon the political process, but can inform legislative developments, as well as education and communication campaigns associated with scientific developments. The process itself has been found to be a useful way to inform the broader public about science.

On the flip side of opening up science policy making to greater societal involvement and influence are efforts to expand the ways that policy making generally is informed by science, data and other empirical evidence. Participation of scientists in the policy-making process promises to strengthen the evaluation of policy options and the design of policies and programs. As articulated in the AAAS Coalition study, "participants emphasized the central role of science in providing a rational empirical basis for government action."[76] That is not to suggest, however, that the empirical assessment of an issue will or should be the only factor taken into consideration in policy making processes when other legitimate influences exist. What is more, questions still exist within the scientific community about how scientists can be responsibly involved in policy-making processes while ensuring the continued independence and credibility of science.[77]

The final aspect of participation in science relates directly to the doing of science, both as a scientist as well as a research subject. In many current contexts, the notion of who is a 'scientist' is changing and evolving to embrace 'citizen scientists' and other science enthusiasts who may not be technically trained, or not to

[73] D. Sarewitz and R.A. Pielke Jr, "The neglected heart of science policy: reconciling supply of and demand for science", *Environmental Science and Policy*, vol. 10, 2007, p. 8.
[74] *Idem*, p. 9.
[75] E. Turnhout *et al.*, "New roles of science in society: Different repertoires of knowledge brokering", *Science and Public Policy*, 2013, p. 1.
[76] AAAS Science and Human Rights Coalition, *op. cit.*, p. 14.
[77] D. Runkle, "Advocacy in Science: Summary of a Workshop convened by the American Association for the Advancement of Science", Washington, DC, 1 May 2012.

the level usually attained through a doctoral degree, but who have the interest, motivation and training sufficient to address scientific issues. InnoCentive is an example of a company that harnesses the interest and expertise of such individuals to crowd source solutions to scientific challenges.[78] With just forty percent of their online workforce possessing a doctoral degree, they have addressed challenges from cleaning up oil spills to identifying biological targets for obesity. This approach has been linked to the broader trend of democratization of science and provides an example of how participation in science will invariably expand beyond the traditional research universities and industry labs, aided by technologies that facilitate inventiveness and allow for the proliferation of knowledge. This is the realized instantiation of the fluid role of individuals moving from left to right along the continuum of access discussed in this article depending on their technical training (whether formal or informal), personal interest, and motivation. Beyond personal characteristics, another variable that influences a persons position on the continuum of access are the societal risks and responsibilities associated with providing access. Indeed, as informally trained, less formally associated inventors and investigators emerge, the question of risks is heightened, including the risks that can arise in the absence of a guiding ethical framework and peer network.

In the next section the discussion shifts away from scientific participation to a consideration of potential misuse and abuse of science and technology, beginning with violations of the human rights of scientists and then considering the societal responsibilities incumbent upon scientists within their privileged role. The section ends with a brief consideration of the need to protect against truly retrogressive scientific developments and the unique challenges of dual-use research and technologies.

C. Protection

One of the points of contention in the drafting of Article 15 related to whether the word "indispensable" should be retained in Article 15(3) which reads as follows, "The States Parties to the present Covenant undertake to respect the freedom indispensable for scientific research and creative activity." To include "indispensable" in the language of the article was seen by some of the state representatives to be potentially limiting of the freedom protected by the provision and legitimizing political interference in and restrictions on science.[79] As such, protection of the freedom and autonomy of scientists was a key concern among the drafters. Yet, such freedom and autonomy is not absolute and must be balanced by a corresponding obligation to act responsibly, both in accordance with norms and codes internal to the scientific community, as well as externally to society.

[78] J. Travis, "Science by the Masses", *Science*, vol. 319, 28 March 2008, p. 1750.
[79] United Nations General Assembly, Twelfth Session, Third Committee, Agenda Item 33, "Article 16 [later renumbered 15] of the Draft Covenant on Economic, Social and Cultural Rights (E/2573, Annex IA), A/C.3/SR.795, pp. 183, 189.

1. *Scientific Freedom*

The concern of the scientific community for the rights of colleagues became pronounced in the late 1970s and early 1980s, exemplified by the case of Andrei Sakharov, a Russian nuclear physicist and human rights advocate who was exiled for his public protests against the Soviet leadership which ranged from an essay against anti-ballistic missile defense development to public protests against Soviet intervention in Afghanistan. Scientific freedom continues to be curtailed today, including the abuse and torture of doctors in Syria for treating anti-government protesters, and the arrest and imprisonment of Turkish academic leaders for promoting secular campuses and education.[80] In persecution of a somewhat different nature, animal rights advocates in the United Kingdom and United States have undermined scientific freedom by harassing and threatening scientists whose research involves the use of animals. In each case, the goal is to curtail the intellectual freedom of the scientists and to deter further similar research, not only by the individuals directly involved but by colleagues in related fields.

Scientific freedom and the violation of the rights of scientists have garnered only limited attention from regional and international human rights monitoring mechanisms. The General Comment on the right to education of the Committee on Economic, Social and Cultural Rights addresses academic freedom generally. The Committee's conceptualization of academic freedom is broad, encompassing the individual and collective rights of academics to freely pursue, develop and transmit knowledge and ideas through research, teaching, study, discussion, documentation, production, creation or writing.[81] The UNESCO Recommendation on the Status of Scientific Researchers adopted in 1974 and currently under review adopts a similar broad view of scientific freedom.[82]

Neither the references in the General Comment nor Article 15(3) have garnered much attention by the Committee. A handful of examples exist of special procedures responding to communications about scientists under threat.[83] However, in all cases the lens through which the communication was addressed – the rights of human rights defenders, freedom of expression, freedom from arbitrary detention – was not scientific freedom *per se*.

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[80] See, for example, Physicians for Human Rights, "Syria: Attacks on Doctors, Patients and Hospitals", 2011; J. Bohannon, "Grim Day for Turkish Science as Six Academics Get Long Prison Terms", *Science*, vol. 341, 9 August 2013, p. 603.

[81] [78] Committee on Economic, Social and Cultural Rights, *General Comment 13, The right to education,* Twenty-first Session, UN Doc. E/C.12/1999/10 (1999), reprinted in Compilation of General Comments and General Recommendations Adopted by Human Rights Treaty Bodies, UN. Doc. HRI/GEN/1/Rev.6 at 70 (2003).

[82] UNESCO, Recommendation on the Status of Scientific Researchers, 18C/Res.40, adopted on 20 November 1974, UNESCO Standard-Setting Instruments, Section II.B.1.

[83] See, for example, Report of the Special Representative of the Secretary-General on human rights defenders, Hina Jilani, presented at the Fifty-ninth Session of the Commission on Human Rights (20 February 2003) (E/CN.4/2003/104/Add.1), p. 20; Report of the Special Rapporteur on torture and other cruel, inhuman or degrading treatment or punishment, Manfred Nowak, presented at the Sixty-second Session of the Commission on Human Rights (21 March 2006) (E/CN.4/2006/6/Add.1), p. 239; and Report of the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression, Frank La Rue, presented at the Seventeenth Session of the Human Rights Council (27 May 2009) (A/HRC/11/4/Add.1), p. 379.

Scientists are often members of an educated elite, whose opinions garner particular public and political attention. As such, the rights of scientists may be violated, not because of their scientific activities, but as a result of their political activities. The protection that Article 15(3) seeks to afford scientists expressly because of their scientific activities encompasses freedom of thought, freedom of information, freedom of association, and freedom to collaborate both within and across national borders.[84] When regional and international human rights mechanisms start to give focus to these aspects of scientific freedom, they will be demonstrating a commitment to the inherent value of science to human rights as reflected in Article 15(3).

2. *Scientific Responsibility*

Article 15 of the ICESCR addresses explicitly scientific freedom but does not mention scientific responsibility. Nonetheless, it is accepted in the literature that "scientific freedom is not absolute."[85] Measures should be taken to prevent abuse and the adverse effects of science its applications.[86]

Arthur W. Galston was an American botanist who, as a graduate student in the mid-1940s, identified the defoliant effects of a chemical that the British and United States military later developed into Agent Orange. Though his research was aimed at the agricultural benefits that flowed from increased knowledge and use of herbicides, it was evident that the same knowledge could be used for highly destructive purposes. Galston became an early proponent of the notion of the 'social responsibility' of scientists and the scientific community. "Science is now too potent in transforming our world to permit random fallout of the social consequences of scientific discoveries," he said. "Some scrutiny and regulation are required, and I believe that scientists must play an important role."[87]

The responsibilities of scientists can be characterized as external and internal: those that require fidelity with the standards of practice agreed upon by the scientific community; and those aimed at the larger community.[88] The first set of responsibilities traditionally fall under the umbrella of science ethics and concern issues such as the fabrication or falsification of results, authorship and plagiarism, the protection of animal subjects, and the protection of human subjects (including informed consent, confidentiality and privacy of personal data).[89]

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[84] See, for example, UNESCO (2009), *op. cit.*, p. 17; Shaheed, *op. cit.*, §§ 21, 40, 41.
[85] Chapman, *op. cit.*, p. 17.
[86] UNESCO, Venice Statement *op. cit.*, §§ 12.f, 13.c, 14.d.
[87] A.W. Galston, "Science and Social Responsibility: A Case History", *Annals of the New York Academy of Science*, vol. 196, 1972, p. 223.
[88] M.S. Frankel, "Science as a Socially Responsible Community", Paper adapted from an addressed presented at a Conference on Scientific (Mis)Conduct and Social (Ir)Responsibility, Indiana University, Bloomington, 27 May 1994, p. 1.
[89] K.D. Pimple, "Six Domains of Research Ethics: A Heuristic Framework for the Responsible Conduct of Research", *Science and Engineering Ethics*, vol. 8, 2002, p. 191.

Egregious examples exist of research being conducted involving human subjects whose rights were violated in the name of scientific experimentation and progress: the Tuskegee experiment which began in the 1930s and continued through the 1970s involved African American research subjects already infected with syphilis who were not treated, even after penicillin was discovered to be effective; and during the same period in Guatemala, a US-funded research project involved the deliberate infecting of orphans and prisoners, among others, with sexually transmitted diseases.[90] The pseudo-science used to justify the Holocaust is another example.

Though it was the horrors of the Holocaust that sparked the development of both the modern human rights movement as well as ethical standards of research practice, international human rights mechanisms have had little to say about responsible scientific practice. Article 7 of the International Covenant on Civil and Political Rights prohibits "medical or scientific experimentation" without the free consent of the person involved. The Human Rights Committee elaborated on this provision in its General Comment No. 20, indicating that special measures are needed to protect persons incapable of giving their consent and vulnerable populations. Adding to this articulation of the need for protection of human subjects, the UNESCO Universal Declaration on Bioethics and Human Rights addresses the rights of human subjects by requiring benefit-sharing and the provision of remedies in the event of abuse.[91] Similar provisions exist in the Universal Declaration on the Human Genome and Human Rights.[92]

Within the domestic context, regulation of these issues occurs at various levels: governmental, institutional, and at the level of disciplinary specific scientific organizations. For such regulatory frameworks to be consistent with the right to science, continued focus needs to be given to the specific vulnerabilities and potential for exploitation to which research subjects are exposed, particularly among marginalized populations. The state responsibility in such cases must be to ensure the protection of the human rights of people subject to research activities by all entities, whether public or private.

Beyond 'internal' considerations emerging from scientific practice are the 'external' responsibilities of scientists towards society. Within the scientific community, there is no consensus as to whether such social responsibilities exist and, if so, what precisely they are, to whom they are owed, and in what circumstances. Already mentioned is the view held by some scientists that communi-

[90] Tuskegee Syphilis Study Ad Hoc Advisory Panel, *Final Report* (Washington, DC: US Public Health Service, April 1973); Presidential Commission on the Study of Bioethical Issues, "Ethically impossible" STD research in Guatemala from 1946–1948", September 2011.
[91] UNESCO, *Universal Declaration of Bioethics and Human Rights*, (adopted by UNESCO's General Conference on 19 October 2005).
[92] UNESCO, *Universal Declaration on the Human Genome and Human Rights*, (adopted by UNESCO's General Conference on 11 November 1997).

cating scientific information is a responsibility of the scientific community. Galston suggests that a scientist's responsibility does not cease with publication but that they should follow the progress of their research "to the end", though he admits of having "no moral imperative to invoke."[93] Others argue that scientists also have a responsibility to act as advocates in appropriate circumstances.[94]

As the process of defining the right to science continues and extends to consideration of the scope of scientific responsibility within a human rights context the opportunity exists to inform these ongoing discussions within the scientific community. One avenue is to identify how human rights norms may complement and be incorporated into existing codes of conduct. For example, it is arguable that scientists should have a duty to bring to the appropriate authorities information about research practices that may constitute a violation of human rights, or to raise public awareness about technological developments that may lead to human rights violations. Such obligations already exist regarding the reporting of *unethical* behavior in many professional scientific codes of conduct. Specifying human rights violations as a specific covered example of unethical behavior might be a useful step forward. That said, what would be even more valuable at this stage would be to determine, as a starting point, what scientists consider their social responsibilities to be and from where they are derived. From that starting point a fruitful discussion about the social responsibilities of scientists can develop.

3. *Misuse and Abuse of Science and Technology*

Beyond the scope of scientific responsibility are broad considerations of the responsibility to protect against the development, misuse and abuse of science and technology that may be harmful to individuals or communities. Article 15 speaks of the right to enjoy the benefits of scientific progress, but are there not scientific developments that are retrogressive whether in design or effect? Chapman raises the possibility of applying the "precautionary principle" as a standard for protecting populations from the harmful impacts of science and technology,[95] a suggestion which has since been echoed.[96] However, she also identifies complications in applying this principle in practice, including the challenges of obtaining relevant data and analyzing its implications, the reality that problems with some technologies may only emerge years after they are developed, and the uneven impacts of technology.

To concerns about the misuse and abuse of science and technology can be added the unique challenges posed by dual-use research and technologies which may have, for example, legitimate military purposes but are inappropriate for civilian application. One such example is provided by long-range acoustical devices, or

[93] Galston, *op. cit.*, p. 223.
[94] Pimple, *op. cit.*, p. 191
[95] Chapman, *op. cit.*, p. 28.
[96] UNESCO (2009), *op. cit.*, p. 17.

LRADs, which are essentially sound weapons used to create safety zones by emitting a high-pitched, piercing tone that has the potential to cause pain for days after exposure and even deafness. The discomfort and pain caused by the sound deters humans from coming within a certain range. Designed to be used against militants, whether armed forces on land, or pirates at sea, LRADs were first used against civilians in 2009 during the G20 meeting in Pittsburgh and have been deployed in subsequent civilian contexts.

Several international statements relevant to the use of science and technology have called for states to prevent the use of scientific and technological developments that are detrimental to human rights.[97] However, they do not offer practical guidance concerning how the monitoring of such development should occur, the bases upon which a determination is made as to its potentially detrimental impact, and who bears the specific responsibility for making that assessment.

IV. Conclusion

The aim of the foregoing analysis is to identify the contours of the right to science, drawing from both existing literature but also new contributions to this discussion being made by the scientific community, and demonstrate the interdependence of the provisions of Article 15 as a whole.

Access, participation and protection are three pillars that serve to define the scope of the right and shed light on the potential roles and responsibilities of both duty bearers and right holders. Emerging throughout this analysis is a common thread which is the need for a minimum level of government infrastructure to build and maintain these pillars – infrastructure to support science education, disseminate scientific knowledge and products, determine science funding priorities, and regulate the scientific enterprise. In each of these activities a human rights approach demands consideration of the rights and role of the scientific community and society broadly, the needs of marginalized and vulnerable populations, and an assessment of the broad societal goals to which science should be directed.

Many of the questions remaining to be answered in the process of defining the right to science raise issues already being debated within the scientific community or elsewhere, including the nature of governments international obligations, the scope of the responsibility of scientists, protections against abuse in science, and mechanisms for effective public participation in science. To the extent relevant, lessons should be learned from and connections made with these discus-

[97] See, for example, *United Nations Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind*, Proclaimed by General Assembly resolution 3384 (XXX) of 10 November 1975, Articles 2, 8.

sions and communities of shared concern. To draw these connections may help inform conceptualization of the right to science, and may also demonstrate the value of considering the human rights perspective on an issue vital to a robust and responsive scientific enterprise.

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Science without Borders and the Boundaries of Human Rights: Who Owes the Human Right to Science?

Une science sans frontière face aux frontières des droits de l'homme – Qui est débiteur du droit de l'homme à la science?

Samantha Besson*

Abstract

What is specific about the supply-side of the right to science is two-fold. First of all, by virtue of the interest protected by the right to science, i.e. the access to the benefits of science and hence an individual interest in a universal public good, and of the universal scope of the threats to that interest, the duties relative to the right to science are collective duties States and/or international institutions of jurisdiction bear together, and not only concurrently. This has consequences for their feasibility and hence for their recognition in the first place, but also for their co-allocation among States and institutions of jurisdiction and not only within each of them. Secondly, this also has an impact on the other private actors', States' and international institutions' responsibilities for the right to science, since those responsibilities are borne together as well and should, as a result, be coordinated in their primary allocation. In short, the "unbounded" nature of science should not be too quickly defeated by the "bounded" nature of human rights. If the human right to science and hence to innovation is to be protected effectively, one should be ready to innovate institutionally in order to "unbound" their corresponding duties and responsibilities.

Résumé

Les obligations et responsabilités relatives au droit à la science présentent deux spécificités. Tout d'abord, en vertu de l'intérêt protégé par le droit à la science, à savoir l'accès aux bienfaits de la science, et donc un intérêt individuel à un bien public universel, et la portée universelle des menaces à cet intérêt, les obligations relatives au droit à la science devraient être abordées comme des obligations collectives que les États et/ou les institutions internationales de juridiction portent ensemble, et non seulement de manière concurrente et séparée comme d'autres droits de l'homme. Ceci a des conséquences institutionnelles importantes pour l'allocation entre les États et les institutions de juridiction, et non seulement à l'intérieur de chacun d'entre eux. Deuxièmement, ceci a également un impact sur les responsabilités pour le droit à la science d'autres acteurs privés, États et institutions internationales, puisque ces responsabilités naissent ensemble et doivent donc être coordonnées dans leur allocation primaire. En bref, le caractère « désenclavé » et universel de la science ne doit pas être mis en échec par le caractère « enclavé » et juridictionnel des obligations relatives aux droits de l'homme. Pour que le droit à la science, et par-là à l'innovation, puisse être protégé de manière efficace, nous devrions être prêts à innover aussi d'un point de vue institutionnel pour « désenclaver » les responsabilités et obligations correspondantes.

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I. Introduction

One of the most difficult questions arising in the context of the specification of the "Right to enjoy the benefits of scientific progress and its applications" (REBSPA; Article 15(1)(b) International Covenant on Economic, Social and Cultural Rights [ICESCR])[1] (hereafter, the (human) "right to science"[2]) pertains to the identification of its duty-bearers. This is also what one may refer to as the "duty-side"[3] or "supply-side" of the right to science. It amounts to the personal and, by extension, territorial scope of the duties corresponding to the right to science.[4]

At first sight, this should not come as a surprise for the supply-side of human rights in general is among the most controversial questions in human rights theory and practice.[5] What makes it even harder to address in this context, however, is the object of the right to science, and accordingly of its corresponding duties. A brief survey of the existing international human rights instruments reveals that the right to science protects the following interests *qua* object of the right: primarily, the "non-discriminatory access to the benefits of scientific progress and its applications" (i), but also, by extension, the "opportunities for all to contribute to the scientific enterprise" (ii) and the "protection from adverse effects of science" (iii).[6] Focusing on the first and most important of those interests,[7] the difficulty for the supply-side of the right to science stems from the fact

[1] See also Article 27(1) Universal Declaration of Human Rights [UDHR], Proclaimed by UN General Assembly, Resolution 217 A (III) (10 December 1948) (A/RES/3/217 A); UN Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind, Proclaimed by UN General Assembly, Resolution 3384 (XXX) (10 November 1975) (A/RES/30/3384); UNESCO Universal Declaration on Bioethics and Human Rights (19 October 2005); UNESCO, Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications (Article 15(1)(b) ICESCR) (16-17 July 2009).

[2] See for this expression, e.g. Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on the right to enjoy the benefits of scientific progress and its applications, presented at the Twentieth Session of the Human Rights Council (14 May 2012) (A/HRC/20/26), p. 3; P. Saul, D. Kinley, and J. F. Mowbray, "Art. 15: Cultural Rights", in B. Saul, D. Kinley, and J.F. Mowbray, *The International Covenant on Economic, Social and Cultural Rights: Commentary, Cases and Materials*, Oxford, Oxford University Press, 2014, p. 1175, at p. 1212; J. Ringelheim, "Cultural Rights", in D. Moeckli, S. Shah, and S. Sivakumaran (eds), *International Human Rights Law*, 2nd edition, Oxford, Oxford University Press, 2013, p. 286, at p. 296-297.

[3] This article refers to "duties" and "obligations" interchangeably.

[4] The material scope of the right to science, i.e. the content of its specific duties including its core duties, is addressed in other contributions in this volume.

[5] See on the "supply-side" of human rights, e.g. H. Shue, *Basic Rights: Subsistence, Affluence, and US Foreign Policy*, 2nd edition, Princeton, Princeton University Press, 1996; J. Nickel, "How Human Rights Generate Duties to Protect and Provide", *Human Rights Quarterly*, vol. 15, nº 1, 1993, p. 77. As I have explained in S. Besson, "The Allocation of Anti-poverty Rights Duties – Our Rights, but Whose Duties?", in K. Nadakavukaren Schefer (ed.), *Duties to Address Poverty*, Cambridge, Cambridge University Press, 2013, p. 408, the supply-side of human rights pertains to three issues: the specification of concrete human rights duties; the identification of the concrete human rights duty-bearers; and the allocation of specific duties between them. In this article, I will focus on the latter two only, for the first is addressed in other contributions in this volume.

[6] See e.g. Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, p. 9 ff.; Venice Statement 2009, *op. cit.*, Article 13(a)(b) and (c).

[7] In this article, I will focus primarily on the non-discriminatory access to the benefits of scientific progress and its applications. Indeed, the second interest amounts to a participatory public good that cannot be enjoyed individually. It cannot therefore be the object of an individual right and hence of a human right. As to the third interest, it is not an interest that may be protected by the right to science when the latter is understood as protecting the primary interest mentioned before. Every human right entails a right to exclude oneself from the benefit of that right. For this paternalistic approach to the right to science defined, with respect to this third alleged interest, by reference to the protection of dignity and other human rights, see e.g. R.P. Claude, "Scientists' Rights and the Human Right to the Benefits of Science", in A. Chapman and S. Russell (eds), *Core Obligations: Building A Framework for Economic, Social and Cultural Rights*, Antwerp, Oxford, and New York, Intersentia, 2002, p. 247; Committee on Economic, Social and Cultural Rights [CESCR], Guidelines on Treaty-Specific Documents to be Submitted by States Parties

that the production of science and, accordingly, the access to its benefits take place in many different places at the same time. This is actually how it should be in light of the "universal"[8] or, better, "global" nature of science. As a result, what one may coin the "unbounded" nature of science is in tension with the "bounded" nature of human rights. Of course, human rights are universal to the extent that they belong to everyone and are owed by all States.[9] However, they are also bounded to the extent that they are only owed by one or many State(s) at a time that have jurisdiction, on the one hand, and only to those situated within the boundaries of its or their jurisdiction and hence to those who are in a relationship to it or them and become right-holders on that basis, on the other (e.g. Article 1 European Convention on Human Rights [ECHR]) – whether that jurisdiction is territorial or extra-territorial.

More specifically, the fact that, like other human rights' duties, the supply-side of the right to science is inherently bounded by the relationship of jurisdiction between right-holders and duty-bearers gives rise to at least three difficulties.

First and foremost, the access to the benefits of science is not an interest that may be protected effectively domestically only; it has to be secured concurrently in every State at the same time for science is a collective endeavour.[10] This in turn challenges the way in which human rights are usually protected, i.e. by one State at a time. Indeed, any given State of jurisdiction may not always be in a position on its own to protect the right to science of those under its jurisdiction effectively against many of the threats to the interest protected by the right, i.e. the access to the benefits of science, that escape its jurisdiction. Or, conversely, some States may set scientific priorities domestically that directly conflict with others' and affect the latter's ability to secure access to the benefits of science while securing theirs. Some of those threats may actually stem from private actors depending from another State, but also from international law and international institu-

under Articles 16 and 17 of the International Covenant on Economic, Social and Cultural Rights (24 March 2009) (E/C.12/2008/2), § 70(b). Generally, against such a paternalistic reading of the contemporary scientific endeavour, see P. Kitcher, *Science, Truth and Democracy*, Oxford, Oxford University Press, 2001. In any case, those two interests are indirectly covered by other human rights, such as the human right to health, to food, to information or to expression.

[8] On the universality of science, see e.g. Kitcher, *Science, Truth and Democracy*, *op. cit.*; R. K. Merton, *The Sociology of Science: Theoretical and Empirical Investigations*, Chicago, Chicago University Press, 1973. See also UNESCO, Recommendation on the Status of Scientific Researchers (20 November 1974), n. 16-19 on the "international dimension of science"; International Council for Science, Freedom, Responsibility and Universality of Science (October 2008). Of course, there may be contextualized and hence local forms of science, but their scientific characterization depends on their being or claiming to be international.

[9] Not necessarily with the same content, of course: human rights duties are specified in context and, beyond their minimal content, may vary from one State to the next. See also A. Müller, "Remarks on the Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications (Article 15(1)(b) ICESCR)", *Human Rights Law Review*, vol. 10, nº 4, 2010, p. 765, pp. 782-783.

[10] This tension is particularly patent in the reference to "equal" access or access "without discrimination". That additional reference is usually interpreted as amounting to more than a domestic non-discrimination requirement of the kind that applies to all human rights and hence to all ICESCR rights. See e.g. the discussion in the Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, pp. 9-11, that conflates domestic and international measures to promote equality in the access to the benefits of science without distinguishing between them (compare e.g. §§ 26-33 to 34-38). See also Venice Statement 2009, *op. cit.*, §§ 3 and 4, referring to "inequalities among and within States" and to technological disparities between "societies".

tions.[11] This first difficulty pertains, in other words, to the concurrence of human rights duties or responsibilities for human rights of States other than a given State(s) of (territorial or extra-territorial) jurisdiction, and to their overall coordination.

Secondly, private actors play an important role in the production of scientific knowledge today, whether through financing, developing or diffusing it. This raises important questions as to those private actors' direct duties or responsibilities for the right to science or, at least, as to the ways in which one or the other State of jurisdiction may be under duties or responsibilities to protect the right to science from them. This second difficulty pertains, in other words, to the human rights duties or responsibilities of or for private actors. Finally, international organizations created by States to facilitate cooperation on scientific issues, such as intellectual property or trade, often hamper equal access to the benefits of scientific progress and its applications, thus raising important questions as to their direct duties or responsibilities under the right to science or about the ways in which their member States could bear duties with respect to their actions and omissions. This final difficulty pertains, in other words, to the human rights duties or responsibilities of or for international institutions.

Those three difficulties are best exemplified by looking at contemporary debates surrounding unequal access to the benefits of scientific progress, and in particular access to vital medication (mostly in relation to the right to health), access to seed technology (mostly in relation to the right to food), access to scientific discoveries able to enhance environmental protection (mostly in relation to the right to a safe environment),[12] or access to information and communication technologies and the Internet (mostly in relation to the right to privacy and information).[13] In the first of those cases, for instance, many States are usually involved at the same time, such as notably South Africa or India and the United States in the past, and with various jurisdictional but also non-jurisdictional relationships to the holders of the right to science ; private corporations are also implicated, and invoke various commercial and intellectual property rights to choose which drugs

[11] See Venice Statement 2009, *op. cit.*, § 4. See also C. Timmermann, "Sharing in or Benefiting from Scientific Advancement ?", *Sci Eng Ethics*, vol. 20, n° 1, 2014, p. 111, at p. 121-125.

[12] See e.g. CESCR, Report on the 7th Session (23 November-11 December 1992) (E/1993/22), § 73 (Belarus).

[13] On the relationship between the right to science and other human rights, see e.g. Saul, Kinley, and Mowbray, "Art. 15 : Cultural Rights", *op. cit.*, pp. 1223-1224 ; Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, p. 8, pp. 16-23. On the right to science and the right to food, see e.g. O. De Schutter, "The Right of Everyone to Enjoy the Benefits of Scientific Progress and the Right to Food : From Conflict to Complementarity", *Human Rights Quarterly*, vol. 33, n° 2, 2011, p. 304 ; H. M. Haugen, "Human Rights and Technology : A Conflictual Relationship ? Assessing Private Research and the Right to Adequate Food", *Journal of Human Rights*, vol. 7, n° 3, 2008, p. 224 ; on the right to science and the right to health, see e.g. Y. Donders, "The Right to Enjoy the Benefits of Scientific Progress : In Search of State Obligations in Relation to Health", *Medicine, Health Care and Philosophy*, vol. 14, n° 4, 2011, p. 371 ; and on the right to science and intellectual property, see e.g. L. Helfer and G. W. Austin, *Human Rights and Intellectual Property : Mapping the Global Interface*, Cambridge, Cambridge University Press, 2011, pp. 233-242 ; A. Plomer, "The Human Rights Paradox : Intellectual Property Rights and Rights of Access to Science", *Human Rights Quarterly*, vol. 35, n° 1, 2013, p. 143 ; L. Shaver, "The Impact of Intellectual Property Regimes on the Right to Science and Culture", Background note submitted to the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed (20 May 2014) ; Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on copyright policy and the right to science and culture, presented at the Twenty-eight Session of the Human Rights Council (24 December 2014) (A/HRC/28/57).

to produce in priority or to protect their drugs from the production of cheaper and more affordable generics that could be made available to poor States' medical institutions; and, finally, international organizations, such as the World Trade Organization (WTO) or the European Union (EU) in this case, have contributed to develop and entrench the international law framework for trade and intellectual property in which the different claims are being formulated and justified on all sides.

It is this article's aim to explain how we should identify who owes the duties relative to the right to science and explain how those duties should be specified and allocated between the duty-bearers. Interestingly, while those difficulties with the identification and coordination of the duty-bearers of the right to science were flagged in the 2009 UNESCO Venice Statement already (e.g. 3(i) to (iii)), they have not been given much attention in the Special Rapporteur in the field of cultural rights' 2012 Report[14] or in the fast-developing literature.[15] A first reason one may venture for this omission pertains to the meaning of science itself and the difficulty to define it. This indeterminacy has actually plagued the practice of the right to science and its monitoring by the Committee on Social, Economic and Cultural Rights [CESCR] to date.[16] Secondly, science and technology are "inextricably linked" with the means of protection of other human rights (see e.g. Article 2(1) and 23 ICESCR in general; Article 11(2) ICESCR with respect to the right to food).[17] This makes the supply-side of the right to science not only instrumental but even necessary to that of other rights,[18] and its specification even harder than others', as a result.

The neglect of the supply-side of the right to science is even more surprising, as it is with respect to the other rights listed in the ICESCR, including cultural rights under Article 15 (1) ICESCR, that the potential duties and responsibilities of States other than the State(s) of jurisdiction, on the one hand, and of or, at least,

[14] The only references to the obligations of actors other than States of jurisdiction are on pp. 70-73 of the Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit*. And there is very little mention of the challenge of global protection for States' duties, beyond the usual mention of the vague responsibility of "international assistance and cooperation".

[15] There are exceptions, of course: e.g. Müller, "Remarks on the Venice Statement", *op. cit.*, at pp. 782-783; A. Chapman, "Towards an Understanding of the Right to Enjoy the Benefits of Scientific Progress and its Applications", *Journal of Human Rights*, vol. 8, n° 1, 2009, p. 1, at pp. 24-27 and 29-31. See also, albeit not from a human rights perspective, T. Pogge, "The Health Impact Fund: Enhancing Justice and Efficiency in Global Health", *Journal of Human Development and Capabilities*, vol. 13, n° 4, 2012, p. 537; A. Buchanan, T. Cole, and R. O. Keohane, "Justice in the Diffusion of Innovation", *The Journal of Political Philosophy*, vol. 19, n° 3, 2011, p. 306.

[16] See e.g. Chapman, "Towards an Understanding", *op. cit.*; E. Riedel, "Sleeping Beauty or Let Sleeping Dogs Lie? The Right of Everyone to Enjoy the Benefits of Scientific Progress and its Applications (REBSPA)", in H. Hestermeyer *et al.* (eds), *Coexistence, Cooperation and Solidarity, Liber Amicorum Rüdiger Wolfrum*, Leiden, Nijhoff, 2011, p. 503; Müller, "Remarks on the Venice Statement", *op. cit.*, p. 766.

[17] See e.g. Venice Statement 2009, *op. cit.*, § 12(d). See also W.A. Schabas, "Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and its Applications", in Y. Donders and V. Volodin (eds), *Human Rights in Education, Science, and Culture: Legal Developments and Challenges*, Aldershot, Ashgate, 2008, p. 273, at p. 302; Timmermann, "Sharing in or Benefiting from Scientific Advancement?", *op. cit.*, at pp. 125-127.

[18] See e.g. O. De Schutter *et al.*, "Commentary to the Maastricht Principles on Extra-Territorial Obligations of States in the Area of Economic, Social and Cultural Rights", *Human Rights Quarterly*, vol. 34, n° 4, 2012, p. 1084, at p. 1153, on "technological capacities" as a ground for additional responsibilities for economic, social and cultural rights of all States Parties to the ICESCR.

for private and non-State actors, on the other, have been discussed the most.[19] This focus, especially on the part of the CESCR, may be explained by reference to the absence of an explicit jurisdiction clause in the ICESCR, but also by the provision mentioning "international assistance and cooperation" among States Parties (Article 2(1) ICESCR). *Prima facie,* therefore, there is a rich range of legal and institutional mechanisms to work with when spelling out the duty-side of the right to science.

My argument in this article will be that, unlike most other human rights duties, the duties arising out of the right to science are collective duties, i.e. duties States and international institutions of jurisdiction bear together and not only concurrently, albeit for every State or institution only to the respective right-holders situated under their jurisdiction. The structure of the proposed argument will be four-pronged. In a first section, I will introduce key notions and distinctions for the supply-side of human rights in general : the notions of jurisdiction and responsibility, and, more exactly, the distinctions between territorial and extra-territorial jurisdiction and between human rights duties and responsibilities for human rights (II.). I will then turn to the identification of the bearers of human rights duties and of responsibilities for human rights, on the one hand, and to the allocation between them of human rights duties and responsibilities for human rights, on the other (III.). It is important to discuss those issues in international human rights law in general, first, as they are rarely addressed in international human rights law scholarship in full detail and the practice is still in flux in some respects. In a third section, I will address the specificities of the supply-side of the right to science : there, I will argue for the existence of collective duties relative to the right to science and for collective responsibilities for the right to science and, on that basis, for the co-specification and co-allocation of those duties, but also for the coordination of the corresponding responsibilities (IV.).

Before starting with the argument, a methodological *caveat* is in order. This article is part and parcel of a more general project of developing a legal theory of human rights.[20] Starting from legal questions and categories, it proposes an interpretation of international human rights law. Concretely, in this case, this means identifying the justifications underpinning international human rights law on the supply-side of the right to science, in order to present the existing law and practice in its best light. Like any legal interpretation, it is constrained and shaped by the normative practice of law, but it is also part of that practice and hence constrains it and shapes it in return. So-doing, the theory of the supply-side of the right to science I propose is not trapped in the kind of normatively inert descriptions of the human rights practice one finds in so-called "political" theories of human rights,[21] on the one hand, but it is not freed from that prac-

[19] See e.g. O. De Schutter, *International Human Rights Law*, 2nd edition, Cambridge, Cambridge University Press, 2014, p. 187 ff.
[20] See S. Besson, "The Law in Human Rights Theory", *Journal for Human Rights*, vol. 7, n° 1, 2013, p. 120.
[21] See e.g. C. Beitz, *The Idea of Human Rights*, Oxford, Oxford University Press, 2009.

tice and from having to account for it as are the kind of practice-guiding normative accounts of moral human rights one finds in so-called "ethical" human rights theories,[22] on the other.

II. Two Key Notions: Jurisdiction and Responsibility

There are two key notions one encounters in the international human rights practice and that help us understand who "owes" those rights: "jurisdiction" (A.) and "responsibility" (B.). The first explains who owes duties *stricto sensu*, while the latter explains what other responsibilities arise concurrently to those duties and for whom.

In a nutshell, the first notion helps realize that human rights should fundamentally be understood as normative relationships that correspond to relationships of jurisdiction. Such relationships have to be institutional, even more so if they are to be democratic and hence egalitarian.[23] Does it mean that only States may bear human rights duties? No, precisely: States do, of course, bear those duties, but so does any international institution that can exercize jurisdiction and be organized democratically. To date, this has only been the case of the EU.[24] Does it mean that other States and international institutions are off the hook of human rights? No, not at all. And here comes the second notion one encounters in human rights practice: responsibilities for human rights. They should be carefully distinguished from human rights' duties. Responsibilities for the protection and promotion of human rights (by their respective States and international institutions of jurisdiction) are concurrent to the human rights duties of those States and institutions, and bear on other subjects than those States and institutions and in particular on all other States, international institutions and even private actors. They are not owed to the right-holders and also have a different content.

A. Jurisdiction: Territorial and Extra-Territorial Human Rights Duties

The trigger for the application of human rights in international human rights law is jurisdiction. Only those people under the jurisdiction of a given State or international institution hold rights against that very State or institution, and only that State or institution bears duties to those people. Even though not all international human rights treaties include a jurisdiction clause (e.g. Article 1 ECHR), its

[22] See e.g. J. Griffin, *On Human Rights*, Oxford, Oxford University Press, 2008.
[23] See Besson, "The Allocation of Anti-poverty Rights Duties", *op. cit.*; and S. Besson, "International Institutions' Responsibilities for Human Rights", *Social Philosophy & Policy*, vol. 32, n° 1, 2015, forthcoming.
[24] See Besson, "International Institutions' Responsibilities for Human Rights", *op. cit.*

existence is assumed in practice. It is the case of the ICESCR that does not entail an explicit jurisdiction clause.[25]

In a nutshell, jurisdiction refers to *de facto* authority, that is to say the practical political and legal authority that is not yet legitimate or justified authority, but claims to be or at least is held to be legitimate by its subjects. *Qua de facto* authority, jurisdiction consists in effective, overall and normative power or control (whether it is prescriptive, executive or adjudicative).[26] It amounts to more than the mere exercize of coercion or power, as a result : it also includes a normative dimension by reference to the imposition of reasons for action on its subjects and the corresponding appeal for compliance.

Importantly, jurisdiction applies both on the domestic territory and extra-territorially.[27] Jurisdiction is functional therefore, and not primarily personal or territorial although personal and territorial control may be used as shorthand or criteria when assessing jurisdiction. Jurisdiction is an all or nothing matter and not a matter of degree : either one is giving reasons for action and requiring compliance, or one is not. It cannot therefore be split into levels or acquired gradually.

B. Responsibility : Human Rights Duties and Responsibilities for Human Rights

A lot of confusion around human rights duties and the identification of their bearers, especially in circumstances of extra-territorial jurisdiction, stems from an insufficiently reflected use of the term "responsibilities", and in particular from the insufficient delineation of "human rights duties" *stricto sensu* from "responsibilities for human rights" that fall on other bearers than the human rights duty-bearers.

Human rights duties are perfect or directed duties : they are owed to someone, the right-holder. They constitute the supply-side of a normative claim, called a human right. Responsibilities for human rights, by contrast, are responsibilities to hold accountable (monitor, ensure compliance), assist or aid (promote, train ; mostly through cooperation) and intervene (as an *ultima ratio* only).[28] They include responsibilities to protect and remedy, but also responsibilities to respect. Some are preventive while others are remedial.

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[25] See De Schutter, *International Human Rights Law*, *op. cit.*, p. 187 ff. See also the Maastricht Principles on Extra-territorial Obligations of States in the Area of Economic, Social and Cultural Rights (September 2011) ; De Schutter *et al.*, "Commentary to the Maastricht Principles", *op. cit.*

[26] See Eur. Ct. H.R. (GC), *Al-Skeini and others* v. *the United Kingdom*, 7 July 2011 (Appl. No. 55721/07).

[27] See e.g. S. Besson, "The Extra-Territoriality of the European Convention on Human Rights. Why Human Rights Depend on Jurisdiction and What Jurisdiction Amounts to", *Leiden Journal of International Law*, vol. 25, n° 4, 2012, p. 857 ; W. Vandenhole, "Extraterritorial Human Rights Obligations : Taking Stock, Looking Forward", *J.E.D.H./E.J.H.R.*, 2013/5, p. 804 ; S. Besson, "L'extra-territorialité des droits de l'homme internationaux : juridictions concurrentes, obligations conjointes et responsabilités partagées", in P. D'Argent (ed.), *Droit des frontières internationales*, Paris, Pedone 2015, forthcoming.

[28] See C. Beitz, *The Idea of Human Rights*, *op. cit.*, at pp. 109 and 163.

Besides the identity of their bearers, the primary characteristic of responsibilities for human rights, and what distinguishes them from human rights duties, is that responsibilities for human rights are not directed to a right-holder and are not correlative to a right. Secondly, most of the time, they have a content distinct from human rights duties for they do not protect the interests at stake directly, but the ability of the States or international institutions of jurisdiction to protect them. The difference between responsibilities for human rights and human rights duties explains why the former are not subsidiary, secondary or default human rights duties, but concurrent responsibilities that apply alongside human rights duties.[29] Responsibilities for human rights help prevent human rights violations by human rights duty-bearers or remedy those violations when human rights duty-bearers are unable or unwilling to fulfill their duties.[30]

A key example of responsibilities for human rights, of course, is the "responsibility to protect" (R2P) of all States in the international community that was endorsed by the United Nations (UN) through a General Assembly Resolution in 2009.[31] Another example are the "corporate responsibilities to respect human rights"[32] developed in the context of the United Nations' effort to curtail the negative impact of multinational corporations on human rights' protection, and that bear on corporations but also, concurrently albeit differently, on their States of origin. Finally, the 2011 Maastricht Principles on Extra-territorial Obligations (ETO) of States refer to the "responsibilities" for human rights of other States besides the States of jurisdiction's (territorial and extra-territorial) human rights "duties" (e.g. Article 29 ETO).[33] They echo the so-called "supporting"[34] responsibilities of "international cooperation and assistance" under the International Covenant on Economic, Social and Cultural Rights (Article 2(1) ICESCR) that bear on all States parties to the Covenant.

III. The Bearers of Human Rights Duties and Responsibilities in General

The identity of the bearers of human rights duties differs from that of the bearers of responsibilities for human rights: States and international institutions of jurisdiction for the former (A.), and private actors, States and international insti-

[29] See also Beitz, *The Idea of Human Rights*, *op. cit.*, p. 108; D. Miller, "The Responsibility to Protect Human Rights", in L.H. Meyer (ed.), *Legitimacy, Justice, and Public International Law*, Cambridge, Cambridge University Press, 2000, p. 232, at p. 233.

[30] The responsibilities for human rights at stake in this article should not be conflated with secondary or remedial responsibilities that arise from the violation of primary human rights duties. See on the latter, e.g. Besson, "L'extra-territorialité des droits de l'homme internationaux: juridictions concurrentes, obligations conjointes et responsabilités partagées", *op. cit.*

[31] See UN General Assembly, Resolution 63/308, "The Responsibility to Protect" (14 September 2009) (A/RES/63/308).

[32] See Office of the High Commissioner for Human Rights [OHCHR], Guiding Principles on Business and Human Rights, Endorsed by Human Rights Council, Resolution 17/4 (6 July 2011) (A/HRC/RES/17/A).

[33] See the Maastricht Principles, *op. cit.*

[34] See OHCHR, Guiding Principles on Extreme Poverty and Human Rights, Adopted by Human Rights Council, Resolution 21/11 (18 October 2012) (A/HRC/21/11), §§ 93-94.

tutions other than those of jurisdiction for the latter (B.). Once the bearers of human rights duties and responsibilities for human rights identified, the next question to arise is the allocation of specific human rights duties and responsibilities for human rights to those different bearers (C.).

A. The Identification of Human Rights Duty-Bearers

The identification of human rights duty-bearers occurs through the relationship of jurisdiction. The bearers of human rights duties are States (1.) and international institutions of jurisdiction (2.).

1. *States of Jurisdiction*

a) For their Agents

To date, the institutions that exercize jurisdiction under international law are primarily States. They are the institutions of political communities in which people share roughly equal and interdependent stakes, and that may therefore be sufficiently egalitarian to respect human rights, on the one hand. They are also the ones, on the other, that both have and ought to exercize regular effective normative control over the community of right-holders of which they are constituted and hence have jurisdiction over them. As a result, they are the primary human rights' duty-bearers.

Further specifications about the identity of specific institutional duty-bearers within the State may be reconstructed from rules of attribution of conduct and responsibility used to attribute remedial responsibilities in case of violation of the State of jurisdiction's human rights duties in practice. Thus, States bear human rights duties for and through various agents whose conduct may be attributed to it. This includes their own agents, of course. Those agents in any given State of jurisdiction include all its organs, whether legislative, executive or judicial and whether central or decentralized as in federal States (e.g. Article 4 ARSIWA[35]). They also include those that are borrowed from other States in some cases (e.g. Article 6 ARSIWA). As I will explain now, States also bear human rights duties, under certain conditions, "for" private actors (b)) and international institutions (c)).

b) For Private Actors

Private actors do not bear human rights duties under international human rights law. The explanation lies in the mediating role of institutions in the protection of human rights in practice, but also in the equality and mutuality of human

[35] Articles on the Responsibility of States for Internationally Wrongful Acts; see UN General Assembly, Resolution 56/83 (12 December 2001) (A/RES/56/83).

rights.[36] Institutions are able to re-allocate human rights duties and mediate the resources and burdens among individuals, but they are also able to protect the equality of all in doing so and to ensure the overall legitimacy of the process. Of course, private actors bear responsibilities for human rights, as we will see, but those responsibilities should not be conflated with human rights duties.

States themselves bear human rights duties with respect to the actions or omissions of private actors. They do so, both when private actors' acts may be attributed to the State and the State bears indirect duties as a result, on the one hand, and when the State bears direct positive duties of its own to protect against private actors, on the other.

First of all, then, because certain acts of private actors may be attributed to the State, the State bears duties in those cases as if those actors were its agents. One may imagine different cases : private actors are exercizing elements of governmental authority (e.g. Article 5 ARSIWA) ; their conduct is directed or controlled effectively by the State (*de facto* organs) (e.g. Article 8 ARSIWA) ; their conduct was carried out in the absence or default of the official authorities (e.g. Article 9 ARSIWA) ; or, finally, their conduct is acknowledged by the State as its own (e.g. Article 11 ARSIWA).

Secondly, States also bear positive duties of their own to protect right-holders against the conduct of private actors under certain conditions.[37] Those positive duties include duties to prevent violations by private actors, for instance through private or criminal legislation or police actions, but also to remedy them if the duties to prevent have failed, for instance through the judicial system. Those duties to prevent are duties of due diligence submitted to strict conditions : the State could and should have known about the private threat, first, and it was reasonable to expect it to intervene, second. The mere fact that the violation occurred is not enough for the duty to prevent to be regarded as breached. All this applies whether jurisdiction is territorial or extra-territorial.[38]

An interesting question is whether the extra-territorial jurisdiction of a State for the sake of positive duties to protect extends to cases when private actors of the nationality of that State and domiciled in its territory are violating human rights abroad where no effective personal or territorial control is exercized by the State's agents. This is a construction put forward by authors and human rights activists who distrust the ability of the host State to protect human rights effectively against private actors and especially against transnational corporations. It fails to convince, however, because of the disjunction between the place of relevant jurisdiction and hence of effective and regular normative control over the right-holders, on the one hand, and the place of effective control necessary over the

[36] See Besson, "International Institutions' Responsibilities for Human Rights", *op. cit.* ; Shue, *Basic Rights*, *op. cit.*
[37] See e.g. Eur. Ct. H.R. (GC), *O'Keeffe* v. *Ireland*, 28 January 2014 (Appl. No. 35810/09).
[38] See Besson, "The Extra-Territoriality of the European Convention on Human Rights", *op. cit.*

private actors responsible for the violation in order for the State's positive duties to arise, on the other.

Yet, according to the CESCR, "States have an obligation to take steps to prevent human rights contraventions from abroad by corporations which have their main office under their jurisdiction" –"without", of course, "infringing the sovereignty or diminishing the obligations of the host States." This includes setting out clearly "the expectation that all business enterprises domiciled in their territory and/or jurisdiction respect human rights throughout their operations", including abroad.[39] Two arguments have been made to support this position,[40] although none of them very successfully.

The first argument for extending the scope of States' extra-territorial positive duties to protect to the acts of private actors abroad, even when States have no jurisdiction over there, lies in their alleged duty not to allow one's territory to be used by private actors to cause damage to another State.[41] The problem is that this duty does not exist generally outside of explicit and specific duties of diligence of the State, and this is precisely the duty we are missing here. Such a duty does not exist under general international law, and international human rights law does not provide one either.[42] The second argument pertains to the duty of all States Parties to international human rights treaties not to create obstacles to the fulfilment of their human rights duties by other States Parties.[43] There is a qualification issue here: while it is true that the former have responsibilities for the protection of human rights in all other States Parties, they incur no human rights *duties* to do so that are owed to the right-holders. Nor do their rights to claim respect for human rights duties, that are owed *erga omnes*, imply a duty to do so (except under Article 41 ARSIWA).

c) For International Institutions

States may also bear human rights duties in relation to the activities of international institutions. One may distinguish between the indirect obligations that arise from the attribution of acts committed by international institutions to States, on the one hand, and the obligations to protect from international institutions that fall directly onto States, on the other.

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[39] Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, at pp. 15 and 19. See also CESCR, Statement on the Obligations of States Parties Regarding the Corporate Sector and Economic, Social and Cultural Rights (20 May 2011) (E/C.12/2011/1), § 5; OHCHR, Guiding Principles on Business and Human Rights, *op. cit.*

[40] See De Schutter, *International Human Rights Law*, *op. cit.*, p. 187 ff.

[41] See e.g. CESCR, General Comment 14, The Right to the Highest Attainable Standard of Health (11 August 2000) (E/C.12/2000/4), § 39; CESCR, General Comment 15, The Right to Water (20 January 2003) (E/C.12/2002/11), §§ 31 and 35-36; CESCR, Statement on the Obligations of States Parties Regarding the Corporate Sector and Economic, Social and Cultural Rights, *op. cit.*, §§ 3 and 5.

[42] Hence the need for the Maastricht Principles 13 and 23. See De Schutter *et al.*, "Commentary to the Maastricht Principles", *op. cit.*, at pp. 1112-1115.

[43] See e.g. Maastricht Principle 21(a).

First of all, in cases where States' organs act for an international institution, the latter's conduct may be attributed to States provided they share effective control over their organs (e.g. Articles 6-7 DARIO[44] and Article 57 ARSIWA). What this means is that States bear human rights duties in relation to the acts or omissions of international organizations when they (also) control the agents acting for the organization. Other grounds of attribution of responsibility of the organization to its member States, such as aid or assistance, direction and control or coercion of the organization by a State (Articles 58-62 DARIO), are only available when the organization also bears human rights duties itself.

In some cases, however, States may try to escape their human rights duties by transferring competences to international institutions that have distinct personality, but do not have jurisdiction over the corresponding right-holders and do not bear human rights duties of their own, as a result. True, States do not incur responsibility for those acts by the mere fact of membership in the international institution (e.g. Article 62 DARIO) and may not therefore be regarded as bearing related human rights duties as a result. However, this potential abuse of membership in an international institution has led to the development of a regime of attribution of international responsibility of States for the intentional circumventing of *their* human rights duties through (membership in) an international institution and conduct of the latter, even when the act in question is not internationally wrongful for the international institution itself (e.g. Article 61 DARIO).

What this means, secondly, then is that States are ascribed an international human rights-based positive duty of diligence to make sure that their membership in the organization and the activity of the organization do not prevent them from protecting human rights and that human rights protection provided by the organization is equivalent to their international human rights law duties.[45] This comes close to a duty to protect of States. It is more limited, however, to the extent that it leaves a gap in cases where States could not have reasonably anticipated the problem or have secured some minimal equivalent safeguards.

2. *International Institutions of Jurisdiction*

There is nothing in this account that precludes extending human rights duties to international institutions beyond States, provided they have jurisdiction. What is required, however, is for them to amount to political communities where political equality may be claimed and exercized, on the one hand, and where the kind of overall and effective normative control discussed before may apply, on the other.

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[44] Draft Articles on the Responsibility of International Organizations ; see UN General Assembly, Resolution 66/100 (9 December 2011) (A/RES/66/100).

[45] See e.g. Eur. Ct. H.R. (2nd sect.), *Al-Dulimi and Montana Management Inc.* v. *Switzerland*, 26 November 2013 (Appl. No. 5809/08) (this judgment has been referred to the Grand Chamber).

This is by no means easy to achieve beyond the State, however. To date, first of all, there is no international political community and not even a regional political community besides States (except for the EU that actually bears human rights duties, as a result). This corresponds to a well-known limitation in international politics : the individual stakes are not (yet) sufficiently equal and interdependent at the global level for one to claim there could be an international political community.[46] Moreover, the circumstances of political equality, which imply being in a certain relationship to one another, i.e. sharing a social context,[47] are not yet given at the international level. Secondly, most international institutions do not have the required overall and effective normative control over their individual subjects, if they have any, to exercize jurisdiction.

Of course, States bear human rights duties with respect to the actions or omissions of international institutions under the circumstances discussed before. Moreover, international institutions other than those of jurisdiction also bear their own responsibilities for human rights like all other subjects of international law, as we will see now.

B. The Identification of Bearers of Responsibilities for Human Rights

Unlike the bearers of human rights duties, the bearers of the responsibilities for human rights are usually indeterminate. These responsibilities are diffusely vested on the "international community" at large.[48] The difficulty is that that community is not (yet) institutionalized : it consists of various individuals, States and international institutions, some regional and some global but never, in the latter case, in an inclusive fashion.

As individuals, first of all, we all bear a shared responsibility for the respect of human rights as primary constituency of the international community. Importantly, and for reasons of equality, that responsibility is collective and we bear it together, as a result. Practically, of course, there are coordination limitations to what individuals can do collectively at the global level. This is why, in the absence of institutionalization of the international community, other, and especially institutional, subjects of international law than individuals are more likely to act upon their responsibilities for human rights.

Secondly, then, the States other than the human rights duty-bearing States of jurisdiction may be seen as direct instruments of global justice through which we institutionalize our shared individual responsibilities for human rights.[49]

[46] See S. Besson, "Human Rights and Democracy in a Global Context : Decoupling and Recoupling", *Ethics & Global Politics*, vol. 4, n° 1, 2011, p. 19.
[47] See D. Miller, *National Responsibility and Global Justice*, Oxford, Oxford University Press, 2007, p. 56 ff.
[48] See Beitz, *The Idea of Human Rights*, *op. cit.*, p. 108.
[49] See Miller, "The Responsibility to Protect Human Rights", *op. cit.*, p. 241.

Again, States cannot do much on their own without institutional coordination at the global level. This explains why, finally, international institutions are often regarded as bearers of our responsibilities for human rights to the extent that they provide an institutional framework for State cooperation albeit one that is not yet global and inclusive.[50]

C. The Allocation of Human Rights Duties and Responsibilities for Human Rights

The allocation of human rights duties (1.) should be distinguished from that of responsibilities for human rights (2.).

1. *The Allocation of Human Rights Duties*

The allocation of human rights duties to specific duty-bearers raises questions of fairness and also needs to be justified. The primary allocation of the aggregate burden of human rights duties to the State or institution of jurisdiction ought to be justified in itself.

Just as the burden of duties allocated to them is an aggregate of individual duties, the grounds for the allocation to the institutions may also be deemed as an aggregate of various justifications.[51] By contrast, the subsequent re-allocation of human rights duties to specific organs of the State or institution of jurisdiction and/or the attribution of derived (criminal or private law) duties to individuals have to be justified separately. In the assessment of the justification of an assignment of human rights duties to specific duty-bearers, the reasonableness of the overall burden and of the cost also needs to be taken into account besides the grounds for assigning the duties.

In view of the moral complexity of the allocation of human rights duties and of the priorities to be set between them, the quality of the institutional process is essential to the justification of the allocation. Democratic institutions offer a procedural framework in which human rights duties can be deliberated over and allocated in an inclusive and egalitarian fashion. Further, the need to allocate human rights duties in context explains why the domestic institutions of jurisdiction are best positioned to do so. Of course, international human rights institutions may and should assist institutions of jurisdiction, i.e. States and the EU, in the subsidiary allocation of the specific duties to specific institutional bodies and to individuals. This only takes place *ex post*, however, and in the context of concrete cases pertaining to the remedial responsibilities for a violation of specific human rights duties.

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[50] See Shue, *Basic Rights*, *op. cit.*, p. 178.
[51] See C. Beitz and R. Goodin, "Introduction", in C. Beitz and R. Goodin (eds), *Global Basic Rights*, Oxford, Oxford University Press, 2009, p. 1, at p. 17.

2. *The Allocation of Responsibilities for Human Rights*

The allocation of responsibilities for human rights to their bearers is very difficult. This has to do, first, with the many concurrent grounds for allocating those responsibilities (e.g. outcome, causality, harm, capacity, benefit or special ties),[52] and, secondly, with the lack of universal international institutional framework or procedure for the allocation of responsibilities for human rights on all grounds and to all their bearers in a feasible and fair fashion.

As a result, the allocation of international responsibilities for human rights remains a matter of judgment for each potential responsibility-bearer in each case. Potential responsibility-bearers have to resort to individual and strategic or pragmatic thinking in the absence of assurance about others' actions.[53] One cannot exclude therefore that no one will act in the end.[54] This has also been referred to as the protection gap between human rights duties and responsibilities for human rights.[55]

IV. The Bearers of Duties and Responsibilities for the Human Right to Science

Two specificities of the supply-side of the right to science need to be discussed in more detail : first, the collective duties of States and international institutions of jurisdiction, and their co-specification and co-allocation (A.) and, second, the corresponding collective responsibilities for cooperation and assistance of other States and international institutions, and their coordination (B.).

A. The Collective Duties of States and Institutions of Jurisdiction

Duties corresponding to the right to science arise within the context of each State or international institution of jurisdiction and are owed to right-holders situated under that State or institutions' jurisdiction. Importantly, however, those duties are also collective duties, i.e. duties States and international institutions of jurisdiction bear together.

The justification for their collective dimension resides, first of all, in the universal or global scope of the public or collective good[56] (science) the individual interest in

[52] See D. Miller, "Distributing Responsibilities", *Journal of Political Philosophy*, vol. 9, n° 4, 2001, p. 453, at p. 464 ff. ; Miller, *National Responsibility and Global Justice*, *op. cit.*, p. 98 ff.
[53] See Shue, *Basic Rights*, *op. cit.*, at pp. 160-161.
[54] See Beitz and Goodin, "Introduction", *op. cit.*, at pp. 22-23.
[55] See Miller, "The Responsibility to Protect Human Rights", *op. cit.*, at p. 246 ; Miller, *National Responsibility and Global Justice*, *op. cit.*, p. 274.
[56] Goods are understood here as potential objects of interest that are of value, and public goods as goods that are non-exclusionary and non-rival in consumption, whether in a contingent or inherent fashion. See D. Newman, *Community and Collective Rights*, Oxford, Hart, 2011, at p. 66-76.

which is protected by the right to science[57] (the access to the benefits of science). It also derives, secondly and by extension, from the universal or global scope of the standard threats to that interest. It is both that good's global scope and the need to protect it effectively at once on a global scale, and not only its nature of public or collective good itself, that account for the common bearing of the corresponding duties by every State or international institution of jurisdiction. This is not only a condition of the feasibility of the protection of the interest against its global threats, but also of the overall fairness of the burden on each of the duty-bearing States or international institutions of jurisdiction. Given that "ought implies can", indeed, the feasibility and fairness of the burden affect the existence and the scope of the supply-side of the right to science.

Importantly, this does not mean that the right to science itself is held collectively as a group (e.g. by the "international community") or has to be exercized collectively, whether at the domestic or at the global level.[58] The interest protected by the right to science is individual, even if it pertains to a public or collective good.[59] Nor, secondly, should those collective duties be conflated with shared or joint human rights duties arising from cases of joint jurisdiction (e.g. territorial for one State and extra-territorial for the other).[60] They may, of course, be shared duties, but most of them arise separately and concurrently for all States or international institutions of jurisdiction. What distinguishes them is that while they may also be fulfilled separately and concurrently at least partly by each duty-bearing State or institution of jurisdiction, they cannot be effectively fulfilled without coordination between them. Thirdly, those collective duties relative to the right to science should not be conflated with responsibilities for human rights of other States and institutions than those of jurisdiction, i.e. responsibilities to cooperate and assist States and institutions of jurisdiction in complying with their duties related to the right to science. Unlike the latter, they are owed to the respective right-holders and do not have assistance and cooperation as their content but merely as a means of realization. Finally, this does not turn them into duties of a collective subject, i.e. of the "international community" itself, for, as I explained before, the latter is not (yet) sufficiently institutionalized to become a subject of human rights duties.

[57] To that extent, the right to science differs from other human rights that do not protect an interest in a collective or public good, like the right to life. Of course, there are other human rights that protect interests in a collective or public good. As there are important differences between public goods (e.g. participatory or not; global or not), those differences are reflected in the corresponding human rights. The fact that some features of the supply-side of human right to science are shared by a few other human rights to the end-product of global and participatory public goods does not affect my argument in this article, however.

[58] Contra: Chapman, "Towards an Understanding", *op. cit.*, p. 30.

[59] This corresponds to a fourth type of so-called "collective rights": those whose protected good is collective or public, but not the protected interest (it is an individual interest in the end-product of a participatory public good, i.e. science itself) (i), the exercize (ii), the holders (iii). See, more generally, D. Réaume, "Individuals, Groups, and Rights to Public Goods", *University of Toronto Law Journal*, vol. 38, n° 1, 1988, p. 1, at p. 8-9.

[60] See e.g. Besson, "International Institutions' Responsibilities for Human Rights", *op. cit.*

There are two implications of the collective nature of the right to science's duties: first, the co-specification of the corresponding duties by their respective bearers (1.); and second, the co-allocation of those duties by those bearers (2.).

1. *The Co-Specification of the Collective Duties of States and Institutions of Jurisdiction*

The primary implication of the collective nature of the duties corresponding to the right to science for its States or international institutions of jurisdiction is that the specification of the duties by its various bearers should be coordinated.

Generally, the specification of human rights duties, i.e. the identification of their content, takes place in one context at a time, and hence at a specific time and place. As to the types of human rights duties, following Henry Shue's seminal three-tier model, one usually distinguishes between negative duties to avoid depriving (respect), positive duties to protect from depriving (protect) and positive duties to aid the deprived (fulfill).[61] All those duties can arise concurrently if need be, even though they are subsidiary to one another. The reason for this is that one needs to be able to spread the burden across time and agents, or else each duty could potentially amount to an unfeasible and/or unreasonable burden on any given agent.[62]

In the context of the duties arising from the right to science, this co-specification of human rights duties is particularly relevant as, without the coordination of all duties, the burden of each duty may be too heavy to bear for each duty-bearer not only domestically, but also across jurisdictions. This is due in part to the combination of private and public interventions in the field of science within one single State or institution of jurisdiction, but also across those States or institutions. Thus, the burden of duties to fulfill[63] on a given State of jurisdiction in the context of drugs whose commercialization is entirely private and occurs through a foreign corporation may be regarded as not only unfair, but largely unfeasible unless its content, but also its articulation with other types of duties are coordinated with that of the corresponding duties of another State of jurisdiction to other holders of the same right abroad, such as the duties of the home State of the corporation.

[61] See Shue, *Basic Rights*, *op. cit.*, at pp. 52-53, 60.
[62] See Shue, *Basic Rights*, *op. cit.*, at pp. 59, 61, 173.
[63] Note that, curiously, the Venice Statement 2009, *op. cit.*, lists the duties corresponding to the equal access to the benefits of science exclusively under "duties to fulfill", as if the other duties to respect and protect generated by the right to science only pertained to the other two interests protected by the right to science (i.e. opportunities for all to contribute to the scientific enterprise and protection from adverse effects of science) (16). This cannot be the case and denotes a stronger emphasis on the rights of scientists than of others (redundant with some of their rights under Articles 15(1)(c) and 15(3) ICESCR anyway), on the one hand, and a paternalistic approach to the rights of others in the context of science, on the other. See also Müller, "Remarks on the Venice Statement", *op. cit.*, at pp. 769-770.

2. *The Co-Allocation of the Collective Duties of States and Institutions of Jurisdiction*

The next implication of the collective nature of the duties corresponding to the right to science for its States or international institutions of jurisdiction is that their allocation among the respective duty-bearers and their further re-allocation within each of them should be coordinated.

It is the case, first of all, of the primary co-allocation of duties between the various States or institutions of jurisdiction. Those States or institutions' respective duties may arise separately and concurrently out of each relationship of jurisdiction with the right-holder of the right to science. They will, however, need to be re-allocated anew among those duty-bearers to allow for coordination of the burden that would otherwise not only be unfair, but to a great extent unfeasible for each of them. It suffices to think of a case of domestic or regional epidemic, like Ebola, and of the burden on the relevant States of jurisdiction whose duty to protect the right to science implies acquiring drugs and treatment too expensive for each and any of them on its own. Secondly, without coordination in the secondary re-allocation to further duty-bearers under domestic law within each State or institution of jurisdiction, whether they are private or public, the burden of each duty may be too heavy to bear within each State or institution of jurisdiction. For instance, in the context of drugs whose commercialization is entirely private and occurs through a foreign corporation, the burden of duties to fulfill in case of failure of the private sector bearing on a given State of jurisdiction may be regarded as not only unfair, but largely unfeasible unless it is coordinated with that of the corresponding duties to fulfill of the corporation's home State of jurisdiction to the corresponding holders of the same right at home.

Of course, in the absence of joint or shared jurisdiction over the same right-holders,[64] it is difficult to come up with shared grounds for the primary co-allocation and the secondary re-allocation of duties relative to the right to science. The collective duties at stake are grounded in the respective jurisdiction of the duty-bearing State or institution, and hence in the aggregate ground of each and every human rights duty discussed before. The primary co-allocation and secondary re-allocation require a meta-ground, therefore, or, at least, a shared procedure.

There is one principle at play in the context of the current specification of the object of the right to science, and that is equality. Thus, the access to the benefits of science is submitted to a requirement of equality or non-discrimination that is not restricted to the boundaries of each State or institution of jurisdiction.[65]

[64] On those cases, see Besson, "L'extra-territorialité des droits de l'homme internationaux: juridictions concurrentes, obligations conjointes et responsabilités partagées", *op. cit.*

[65] See e.g. the discussion in Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, at pp. 9-11, that equates domestic and international measures to promote equality in the access to the benefits of science without distinguishing between them (compare e.g. §§ 26-33 to 34-38). See also Venice Statement 2009, *op. cit.*, §§ 3 and 4, referring to "inequalities among and within States" and to technological disparities between "societies".

It is this very principle I submit that should inform the kind of procedures of primary and secondary co- and re-allocation that are put in place, but also, as far as possible, the allocation of the overall burden of duties relative to the right to science at any given time and place. This raises difficult questions of global equality that are only starting to be discussed, for they raise issues that are very different from the ones that arise within the boundaries of each political community at a time.[66]

The co-allocation of duties relative to the right to science cannot be done by each duty-bearing State or institution of jurisdiction alone and implies creating one or many international institutions to coordinate allocation, therefore.[67] It should not come as a surprise in this context that institution-building with other States or institutions of jurisdiction is part of the duties to fulfill that correspond to the right to science.[68] It is arguably even the overarching duty to fulfill that right.[69] This duty is mentioned by the 2009 UNESCO Venice Statement as the duty "to establish institutions to promote the development and diffusion of science and technology" (16(a)). This leads in effect to the co-allocation of duties with respect to securing access to the benefits of science.

One of the hardest questions relative to the supply-side of the right to science actually pertains to the institutional design of the procedures of co-allocation of the collective duties argued for. Of course, inspiration for those institutions may be drawn from existing international negotiated systems of burden-sharing.[70] Such systems have been set up to enable States of jurisdiction to abide indirectly by human rights duties that have the same global scale as the right to science's. Of course, those systems have not been devised directly in the context of the fulfilment of human rights duties by their States or international institutions of jurisdiction, but the financial construction and the burden-sharing system may both be transposed effectively into the proposed institutional setting.

Procedurally, the co-allocation institution would have to work along egalitarian lines, and be sufficiently participative. Of course, one of the major challenges is democratic legitimacy. This is particularly important given the close ties between human rights and democracy in general, and more particularly in case of conflict between domestic allocations of human rights duties and resources that are democratic, on the one hand, and international re-allocations, on the other. Democratic

[66] See e.g. A. Buchanan, "The Egalitarianism of Human Rights", *Ethics*, vol. 120, n° 4, 2010, p. 679; S. Besson, "The Egalitarian Dimension of Human Rights", *Archiv für Rechts- und Sozialphilosophie Beiheft*, vol. 136, 2013, p. 19.

[67] Importantly, those coordinating institutions are not human rights duty-bearers in themselves and merely enable the duty-bearers to fulfill their collective duties. Think of the Council of Europe or the United Nations, for instance. Of course, coordinating institutions may incur responsibilities for human rights, but unless they exercize jurisdiction over a given right-holder, they will not bear human rights duties.

[68] See e.g. UN Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind, *op. cit.*, §§ 1 and 5; Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, at pp. 66 and 68.

[69] See also Müller, "Remarks on the Venice Statement", *op. cit.*, p. 779.

[70] One may mention, for instance, the system put in place by the Kyoto Protocol to the United Nations Framework on Climate Change or by the Global Fund to Fight Aids, Tuberculosis and Malaria.

legitimacy is not a new concern for international human rights institutions, of course. However, given how closely State resources have been tied to technology and scientific development in practice,[71] but also how democracy is sometimes at odds with innovation over which it may have a chilling effect,[72] the question of the relationship between the international allocation of duties and responsibilities relative to the right to science and its democratic legitimacy is likely to be even more controversial.[73] As a matter of fact, public participation is a concern one regularly finds expressed in current discussions of the right to science.[74] Of course, in line with the Limburg Principle 11, the focus is usually on domestic institutional settings rather than the international institutional level. However, if my argument about non-discriminatory access being global is correct, the same should apply by extension to public participation. This leaves the formidable challenge of devising what equal public participation could mean in an international institution intact, but this discussion will have to await another paper.

Finally, the institutional co-allocation of duties may require financial compensation, especially when domestic public funds have been invested in the scientific endeavour whose benefits are at stake. Setting up a fund to do so may be necessary, therefore. Funding should be public. It could be levied through taxes on the use of technologies, for instance. This source of funding may be associated to intellectual property funds and their private-public work and hybrid funding, along the lines proposed by Thomas Pogge and his Health Impact Fund (HIF)[75] or Allen Buchanan and his Global Innovation Justice Institute (GIJI).[76]

B. The Collective Responsibilities to Cooperate and Assist of Other States and International Institutions

Other States and international institutions than those of jurisdiction bear responsibilities for human rights, and this also applies to the right to science. The specificity of the responsibilities for the right to science, however, is that they are collective. Due to the universal or global scope of science, they are owed together for any one of them to be effectively fulfilled. Moreover, their complementarity to the duties relative to the right to science of the respective States or international institutions of jurisdiction, that are themselves collective, is even greater than for other responsibilities for human rights. They should therefore be coordinated both among themselves, on the one hand, and with the right to science-duties of the respective States or institutions of jurisdiction, on the other.

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[71] See J. Madrick, "Innovation: The Government was Crucial After All", *New York Review of Books* (24 April 2014).
[72] See Kitcher, *Science, Truth and Democracy*, *op. cit.*, on science and democracy.
[73] Thanks to Allen Buchanan for raising this issue in discussion.
[74] See e.g. Venice Statement 2009, *op. cit.*, Article 16(e); Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, at pp. 22 and 43.
[75] See Pogge, "The Health Impact Fund", *op. cit.*
[76] See Buchanan, Cole, and Keohane, "Justice in the Diffusion of Innovation", *op. cit.*

This specificity of the responsibilities for the right to science of other States and institutions of jurisdiction may explain the specific mention of the importance of international cooperation under Article 15(4) ICESCR. It echoes the reference to "international assistance and cooperation" of Article 2(1) ICESCR (see also Articles 22-23 ICESCR).[77] Those provisions do not refer to duties relative to the right to science bearing only on their duty-bearing States *stricto sensu*,[78] but to "supporting"[79] responsibilities for the right to science bearing on all States parties to the ICESCR at once.[80] They are not owed to the right-holders of the right to science who have no right to them, and, more generally, are not directed responsibilities. Finally, their content differs from that of the right to science-relative duties. Those responsibilities amount, in the context of the right to science, to "direct, financial and material, aid, as well as to the development of international collaborative models of research and development for the benefit of developing countries and their populations".[81] They are captured by the 2009 Venice Statement as the responsibilities "to take measures to encourage and strengthen international cooperation and assistance in science and technology to the benefit of all people" (16(d)). This is often coined as the sharing of benefits and the transfer of scientific knowledge and technologies.[82]

The primary implication of the collective nature of the responsibilities for the right to science is that the allocation of the responsibilities by its various bearers should be coordinated. Due to the specific nature of science, responsibilities for the right to science are owed together for any of them to be effectively fulfilled. As a result, "cooperation and assistance" around the right to science are not only about bilateral aid, but amount also to a responsibility for multilateral coordination and institution-building.[83] This procedural or institutional responsibility for the coordinated allocation of responsibilities of international assistance and cooperation is actually identified in the 2011 Maastricht Principles, under Principle 30: "States should coordinate with each other, including in the allocation of responsibilities, in order to cooperate effectively in the universal fulfilment of economic, social and cultural rights".[84]

Of course, just as the co-allocation of duties relative to the right to science requires a meta-ground, the coordinated allocation of responsibilities for the right to science calls for some ordering of the grounds of those responsibilities. As I argued before, the various grounds or justifications for preventive or remedial

[77] See also Chapman, "Towards an Understanding", *op. cit.*, p. 29.
[78] See P. Alston and G. Quinn, "The Nature and Scope of States Parties' Obligations under the International Covenant on Economic, Social and Cultural Rights", *Human Rights Quarterly*, vol. 9, n° 2, 1987, p. 156, at p. 186-192.
[79] See OHCHR, Guiding Principles on Extreme Poverty and Human Rights, *op. cit.*, Principles VI, §§ 93-94.
[80] See also Müller, "Remarks on the Venice Statement", *op. cit.*, at pp. 781-782, for a similar distinction (albeit between "national" and "international" "obligations" stemming from REBPSA).
[81] See e.g. Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, p. 68.
[82] See e.g. UN Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind, *op. cit.*, §§ 1 and 5; Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, at pp. 66 and 68.
[83] See also De Schutter *et al.*, "Commentary to the Maastricht Principles", *op. cit.*, at pp. 1149-1150.
[84] See Maastricht Principles, *op. cit.*

international responsibilities for human rights range from outcome to causality, harm, capacity, benefit or special ties.[85] To coordinate the allocation of responsibilities for the right to science, one may argue that "technological capacity",[86] by reference to the "technical assistance" emphasized in Article 2(1) ICESCR, should be the prior ground or, at least, the meta-ground of responsibility. The institutional and framework for that allocation, however, still remains largely inexistent and even more difficult to establish than for the co-allocation of the collective duties relative to the right to science.

V. Conclusions

In line with what applies to other international human rights and in particular other economic, social and cultural rights, States and international institutions of jurisdiction are the sole bearers of the duties corresponding to the right to science. This applies territorially, but also extra-territorially when States or international institutions exercize jurisdiction outside their domestic borders. Other actors, whether private actors, other States or international institutions, also bear responsibilities for that right concurrently to the duties of States and institutions of jurisdiction. Unlike human rights duties, those responsibilities are not directed to the right-holder and are not owed to them, and they also have a different content. Of course, under certain circumstances, States and international institutions of jurisdiction may bear duties relative to the right to science not only for the conduct of their own agents, but also for the conduct of private actors and even for the conduct of other States and international institutions.

Importantly, the duties and responsibilities relative to the right to science present two specificities. First of all, by virtue of the interest protected by the right to science, i.e. the equal access to the benefits of science and hence an individual interest in a universal public good, and of the universal scope of the threats to that interest, the duties relative to the right to science should be approached as collective duties States and/or international institutions of jurisdiction bear together, and not only concurrently like other human rights duties. This has important institutional consequences for their co-allocation among States and institutions of jurisdiction, and not only within each of them. Secondly, this also has an impact on the other private actors', States' and international institutions' responsibilities for the right to science, since those responsibilities are borne together as well and should, as a result, be coordinated in their primary allocation.

In turn, these collective features of the supply-side of the right to science call for stronger institutionalization of the co-specification and co-allocation of the

[85] See also De Schutter *et al.*, "Commentary to the Maastricht Principles", *op. cit.*, at pp. 1149-1150, 1153.
[86] See also De Schutter *et al.*, "Commentary to the Maastricht Principles", *op. cit.*, at p. 1153.

corresponding duties and responsibilities than it is the case for other human rights. Abiding by a new type of human rights' duties means devising new institutions. If the human right to science and hence to innovation is to be protected effectively, we should be ready to innovate institutionally.[87] We should not let the "unbounded" nature of science be too quickly defeated by the "bounded" nature of human rights. While human rights duties are "bounded" – and, for reasons of equality and democracy, they should remain so –, some universal or global public goods, and the equal individual interests in those goods we have recognized and should now protect as human rights, require us to "unbound" their corresponding duties and responsibilities.

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[87] See Buchanan, Cole, and Keohane, "Justice in the Diffusion of Innovation", *op. cit.*, p. 306.

Balancing Interests: Limitations to the Right to Enjoy the Benefits of Scientific Progress and Its Applications

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Balancing Interests: Limitations to the Right to Enjoy the Benefits of Scientific Progress and Its Applications

Une balance des intérêts – Les restrictions au droit de bénéficier du progrès scientifique et de ses applications

Yvonne Donders

Abstract

Several studies and reports have been elaborated on the normative content and State obligations of the right to enjoy the benefits of scientific progress and its applications. One of the legal aspects that has not yet been fully explored is the possible limitations of this right. The right to enjoy the benefits of scientific progress is, just as most other human rights in international law, not absolute. States may, under certain circumstances, limit the enjoyment of this right. For instance, States may or even must limit the conduct of science or the dissemination of scientific results in order to prevent harm or disrespect of other human rights. This contribution analyses the legal framework of limitations of the right to enjoy the benefits of scientific progress, based on the different regimes in international human rights law. In international human rights law, the possibility of and criteria for limitations are laid down in treaty provisions, so-called limitation clauses. The scope of these clauses has been elaborated by international supervisory bodies and academics, including the criteria of being provided by law, having a legitimate aim and being necessary. Limitations form part of the more general doctrine of State obligations, which in the case of the right to enjoy the benefits of scientific progress is characterized by the ICESCR regime of progressive realization of this right,

Résumé

Plusieurs études et rapports ont été élaborés au sujet du contenu normatif du droit de bénéficier du progrès scientifique et de ses applications et des obligations des États en résultant. L'un des aspects légaux n'ayant pas encore été complétement exploré est la possible restriction de ce droit. Le droit de bénéficier du progrès scientifique et de ses applications n'est pas absolu, au même titre que la plupart des droits de l'homme en droit international. Les États peuvent, à certaines conditions, restreindre la portée de ce droit. Par exemple, ils peuvent, ou parfois même doivent, limiter le comportement scientifique ou la dissémination de résultats scientifiques afin de prévenir le non-respect d'autres droits fondamentaux. Cette contribution analyse le cadre légal des limitations du droit de bénéficier du progrès scientifique et de ses applications en se basant sur différents régimes internationaux de protection des droits de l'homme. En droit international des droits de l'homme, la possibilité et les critères de restriction sont énoncés dans les traités par le biais de clauses de restriction. La portée de ces clauses a été précisée par les organes internationaux de contrôle, ainsi que par les chercheurs, et notamment les critères de la base légale, de l'objectif légitime et de la nécessité de la restriction. Les restrictions font partie de la doctrine plus générale des obligations des États qui,

the prohibition of retrogressive measures and core obligations.

dans le cas du droit de bénéficier du progrès scientifique et de ses applications, sont caractérisées par le régime de la réalisation progressive de ce droit, de l'interdiction des mesures régressives et des obligations fondamentales minimum figurant dans le Pacte international relatif aux droits économiques, sociaux et culturels.

I. Introduction

Recently, the International Court of Justice (ICJ) and a Dutch national court had to decide on cases concerning scientific progress. The ICJ had to determine whether or not a Japanese whaling programme fell within the phrase "for purposes of scientific research", thereby exempting it from the protective measures of the Convention for the Regulation of Whaling (24 September 1931). In its judgment of March 2014, the ICJ did not give a general definition of "scientific research" – and did not accept one suggested by Australia – but found that although some activities could be broadly characterized as scientific research, the Japanese programme for the killing, taking and treating of whales was not for the purposes of scientific research. This assessment by the ICJ was seemingly point of intense debate among the judges, reflected in a number of separate and dissenting opinions, some of which clearly stated that the ICJ was not qualified to make such an assessment, which should be left to the discretion of States and bodies of the Convention.[1]

The question of who determines what is or is not to be qualified as "scientific research" also came up in a case before a Dutch Court in Haarlem in September 2013. The Court decided that the dissemination of scientific manuscripts containing research results about the H5N1 virus technology require a licence on the basis of European Union (EU) regulation 428/2009,[2] which obliges member States to adopt an adequate and effective control system to prevent the dissemination of, *inter alia*, biological weapons.

The applicants were researchers of the Erasmus Medical Center in Rotterdam, who had proven the possibility to genetically mutilate the virus to make it transferable via air. The Dutch Minister of Foreign Affairs found this information extremely dangerous, since it could be used by terrorists to develop biological weapons. Therefore a licence was initially refused. Although a licence was finally provided,

[1] ICJ, *Whaling in the Antarctic (Australia v. Japan, New Zealand intervening)*, judgment of 31 March 2014, see in particular the dissenting opinions by Judges Owada, Abraham and Bennouna.
[2] Regulation (EC) No. 428/2009 of the Council of the 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items (*O.J.* L 134, 25 May 2009, p. 1).

the researchers wanted the Court to decide on the principle matter of whether the government should play a role in the dissemination of scientific research output.

The EU Regulation allows for exceptions to the licence requirement for information that is publicly available and for fundamental scientific research. The researchers argued that their research was of a fundamental character and therefore did not require a licence. The Court, however, argued that the exceptions mentioned in the Regulation should be interpreted strictly, bearing in mind the purpose of the Regulation, which is the prevention of the dissemination of technology and materials that can help to develop biological weapons. Therefore the exception to the licence requirement for fundamental scientific research only applies to research that is not directed towards the realization of a practical purpose related to the dissemination of biological weapons. According to the Court, the research in question also had a practical purpose, the mutilation of the virus, which would, without the licence, damage the purpose of the Regulation.

The Court realised that the obligation to obtain a licence "will understandably limit to a certain extent the accessibility of fundamental scientific research".[3] There could for instance be a delay in the exchange of research output. The Court however found this disadvantage not to outweigh the interest of the effective control of the non-proliferation of biological weapons. According to the Court, excluding public authorities by putting the decision on whether research is of a fundamental nature, making it eligible for an exception to the licence requirement, only in the hands of those who conduct the research and want to publish about it, would lead to the danger that member States cannot fulfil their obligations. "The security interests of the entire international community are in the hands of publishing researchers. An incorrect assessment can in such a situation have unacceptable consequences."[4]

Both Courts made interesting assessments of the different interests at stake in relation to scientific research. Although perhaps far-fetched at first glance, international human rights law is implied in these types of situations. The right to enjoy the benefits of scientific progress and its applications is laid down in the Universal Declaration of Human Rights (UDHR), proclaimed by UN General Assembly Resolution 217 A (III) (10 December 1948) (A/RES/3/217 A), Article 27, and in the International Covenant on Economic, Social and Cultural Rights (ICESCR), Article 15(1)(b). This right implies the freedom to conduct research and disseminate its results as well as the right to enjoy and participate in scientific progress. At the same time, States are obliged to protect people from the (possible) harmful effects of scientific and technological advancement. The case of the virus research licensing illustrates such a situation, although, to no surprise, the human right to

[3] Court Noord Holland, Haarlem, Administrative Law, Case Number AWB 13/792, Decision of 20 September 2013, § 5.11.
[4] *Ibidem*.

enjoy the benefits of scientific progress and its applications was not mentioned in the case.

The right to enjoy the benefits of scientific progress and its applications is still, despite increased attention from United Nations (UN) human rights bodies and academics, very much unknown. Several studies and reports have been elaborated on the normative content and State obligations of this right,[5] but one of the legal aspects that has not yet been fully explored is possible limitations. The right to enjoy the benefits of scientific progress and its applications is, just as most other human rights in international law, not absolute. States may, under certain circumstances, limit this right. As the example shows, States may or even must limit the conduct of science or the dissemination of scientific results in order to prevent harm or disrespect of the human rights of others.

This article analyses the legal framework of limitations of the right to enjoy the benefits of scientific progress, based on the different regimes in international human rights law. In international human rights law, the possibility of and criteria for limitations are laid down in treaty provisions, so-called limitation clauses. The general limitation clause of the ICESCR is Article 4. Relevant to this limitations clause is the more general doctrine of State obligations, which in the case of the right to enjoy the benefits of scientific progress is characterized by the ICESCR regime of progressive realization of this right and the prohibition of retrogressive measures. These issues are analysed on the basis of the work of the monitoring body of the ICESCR, the Committee on Economic, Social and Cultural Rights (CESCR or Committee), and academic sources. The right to enjoy the benefits of scientific progress is interrelated and interdependent with other rights in the ICESCR, such as the rights to education, health, water, housing and food, but also with rights in the International Covenant on Civil and Political Rights (ICCPR), including the right to freedom of expression and information. Therefore, the limitation regime of the ICCPR is also touched upon in the elaboration of the possible limitations of the right to enjoy the benefits of scientific progress.

Another legal regime that is very relevant to the limitation of the right to enjoy the benefits of scientific progress is that of intellectual property (IP). It should first be noted that a specific part of IP rights, namely author's rights, is referenced in the same provision as the right to enjoy the benefits of scientific progress. Article 15(1)(c) ICESCR includes the right of everyone "…to benefit from the

[5] A.R. Chapman, "Towards and Understanding of the Right to Enjoy the Benefits of Scientific Progress and Its Applications", *Journal of Human Rights*, vol. 8, nº 1, 2009, p. 1 ; Y. Donders, "The Right to Enjoy the Benefits of Scientific Progress : in Search of State Obligations in relation to Health", *Medicine, Health Care and Philosophy*, vol. 14, nº 4, 2011, p. 371 ; W.A. Schabas, "Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and Its Applications", in Y. Donders and V. Volodin (eds), *Human Rights in Education, Science and Culture – Legal Developments and Challenges*, Aldershot, Ashgate, 2008, p. 273 ; C. Timmermann, "Sharing or Benefiting from Scientific Advancement ?", *Sci Eng Ethics,* vol. 20, nº 1, 2014, p. 111 ; UNESCO, Venice Statement 2009, *op. cit.* ; Report of the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed on the right to enjoy the benefits of scientific progress and its applications, presented at the Twentieth Session of the Human Rights Council (14 May 2012) (A/HRC/20/26).

protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author." There is undoubtedly a possible tension between this right and the right to enjoy the benefits of scientific progress, although the drafters of the ICESCR "…did not seem to deeply consider the difficult balance between public needs and private rights when it comes to intellectual property".[6] The CESCR adopted a General Comment on this provision, distinguishing author's rights from "…legal entitlements recognized in intellectual property systems".[7] The Committee stated that the author's rights in Article 15 ICESCR were meant to encourage the active contribution of creators to sciences. It recognized the intrinsic link between the right to enjoy the benefits of scientific progress and author's rights, a relationship it described as "…at the same time mutually reinforcing and reciprocally limitative".[8] While author's rights and IP rights in general are possible means to limit the right to enjoy the benefits of science, a detailed discussion of the intellectual property regime, which is mostly developed outside the international human rights law framework, falls outside the scope of this contribution and will be dealt with by others.[9] This article focuses on the general legal human rights framework of limitations of the right to enjoy the benefits of scientific progress, including the criteria to take such measures.

II. Limiting Scientific Freedom to Prevent Abuse and Harm

Article 27 UDHR includes the right to share in scientific advancement and its benefits. The right to enjoy the benefits of scientific progress and its applications is included in Article 15(1)(b) ICESCR. The full provision reads as follows:

> "1) The States Parties to the present Covenant recognize the right of everyone:
>
> a) To take part in cultural life;

[6] M. Green, "Drafting History of the Article 15 (1) (c) of the International Covenant on Economic, Social and Cultural Rights", Background paper submitted for the Day of General Discussion on The right of everyone to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author (article 15.1 (c) of the Covenant) (9 October 2000) (E/C.12/2000/15), § 45.

[7] CESCR, General Comment 17, The right of everyone to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he or she is the author (article 15, § 1 (c), of the Covenant) (12 January 2006) (E/C.12/GC/17), § 1.

[8] *Ibidem,* § 4.

[9] See for an analysis of the link between the right to enjoy the benefits of scientific progress and its applications and intellectual property regimes: P. Samuelson, "Preserving the positive functions of the public domain in science", *Data Science Journal*, vol. 2, 2003, p. 192; L. Shaver, "The Impact of Intellectual Property Regimes on the Right to Science and Culture", Background note submitted to the Special Rapporteur in the field of cultural rights Ms. Farida Shaheed (20 May 2014); C. Timmermann, "Sharing or Benefiting from Scientific Advancement?", *op. cit.,* p. 111. In a statement on intellectual property and human rights, adopted in 2002, the CESCR stated that intellectual property rights must be balanced with the right to enjoy the benefits of scientific progress and encouraged the development of intellectual property systems and the use of intellectual property rights in a balanced manner that would provide protection for the moral and material interests of authors, and at the same time promote the enjoyment of these and other human rights. See CESCR, Statement on human rights and intellectual property (14 December 2001) (E/C.12/2001/15); CESCR, General Comment 17, *op. cit.*, § 1.

b) To enjoy the benefits of scientific progress and its applications;

c) To benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.

2) The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for the conservation, the development and the diffusion of science and culture.

3) The States Parties to the present Covenant undertake to respect the freedom indispensable for scientific research and creative activity.

4) The States Parties to the present Covenant recognize the benefits to be derived from the encouragement and development of international contacts and co-operation in the scientific and cultural fields." ■

The paragraphs of this provision address the two main dimensions of this right: the right of individuals to enjoy the benefits of scientific advancement and the right of scientists to freely conduct science, disseminate the results and to have the results of their work protected. The right of scientists to freely conduct science implies, for instance, the right or freedom to assess and choose the preferred path of scientific and technological development. The right of individuals to enjoy the benefits of scientific advancement implies, for example, the right of access to scientific and technological advancement without discrimination, including medicine, food and communication technology.[10]

It was, however, also realized that "science can be put both at service but also to the detriment of society".[11] The potential abusive use of science and the possible harmful effects of science were present from the earliest international discussions on scientific and technological progress and therefore visible in several early international instruments on science.[12] For example, in the UN Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind (1975), it is acknowledged that scientific and technological achievements could improve the conditions of peoples and nations, but they could also threaten human rights and fundamental freedoms. This instrument therefore includes that States should prevent the use of scientific and technological development to limit the enjoyment of human rights and protect the popula-

[10] A group of experts elaborated the scope and normative content of the right to enjoy the benefits of scientific progress and its applications in the UNESCO, Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications (Article 15(1)(b) ICESCR) (16-17 July 2009). This statement was commented upon by A. Müller, "Remarks on the Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications, (Article 15(1)b ICESCR)", *Human Rights Law Review*, vol. 10, nº 4, 2010, p. 765. A further elaboration is provided in: AAAS Science and Human Rights Coalition, "Defining the Right to Enjoy the Benefits of Scientific Progress and its Applications: American Scientists' Perspectives", Report prepared by Margaret Weigers Vitullo and Jessica Wyndham (October 2013).

[11] C. Timmermann, "Sharing or Benefiting from Scientific Advancement?", *op. cit.*, p. 117.

[12] See for instance the UN Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind, Proclaimed by UN General Assembly, Resolution 3384 (XXX) (10 November 1975) (A/RES/30/3384); the UNESCO Universal Declaration on the Human Genome and Human Rights (11 November 1997); and the UNESCO International Declaration on Human Genetic Data (16 October 2003). See, also Donders, "The Right to Enjoy the Benefits of Scientific Progress", *op. cit.*, p. 371.

tion from possible harmful effects of the misuse of science and technology. It also focused on non-discrimination and international cooperation to ensure that the results of science and technology are used in the interest of peace and security and for the economic and social development of peoples.

As mentioned above, limitations of human rights are a recognized element of international human rights law. Hardly any human right can be enjoyed unlimitedly. The general framework of limitations is outlined in Article 29 UDHR:

> "(1) Everyone has duties to the community in which alone the free and full development of his personality is possible.
>
> (2) In the exercise of his rights and freedoms, everyone shall be subject only to such limitations as are determined by law solely for the purpose of securing due recognition and respect for the rights and freedoms of others and of meeting the just requirements of morality, public order and the general welfare in a democratic society.
>
> (3) These rights and freedoms may in no case be exercised contrary to the purposes and principles of the United Nations."

This provision shows that both the rights holders – individuals – and the duty bearers – States – may be involved in the limitation of the rights. Article 29(1) and (3) include that individuals not only have rights, but also duties to the community and that they may not exercise their rights contrary to the purposes and principles of the United Nations. These purposes include the maintenance of peace and security, as well as the promotion of human rights and development. In other words, individuals should exercise their right to enjoy the benefits of scientific progress responsibly, because "[s]cientific freedom…centers on the nexus of freedom and responsibility".[13] This means simply stated that scientists and researchers should not conduct or disseminate science or technology that is against human rights or peace and that they should, for instance, take the social and cultural context into account when transferring knowledge and technology.[14] Many scientific or technological institutions have developed codes of conduct for researchers, thereby self-imposing limitations on scientific freedom.[15]

Within the framework of UNESCO, standards and programmes have been adopted concerning ethics of science and technology to promote reflection on ethical implications of scientific research and its applications. Several UNESCO instruments on science also emphasize the duties of scientists to promote, conduct

[13] AAAS Science and Human Rights Coalition, "Defining the Right to Enjoy the Benefits of Scientific Progress and its Applications: American Scientists' Perspectives", *op. cit.*, p. 17.
[14] L.D. de Castro, "Transporting Values by Technology Transfer", *Bioethics*, vol. 11, nos 3 & 4, 1997, p. 193.
[15] See for instance the Global Ethics Observatory, which is a database currently including 151 codes of conduct issued by entities dealing with science and technology, with the intention to regulate or educate the behaviour of their members (individuals and/or institutions) or addressing scientists in general. See, on the issue of awareness of taking into account the social and cultural context L.D. de Castro, "Transporting Values by Technology Transfer", *op. cit.*, p. 193.

and use science in a responsible way.[16] The UNESCO Universal Declaration on the Human Genome and Human Rights (1997) and the UNESCO International Declaration on Human Genetic Data (2003) also focus on the potential abuse of science and research. The Declaration on the Human Genome includes, for instance, that researchers have special responsibilities in carrying out their research, including meticulousness, caution, intellectual honesty and integrity (Article 13). It also includes that persons have the right to be informed about research on their genome and that such research should in principle not be carried out without a person's consent. The Declaration on Human Genetic Data emphasizes the ethical aspects of the collection, process, use and storage of human genetic data (Article 6), as well as the necessity of free, prior and informed consent (Article 8).

The responsibility to respect human rights is also recognized in relation to (multinational) companies. The UN "Protect, Respect and Remedy" framework (or Ruggie framework) adopted by the Human Rights Council provides guiding principles to prevent and address the risk of adverse impacts on human rights linked to business activities. The responsibility to respect for human rights means that companies should avoid infringing on human rights and should address adverse human rights impacts with which they are involved.[17] This framework is highly relevant to the right to enjoy the benefits of scientific progress, where private companies nowadays often play a greater role than public authorities.

In this article, however, the focus is on the role of the State as prime duty bearer of human rights promotion and protection, which may include limiting rights. Under international human rights law, the State can lawfully limit the enjoyment of rights, for instance to protect the rights of others or to balance rights with the interests of society as a whole, as indicated in Article 29(3) UDHR. Limiting the enjoyment of human rights may be legitimate, at the same time these limitations should be kept as restricted as possible. Limitation clauses in international human rights law therefore outline specific criteria that need to be respected in order for limitation measures to be legitimate. The limitations clause of the ICESCR, including criteria for limitations, is dealt with below. The limitations clause is closely linked to the broader issue of State obligations, which are therefore addressed first.

[16] See, also, Report of the Special Rapporteur in the field of cultural rights on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, p. 14.
[17] HR Committee, Guiding Principles on Business and Human Rights : Implementing the United Nations "Protect, Respect and Remedy" Framework (21 March 2011) (A/HRC/17/31) ; Human Rights Council, Report of the Special Representative of the Secretary-General on the issue of human rights and transnational corporations and other business enterprises, John Ruggie (7 April 2008) (A/HRC/8/5).

III. State Obligations under the ICESCR

Since the right to enjoy the benefits of scientific progress is part of the ICESCR, its scope and content, including States obligations, are determined by that treaty regime.

A. Progressive Realization and Non-Retrogression

The key provision in the ICESCR with regard to State obligations is Article 2(1), which lays down the principle of progressive achievement conditioned by the availability of resources. It says that each State party "…undertakes to take steps, individually and through international assistance and co-operation, especially economic and technical, to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant by all appropriate means, including particularly the adoption of legislative measures." Article 2(2) ICESCR obliges States to take measures to immediately ban *de jure* discrimination in the enjoyment of the rights in the Covenant. The idea of progressive realization is not applicable here, since the term "to ensure" is used.

The CESCR, the independent body monitoring the implementation of and compliance with the treaty, has given an interpretation of this provision.[18] In its General Comment on State obligations it maintains *inter alia* that the obligation to take steps or measures as laid down in Article 2(1) ICESCR has an immediate character. States should take steps "…within a reasonable, short period of time…" after the Covenant has entered into force for them.[19] Furthermore, taking the appropriate measures implies not only legislative measures, but also administrative, financial, educational, social and other measures, including judicial remedies.[20] States are free to determine which measures they consider best to implement the material provisions of the ICESCR, whereby the Committee, as monitoring body, determines whether the State has, in fact, taken the appropriate measures.[21]

The Committee further asserts that the duty to "progressively realize" is closely related to the availability of financial and economic resources. According to the Committee, States parties should start the implementation immediately and should move as expeditiously and effectively as possible towards the end of total realization.[22] States should, regardless of their level of economic development, do the maximum possible to ensure the enjoyment of economic, social and cultural rights.

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[18] CESCR, General Comment 3. The nature of States parties' obligations (art. 2, § 1, of the Covenant) (Fifth Session 1990) (E/1991/23, E/CN.12/1991/8).
[19] *Ibidem*, § 2.
[20] *Ibidem*, § 5.
[21] *Ibidem*, §§ 4 and 7.
[22] *Ibidem*, § 9.

Progressive realization and moving as speedily as possible towards the end of full realization imply that, in principle, the level of protection may not be diminished after a certain level has been achieved. So-called retrogressive measures are allowed only in exceptional cases. They "…would require the most careful consideration and would need to be fully justified by reference to the totality of the rights provided for in the Covenant and in the context of the full use of the maximum available resources".[23]

The CESCR has indicated that it assesses retrogressive measures according to several criteria, such as the general level of development and economic situation of the State in question, the severity of the alleged breach, as well as "[t]he existence of other serious claims on the State party's limited resources, for example resulting from a recent natural disaster or from recent internal or international armed conflict".[24] In other words, economic, social, political or other serious difficulties may be a reason that a State cannot (temporarily) fulfil its obligations and may take retrogressive measures, which in practice may lead to a limitation of the enjoyment of the rights. As regards the right to enjoy the benefits of scientific progress, possible retrogressive measures may concern, for instance, reduction of public funding for scientific research.

B. Core Obligations

The CESCR has furthermore developed the concepts of the "core content" and "core obligations" of the rights in the Covenant. It has determined that, notwithstanding the concept of progressive realization laid down in Article 2 ICESCR, "…a minimum core obligation to ensure the satisfaction of, at the very least, minimum essential levels of each of the rights is incumbent upon every State party".[25] It has further elaborated the core content of several provisions and core obligations of States that they have to fulfil regardless of their level of economic development. The Committee has in this regard maintained that although resource constraints are a factor in the evaluation of retrogressive measures, in relation to the core, "…in order for a State party to be able to attribute its failure to meet at least its minimum core obligations to a lack of available resources it must demonstrate that every effort has been made to use all resources that are at its disposition in an effort to satisfy, as a matter of priority, those minimum obligations". In other words, in principle, retrogressive measures may not affect the minimum core of the rights, since the core should be implemented irrespectively of the availability of resources.

The CESCR distinguishes retrogressive measures taken under Article 2 ICESCR from limitations, which can be taken in accordance with Article 4.

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[23] *Ibidem*, § 9.
[24] CESCR, Statement on An Evaluation of the obligation to take steps to "the maximum available resources" under an Optional Protocol to the Covenant (21 September 2007) (E/C.12/2007/1), § 10.
[25] *Ibidem,* § 10.

IV. Limitation Clause in Article 4 ICESCR

As stated above, the idea that human rights may be limited under certain circumstances is broadly acknowledged in international human rights law. Most international human rights instruments contain so-called limitation clauses, sometimes in general terms, sometimes attached to a particular provision.

The drafting history of Article 15 ICESCR shows that the proposal to add an explicit limitation clause to this provision was rejected. Some States wanted to add that scientific advancement should contribute to or be in the interest of peace and security. Proposals in this direction were rejected, because the majority of States found that such reference could lead to too much State control.[26] Such reference was however included in Article 13 ICESCR on the right to education, outlining the general purposes that education should serve. Article 13(1) states that "…education shall be directed to the full development of the human personality and the sense of its dignity, and shall strengthen the respect for human rights and fundamental freedoms". "…[E]ducation shall enable all persons to participate effectively in a free society, promote understanding, tolerance and friendship among all nations and all racial, ethnic or religious groups, and further the activities of the United Nations for the maintenance of peace." It could be argued that scientific progress should broadly serve the same aims, but this was not explicitly included.

Since no limitation clause was added to Article 15, the right to enjoy the benefits of scientific progress is regulated by the general limitation clause as laid down in Article 4 ICESCR. According to this provision States parties may subject the rights in the ICESCR only to such limitations that are "…determined by law only in so far as this may be compatible with the nature of these rights and solely for the purpose of promoting the general welfare in a democratic society".

Article 4 has not been elaborated in detail by the CESCR nor referred to extensively by States in their reports.[27] Interpretation of treaty provisions in accordance with the Vienna Convention on the Law of Treaties[28] could be done on the basis of the text of the provision in their context and in light of the object and purpose of the treaty. Context refers to other relevant treaties. Additionally, the drafting history of the treaty and provision may be looked at. The analysis below is therefore based on the text of Article 4, other treaty provisions, the *travaux préparatoires*, and academic studies in order to elaborate on the different elements in this provision.

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[26] Schabas, "Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and Its Applications", *op. cit.*, p. 281 ; M. Green, "Drafting History of the Article 15 (1) (c) of the International Covenant on Economic, Social and Cultural Rights", *op. cit.*, §§ 34 and 42.

[27] A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *Human Rights Law Review*, vol. 9, n° 4, 2009, p. 557.

[28] Vienna Convention on the Law of Treaties (23 May 1969), in United Nations, Treaty Series, vol. 1155, p. 331, articles 31-32.

A. Determined by Law

Limitations should firstly be determined by law, which implies that a national governance system is involved in the drafting and execution of the limitation measures. The term "law" is interpreted broadly by the international supervisory bodies to include not only statute, but also unwritten law.[29] The CESCR has endorsed this broad understanding in several General Comments.[30] Laws must furthermore not be arbitrary, unreasonable or discriminatory and be accessible and foreseeable.[31]

B. Not in Contradiction with the Nature of the Rights

Limitations may not be in contradiction with the nature of the rights in the Covenant, otherwise the provisions would no longer have any value and substance.[32] This links to the above mentioned issue of the "core content" and "core obligations" of the rights. It seems that, similar to retrogressive measures, limitations may not affect the minimum core of the rights, since this would go against their "nature".[33]

C. Legitimate Aim : General Welfare in a Democratic Society

The concept of "the general welfare in a democratic society" is rather broad and vague. Research of the drafting process of Article 4 ICESCR shows that including only "general welfare" as a legitimate aim to limit the enjoyment of the rights was done deliberately. Other possible legitimate aims, such as national security, public order, morals or respect for the rights and freedoms of others were left out of Article 4 ICESCR, because they were not considered to be relevant to economic and social rights. Reasons of public morals or public order were not conceived as legitimate reasons to limit basic needs such as the right to food or health. Only where economic and social rights resemble civil and political rights, for instance Article 8 ICESCR on the right to form trade unions and to strike, such legitimate aims are included.[34] The *travaux préparatoires* therefore seem to suggest that the words "general welfare" should be interpreted restrictively, not including these dimensions.[35] The drafting history further shows that Article 4 was not meant to

[29] HR Committee, General Comment 16 on Article 17 (September 1988) (A/43/40), §§ 3, 4 and 8, Eur. Ct H.R. (Plenary), *Sunday Times v. The United Kingdom*, 26 April 1979 (Appl. No. 6538/74), §§ 47-49.
[30] CESCR, General Comment 7, Forced evictions, and the right to adequate housing (1 January 1998) (E/1998/22, annex IV at 113 (1997)).
[31] Limburg Principles on the Implementation of the International Covenant on Economic, Social and Cultural Rights (1987) (E/CN.4/1987/17), principles no. 48-50. These were derived from the Syracuse Principles on the Limitation and Derogation of Provisions in the ICCPR (28 September 1984) (E/CN.4/1985/4), §§ 15-18.
[32] Limburg Principles, *op. cit.*, pp. 122-135, principles nº 52, 56.
[33] A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *op. cit.*, p. 579.
[34] A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *op. cit.*, p. 579.
[35] P. Alston and G. Quinn, "The Nature and Scope of States' Parties obligations under the International Covenant on Economic, Social and Cultural Rights", *Human Rights Quarterly*, vol. 9, nº 2, 1987, p. 156, at p. 201-2.

allow for limitations for reasons of lack of resources. Such measures were considered to be retrogressive measures to be justified under Article 2 (*infra*).[36]

The UDHR as well as other human rights treaties include more legitimate aims. The European Social Charter, one of the regional treaties on economic and social rights, includes that limitations should be "…prescribed by law and…necessary in a democratic society for the protection of the rights and freedoms of others or for the protection of public interest, national security, public health, or morals".[37] This provision sums up the legitimate aims in more detail than the "general welfare in a democratic society" and adds the test of necessity in a democratic society. This formulation mirrors the limitation clauses of the European Convention on Human Rights (ECHR).

The ICCPR and other treaties containing civil and political rights contain specific limitation clauses in second or third paragraphs of certain provisions. One of the rights closely related to the right to enjoy the benefits of scientific progress, namely the right to freedom of expression and information, may serve as a good example. Article 19(3) ICCPR includes that: "The exercise of the rights provided for in paragraph 2 of this article carries with it special duties and responsibilities. It may therefore be subject to certain restrictions, but these shall only be such as are provided by law and are necessary: (a) For respect of the rights or reputations of others; (b) For the protection of national security or of public order (*ordre public*), or of public health or morals."

The legitimate purposes for limitations such as national security, public order and health reflect the balance that needs to be struck between the interest of the person or group enjoying the right and the general or public interest. Respect for the rights of others as a legitimate aim reflects the balancing of different persons and groups enjoying rights. Such rights and freedoms of others do not have to be recognized in the same legal instrument.[38]

The aims of national security, public order and health (or public safety) could be very relevant aims to limit the right to enjoy the benefits of scientific progress. One can think of the ethical dilemmas related to genetic research or the security and public order risks involved in scientific and technological advancement in relation to biological and nuclear weapons. Respect for the rights and freedoms of others may also be relevant, for instance to protect data and the privacy of persons in relation to scientific research or experiments. These aims could be accepted as justification for limitations, although this implies stepping away from the original intention of the drafters of the ICESCR and focusing on the

[36] A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *op. cit.*, p. 579.
[37] European Social Charter (revised), CETS No. 163, 3 May 1996, Article G.
[38] Syracuse Principles, *op. cit.*, § 35. The Syracuse Principles were adopted by a group of international law experts and meant to elaborate and come to uniformity in the interpretation of the conditions and grounds for permissible limitations and derogations. See, also, the Report of the Special Rapporteur in the field of cultural rights on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, pp. 13-14.

context and purpose of the treaty. This is familiar in international human rights law, where the drafting history has become less relevant as an interpretation tool, since human rights treaties are supposed to be "living instruments" to be interpreted in light of their context, object and purpose.

D. Necessary and Proportionate

The term "necessary" implies that the limitation measures respond to a pressing social need. For instance, certain groups may need special protection through limitations, for instance children, elderly, minorities or persons with disabilities. They may be vulnerable for abuse as research subjects or are not independent decision makers.[39] Children, for instance, can benefit from scientific progress in relation to their health, food and education. At the same time, they may be vulnerable for misuse of information and data, for instance for human trafficking or the illicit harvest and transfer of organs.[40]

Apart from being necessary, the measures should be proportionate to the legitimate aim and the least restrictive ones needed to achieve that aim.[41] Proportionality of the measures also implies that the core content of the right cannot be limited.[42]

V. Reservations and Derogations

There are several other ways in which States can affect the working of treaty provisions, having the effect of annulling State obligations or limiting the enjoyment of rights. These do, however, strictly speaking, not fall within the category of limitations. For instance, reservations to human rights treaties allow a State to become party to a certain treaty, while exempting itself from certain specific obligations enshrined in it. By adopting a reservation, the State notifies that it does not want or consider itself to be bound to certain aspects or provisions of the treaty. This implies that the treaty provision in question is not applicable and cannot be invoked by the rights holders within the jurisdiction of that State.

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[39] Report of the Special Rapporteur on the right to enjoy the benefits of scientific progress and its applications, *op. cit.*, p. 14; AAAS Science and Human Rights Coalition, "Defining the Right to Enjoy the Benefits of Scientific Progress and its Applications: American Scientists' Perspectives", *op. cit.*, p. 10; B. Gran, M. Waltz and H. Renzhofer, "A child's right to enjoy benefits of scientific progress and its applications", *International Journal of Children's Rights*, vol. 21, nº 2, 2013, p. 323.

[40] *Ibidem*, pp. 337-338.

[41] Syracuse Principles, *op. cit.*, §§ 10-11, p. 3. HR Committee, General Comment 22, Article 18 (Freedom of Thought, Conscience and Religion) (27 September 1993) (CCPR/C/21/Rev.1/Add.4), § 8; HR Committee, General Comment 27, Freedom of Movement (1 November 1999) (CCPR/C/21/Rev.1/Add.9), § 14; HR Committee, General Comment 31, The Nature of the General Legal Obligation Imposed on States Parties to the Covenant (26 May 2004) (CCPR/C/21/Rev.1/Add. 13), § 6. This is in line with the necessity and proportionality test used by the European Court of Human Rights.

[42] A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *op. cit.*, p. 784.

Another example is derogation from human rights obligations. In times of pubic emergency "threatening the life of the nation", States are allowed to take measures temporarily suspending (part of) their human rights obligations, in other words to derogate from these obligations. States may do so, provided that the measures are of an exceptional and temporary nature, are not inconsistent with other obligations under international law and do not involve discrimination solely on the ground of race, colour, sex, language, religion or social origin. The principle of proportionality also applies and measures should be limited to the extent strictly required by the situation and they may not affect the core content of the right.[43] Derogations are distinct from limitations, because derogations are only permitted in exceptional cases "…while States may limit human rights even in normal times, albeit for a limited and exhaustive number of reasons".[44] Limitations have to be provided by law, which is not strictly necessary for derogations, which have to be proclaimed and notified to other States parties.[45]

Several human rights instruments contain so-called derogation clauses.[46] These clauses also identify rights that are non-derogable, in other words, that have to be respected at all times. Article 4(2) ICCPR for instance identifies as non-derogable rights the right not to be arbitrarily deprived of life (Article 6), the right not to be tortured (Article 7), the prohibition of slavery (Article 8), and the freedom of conscience and religion (Article 18). It should be noted that freedom of expression or the right to information, closely linked to the right to enjoy the benefits of scientific progress, are not among the non-derogable rights.

The ICESCR does not contain a derogation clause. It was not discussed during the drafting of the Covenant and States have not addressed this issue in their periodic reports to the CESCR.[47] This may have to do with the fact that derogation clauses were mostly meant to protect and restore democratic public order and were therefore perhaps considered to be less relevant to the rights in the ICESCR.[48] The lack of a derogation clause may imply that the rights in the ICESCR can, in principle, not be derogated from.[49]

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[43] The CESCR has also recognized this in General Comment 14, The Right to Health (11 August 2000) (E/C.12/2000/4), § 47 and in General Comment 15, The Right to Water (20 January 2003) (E/C.12/2002/11), § 40; HR Committee, General Comment 29, States of Emergency (article 4) (2001) (CCPR/C/21/Rev.1/Add.11), §§ 4 and 8.
[44] A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *op. cit.*, p. 579.
[45] *Ibidem*, p. 565.
[46] For instance, Article 4 ICCPR, Article 15 ECHR and Article 27 of the American Convention on Human Rights.
[47] A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *op. cit.*, p. 579.
[48] A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *op. cit.*, p. 579.
[49] A similar situation has emerged in the African regional context. The African Charter on Human and Peoples' Rights also does not contain a derogation clause. The African Commission on Human and Peoples' Rights has held that "in contrast to other international human rights instruments, the African Charter does not contain a derogation clause. Therefore limitations on the rights and freedoms enshrined in the Charter cannot be justified by emergencies or special circumstances". See African Commission on Human and Peoples' Rights, *Media Rights Agenda and Others v. Nigeria*, Comm. Nos. 105/93, 128/94, 130/94 and 152/96, 31 October 1998, § 67.

The main difference between reservations and derogations and limitations is that in the case of reservations and derogations the right as such is (temporarily) not applicable. The State may have chosen not to abide by a certain norm (reservation) or to temporarily suspend their obligations (derogation). Non-application of the norms also includes situations in which a certain activity or issue falls outside the scope of a right, for instance when a certain activity falls outside the scope of science or scientific progress, as was the case with the Japanese whaling programme. Limitations however concern situations where the norm or right applies and the activity falls within the scope of the right, but whereby (part of) the enjoyment of the right is limited, for certain specific reasons relating to a balancing of interests and protection against harm, as was the case with the licencing of the research on viruses.

VI. Concluding Remarks

The development of the right and freedom to enjoy the benefits of scientific progress and its applications has always gone hand in hand with the idea of limiting the freedom to conduct and disseminate science and technology in order to protect against abuse and harm. Not only do scientists have a duty to conduct research responsibly, States are obliged according to international human rights law to protect people from the possible abuse or harm of scientific and technological advancement.

Limitations of the right to enjoy the benefits of scientific progress could relate to the different dimensions of this right. For instance, limitations can be applied to the design, development and conduct of science before and during the conduct of science. Such limitations may concern the topics, subjects and methods of the research. Limitations can also be applied to the dissemination of scientific output after the research is done. Such limitations may include the prohibition or limitation – for instance via licensing – of the publication or distribution of scientific output.

The right to enjoy the benefits of scientific progress and its applications as included in Article 15 ICESCR can be lawfully limited according to its own treaty regime, in particular Articles 2 and 4 ICESCR. Retrogressive measures reducing the enjoyment of the right can be taken under Article 2 if they are justified and the maximum available resources are fully used. The CESCR distinguishes retrogressive measures under Article 2 however from limitations under Article 4.[50]

[50] Müller argues that such a distinction between retrogressive measures because of resource constraints and limitations for the same or other reasons cannot always easily be made, see A. Müller, "Limitations to and Derogations from Economic, Social and Cultural Rights", *op. cit.*, p. 579.

Article 4 ICESCR provides that States may subject the rights to limitations provided they fulfil certain criteria. Limitation measures should for instance be determined by law, which should be accessible and foreseeable. Limitations should furthermore have a legitimate aim, which according to Article 4 is the promotion of the general welfare in society. The above has shown that other aims, as included in the UDHR and other human rights treaties, such as national security, public order and public health, as well as the protection of the rights of others, are also relevant to limitations of the right to enjoy the benefits of scientific progress. They give States the necessary room to fulfil one of its important obligations, namely to balance different interests and to protect against harmful effects of scientific and technological progress. The original drafters deliberately chose for a restrictive interpretation of "general welfare". Perhaps with a more extensive interpretation these additional aims could be read into "general welfare", but it seems better to elaborate them more explicitly, for instance in a possible future General Comment on this right.

Another criteria indicated in Article 4 ICESCR is that the limitations must be compatible with the nature of the right. This is related to the well-known criteria of proportionality and could be translated, following the logic of the CESCR, as a prohibition of limitations of the core content of the right. The core content and core obligations of the right to enjoy the benefits of scientific progress have not yet been elaborated by the Committee. Work by academics, inspired by the elaboration of the core content elaborated for other closely related rights, such as the right to health and food, has led to the following list: guarantee non-discrimination, prohibition and prevention of human rights violations by scientific progress, special measures for vulnerable groups, creation of a participatory environment, taking steps to promote scientific freedom, elimination of barriers to international cooperation.[51] In addition, several human rights principles should be respected in relation to the right to enjoy the benefits of scientific progress and its applications, namely non-discrimination, participation, focus on disadvantaged and vulnerable groups, accountability and international cooperation.[52]

The CESCR could further elaborate and clarify, for instance in a General Comment, the core content and the limitations criteria of the right to enjoy the benefits of scientific progress and its applications. It can first start to discuss these more prominently with States parties during the reporting procedure, by which it can search for consensus on the interpretation of Article 4 ICESCR in relation to this right. States and courts at international and national level are already actively involved in legislation, policies and cases concerning scientific and technological

[51] AAAS Science and Human Rights Coalition, "Defining the Right to Enjoy the Benefits of Scientific Progress and its Applications: American Scientists' Perspectives", *op. cit.*, p. 14.
[52] Chapman, "Towards and Understanding of the Right to Enjoy the Benefits of Scientific Progress and Its Applications", *op. cit.*, p. 10; A. Müller, "Remarks on the Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications, (Article 15(1)b ICESCR)", *op. cit.*, p. 182.

progress. They are, however, not always aware of the relevance of the right to enjoy the benefits of scientific progress and its applications, including possible limitations. Awareness raising of the right to enjoy the benefits of scientific progress and its applications, including further elaboration and clarification of its scope, (core) content and limitations, could contribute to the advancement of this right.

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Dossier

Looking Back: How the Founders Considered Science and Progress in their Relation to Human Rights

Un regard rétrospectif: comment les fondateurs envisageaient science et progrès dans leur relation aux droits de l'homme

William A. Schabas

Abstract

Article 27 of the Universal Declaration of Human Rights enshrines the right of everyone to share in scientific advancement. The word 'advancement' may imply a value judgment on the content of science. However, the drafting history of the Declaration shows that a more robust effort to frame and define the nature of science, promoted by the Soviet Union and some of its allies, was not successful. This is in contrast with a similar and more successful effort in article 26 which concerns the right to education. The paper analyses the travaux préparatoires of the Universal Declaration. These materials are inconclusive, although subsequent application and interpretation of article 27 lends support to the view that its interpretation is not entirely neutral as far as the direction and content of scientific research are concerned.

Résumé

L'article 27 de la Déclaration universelle des droits de l'homme consacre le droit de toute personne de participer au progrès scientifique. Le mot «progrès» peut impliquer un jugement de valeur sur le contenu de la science. Toutefois, l'histoire de la rédaction de la Déclaration démontre que des efforts importants afin d'encadrer et définir la nature de la science, promu par l'Union soviétique et ses alliés, n'ont pas porté leurs fruits. Cela contraste avec un effort similaire et couronné de succès en ce qui concerne le droit à l'éducation consacré à l'article 26. Cette contribution analyse les travaux préparatoires de la Déclaration universelle des droits de l'homme. Ces travaux ne sont que peu concluants, bien que l'application et l'interprétation subséquentes de l'article 27 étayent l'idée que son interprétation n'est pas entièrement neutre en ce qui concerne le contenu et la direction de la recherche scientifique.

The contributions to this volume confirm that human rights, science and progress is a 'new topic' generating much interest in the academic community yet it is also an 'old right', one that was studied and developed during the earliest phase of international human rights law-making. Since that seminal period of the late 1940s, it has remained very much of a 'sleeping beauty'. Sleeping beauties don't really exist in science but they are familiar enough in the fine arts. Rich-

ard Wagner wrote the final opera of the Ring cycle first, recounting the tragic conclusion of the relationship of Brünnhilde and Siegfried who, as we are told in the prologue to *Götterdammerung*, had awakened his partner from the prolonged sleep imposed upon her by her father Wotan. Later, Wagner returned to compose *Die Walküre* and *Siegfried*, the operas that tell the story of Brünnhilde's quarrel with her father and his tormented decision to put her to sleep on the mountaintop. And so, like Wagner, after discussing the modern revival of this sleeping beauty, we return to her youth.

Human rights scholars seem inexorably drawn towards the treaties, be they thematic or general, regional or universal. In the case of the right to science and progress, the core provision is article 15(1)(b) of the International Covenant on Economic, Social and Cultural Rights. The provisions of the Covenant, together with its sibling, the International Covenant on Civil and Political Rights, are themselves drawn largely from the Universal Declaration of Human Rights (UDHR), proclaimed by UN General Assembly, Resolution 217 A (III) (10 December 1948) (A/RES/3/217 A). When the United Nations Commission on Human Rights began its work of standard-setting, in 1947, its primary task was to prepare an 'International Bill of Rights'. Later that year, the Commission opted to produce both a manifesto or declaration and a treaty or covenant. Work on the first project advanced rapidly and by late 1948 the Declaration was ready for adoption. Drafting of the treaty took longer, by contrast, and was only finished in the mid-1960s. By then, the 'covenant' had split into two pieces, taking its final form. Thus, to consider the origins of the right to science and progress within international human rights law, we must look to the Universal Declaration of Human Rights and to the work of its drafters during the period 1947-1948, primarily the Commission on Human Rights and the Third Committee of the General Assembly.

The Universal Declaration of Human Rights does not have any explicit formulation about the ideological or philosophical direction that science is to take. In that sense, Article 27 UDHR contrasts rather strikingly with its immediate predecessor on the right to education. Article 26(2) UDHR specifies that education is to be directed to the full development of the human personality, the strengthening of respect for human rights and fundamental freedoms, the promotion of understanding, tolerance and friendship among all nations, racial or religious groups, and furtherance of the activities of the United Nations for the maintenance of peace. During the drafting of Article 27 UDHR, the Soviet Union unsuccessfully proposed that the following text be added to the provision: "The development of science must serve, the interests of progress and democracy and the cause of international peace and co-operation". Little has been written on the rejection of the Soviet proposal and the consequences that it may have, if any, for the interpretation of Article 27 UDHR. For example, the authoritative study by Hans Morsink passes over the matter, focussing instead on the tension between the right to science and the protection of intellectual property.[1]

[1] J. Morsink, *The Universal Declaration of Human Rights: Origins, Drafting, and Intent*, Philadelphia, University of Pennsylvania Press, 2000, pp. 217-222.

The debate around the Soviet proposal manifested an issue that remains a feature to the present day in debates about the place of science within the overall scheme of human rights. As Yvonne Donders notes in her contribution to this volume, recently both national and international courts have had to contend with the scope of the term 'science' or 'scientific'. The debate highlights a matter that preoccupied the drafters of article 26(2) of the Universal Declaration, namely, whether all work or research purporting to be 'scientific' in an objective sense may claim the protection given by law and in particular human rights law.

Although it was a dimension of the problem, and indeed a dimension of the entire catalogue of human rights, that was not adequately understood in 1948, it seems that the debate about the direction of science also addressed, at least indirectly, the nature of duty bearers. Samantha Besson notes, in her essay in this collection, the role that private actors play in the production of scientific knowledge, be it through financing, development or dissemination. If the right to science excludes certain forms of anti-social research, then it is clear that the activities of non-state actors, whether individuals or corporate bodies, most be addressed. One of the marvellous features of the Universal Declaration, in contrast with the treaties that succeeded it, is that its message is not addressed to States alone. In its preamble, it exhorts that 'every individual and every organ of society, keeping this Declaration constantly in mind, shall strive by teaching and education to promote respect for these rights and freedoms'. This is of course relevant to the subtle distinction that Professor Besson makes between duties and responsibilities.

I. Latin American Origins of the Right

The origin of Article 27 DUHR can be traced to a draft of the American Declaration of Human Rights prepared by the Inter-American Juridical Committee in 1946 in accordance with decisions taken at the Chapultapec Conference. After failing to put the matter of the International Bill of Rights on the agenda of the General Assembly in late 1946,[2] the text was presented by Chile at the first session of the Commission on Human Rights of the United Nations, which met in New York City in January 1947. Entitled "Right to Share in Benefits of Science", it read as follows :

> "Article 15
>
> Right to Share in Benefits of Science
>
> Every person has the right to share in the benefits accruing from the discoveries and inventions of science, under conditions which permit a fair return to the industry and skill of those responsible for the discovery or invention.

[2] First Committee of the General Assembly, Forty-first Meeting (6 December 1946) (A/C.1/SR.41). See : Letter from the Representative of Chile to the Secretary-General Dated 3 November 1946 (3 November 1946) (A/C.1/38).

> The State has the duty to encourage the development of the arts and sciences, but it must see to it that the laws for the protection of trademarks, patents and copyrights are not used for the establishment of monopolies which might prevent all persons from sharing in the benefits of science. It is the duty of the State to protect the citizen against the use of scientific discoveries in a manner to create fear and unrest among the people."[3] ■

The text balanced the right to share in the benefits of science with the rights of those entitled to "a fair return" for their discoveries or inventions. It also indicated that scientific discoveries were not to be used "in a manner to create fear and unrest among the people". Both of these ideas were effectively removed from the final version of the text, which is much more succinct. Article 13(1) of the American Declaration of the Rights and Duties of Man, adopted in May 1948, states : "Every person has the right to take part in the cultural life of the community, to enjoy the arts, and to participate in the benefits that result from intellectual progress, especially scientific discoveries."[4]

The Chilean proposal prompted the Division of Human Rights, under the direction of John P. Humphrey, to include what was labelled a "right to share in the benefits of science" in its list of types of rights contained in drafts of proposed international bills of rights, issued in late-January 1947. It was placed under the broad rubric of the "Status of Social Security".[5] In June 1947, the Division of Human Rights presented a "Draft Outline of International Bill of Rights", often referred to as the "Humphrey draft", to the Drafting Committee of the Commission on Human Rights. The relevant text read : "Everyone has the right to participate in the cultural life of the community, to enjoy the arts and to share in the benefits of science."[6] Humphrey had placed art before science, perhaps reflecting a personal idiosyncracy, as Hans Morsink has suggested.[7] But in the title Humphrey gave to the provision, "Right to participate in cultural, scientific and artistic life", science came before art.[8]

In preparing his initial draft, Humphrey had drawn upon national constitutions, as well as various drafts submitted by international organisations and non-governmental organisations. These included the text prepared by the Inter-American Juridical Committee. There was little if anything in the catalogue of national constitutions to resemble the text Humphrey had proposed. Nicaragua's constitution said : "The sciences, letters, and arts, as well as their instruction, are free

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[3] Economic and Social Council, Draft Declaration of the International Rights and Duties of Man, Formulated by the Inter-American Juridical Committee (8 January 1947) (E/CN.4/2).
[4] American Declaration on the Rights and Duties of Man, Res. XXX, Final Act of the Ninth International Conference of American States (Pan American Union), Bogota, Colombia, (30 March-2 May 1948) (OEA/Ser.L/V/II.23 Doc. 21 Rev. 6).
[5] Division of Human Rights, List of Types of Rights Contained in Drafts of Proposed International Bills of Rights (31 January 1947) (A/CN.4/W.18), p. 2. Also : Commission on Human Rights, Analysis of Various Draft International Bills of Rights (23 January 1947) (E/CN.4/W.16), p. 5.
[6] Commission on Human Rights, Draft Outline of International Bill of Rights (4 June 1947) (E/CN.4/AC.1/3), p. 2.
[7] J. Morsink, *The Universal Declaration of Human Rights : Origins, Drafting, and Intent*, *op. cit.*, p. 218.
[8] Commission on Human Rights, Plan of the Draft Outline of an International Bill of Rights (9 June 1947) (E/CN.4/AC.1/3/Add.2), p. 6.

when they are not contrary to good habits and public order."[9] The Iranian constitution had a text along similar lines : "The acquisition and study of all science, arts and crafts is free, save in the case of such as may be forbidden by the ecclesiastical law."[10] The constitution of China contained the following : "Education and culture shall have as its aim the development among citizens of national spirit, a democratic spirit, national morality, sound and healthy physique, of sciences and of the knowledge and ability to earn a living."[11] The text from the Philippines was closer to the Humphrey text : "The State shall promote scientific research and invention."[12] Similarly, Yugoslavia's constitution contained this provision : "The State assists science and art with a view to developing the people's culture and prosperity."[13]

The provision concerning scientific progress was discussed by the Drafting Committee in conjunction with the text on rest and leisure : "Everyone has the right to a fair share of rest and leisure and to the knowledge of the outside world."[14] Eleanor Roosevelt suggested that this idea of knowledge of the outside world be moved to the provision dealing with freedom of information, but René Cassin disagreed, explaining that it referred to the advance of culture and had no direct relation to freedom of information. This prompted Roosevelt to propose including the notion in the provision on scientific progress. Cassin then suggested adding the words "to broaden his knowledge and outlook through the knowledge of his fellow-men" immediately before "to share in the benefits of science".[15] Roosevelt, who was the Chairman, then proposed that the Commission agree to a slightly modified version of the Humphrey draft ("Everyone has the right to participate in the cultural life of the community, to enjoy the arts and to share in the benefits that result from scientific inventions and discoveries") with a note indicating that it might be included in the preamble.[16] The report of the draft made only a minor change to the text initially proposed by Humphrey : "Everyone has the right to participate in the cultural life of the community, to enjoy the arts, and to share in the benefits that result from scientific discoveries."[17]

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[9] Commission on Human Rights, International Bill of Rights (Documented Outline) (11 June 1947) (E/CN.4/AC.1/3/Add.1), p. 164.
[10] Commission on Human Rights, International Bill of Rights (Documented Outline), *op. cit.*, p. 299.
[11] Commission on Human Rights, International Bill of Rights (Documented Outline), *op. cit.*, p. 293.
[12] Commission on Human Rights, International Bill of Rights (Documented Outline), *op. cit.*, p. 305.
[13] Commission on Human Rights, International Bill of Rights (Documented Outline), *op. cit.*, p. 358.
[14] Commission on Human Rights, Report of the Drafting Committee on an International Bill of Rights (1 July 1947) (E/CN.4/21, Annex D), p. 63.
[15] Commission on Human Rights, Summary Record of the Fifteenth Meeting (3 July 1947) (E/CN.4/AC.1/SR.15), p. 3.
[16] Commission on Human Rights, Summary Record of the Fifteenth Meeting, *op. cit.*, p. 4.
[17] Commission on Human Rights, Report of the Drafting Committee on an International Bill of Rights, *op. cit.*, p. 80-1.

II. UNESCO's Contribution

In parallel with the work at the United Nations Commission on Human Rights, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) undertook an initiative intended to contribute to the drafting of the International Bill of Rights. Almost certainly the members of the Commission were aware of UNESCO's activity although there was no real coordination. The work at UNESCO went on under the auspices of its Committee on the Philosophical Principles of the Rights of Man. The central personality in this Committee was the French philosopher Jacques Maritain. On the issue of "the right to share in progress" the report of the Committee contains the following:

> Every man has the right to full access to the enjoyment of the technical and cultural achievements of civilisation.
>
> Such a study should be undertaken, however, only if it is seen to contribute to the formulation and implementation of the Declaration of Human Rights which is in process of preparation by the Commission on Human Rights, for the Unesco Committee is convinced that agreement is possible concerning such a declaration and that it will constitute a basic contribution to the fullness of man's life, and to the stability and to the effectiveness of the operation of the United Nations
>
> These rights, the UNESCO Committee on the Philosophical Principles of Human Rights is convinced, are of fundamental importance not only to the enrichment of the human spirit but to the development of all forms of human association, including the development of national cultures and international co-operation. The UNESCO Committee has attempted to indicate some of the intellectual ramifications and implications of the problem of human rights in the modern world and in the international framework of the United nations by setting forth briefly the turns of the historical development of human rights and the broad lines of the interrelations of human rights which are consequent on that development. The Committee is particularly concerned to emphasise the dynamic character of the interrelations of human rights and the need, therefore, to explore and control the basic ideas which are in the process of being fitted to new industrial and technological means for the improvement of human good. The Committee reaffirms its conviction that a further study of the oppositions of philosophical doctrines which lead to diversities of interpretation of human rights, or which counsel fundamental principles on which agreement is possible despite these diversities, might facilitate the discussion of human rights today. It reaffirms also the further conviction that UNESCO might properly be asked to take the study of these philosophical differences. Such a study should be undertaken, however, only if it is seen to contribute to the formulation and implementation of the Declaration of Human Rights which is in process of preparation by the Commission on Human Rights, for the UNESCO Committee is convinced that agreement is possible concerning such a declaration and that it will constitute a basic contribution to the full-

> ness of man's life, and to the stability and to the effectiveness of the operation of the United Nations.[18]

These vague remarks did not constitute a particularly useful contribution and they do not appear to have been taken seriously by the Commission.[19]

III. Debates in the Commission on Human Rights

The provision was next discussed in the Working Group on the draft declaration established during the second session of the Commission on Human Rights, in December 1947. The Panamanian representative proposed that the article on scientific progress be dropped altogether, a suggestion that was rejected by three votes to one, with two abstentions.[20] Cassin explained that the provision was linked to the right to rest and leisure, with which it might perhaps be advisable to connect it ultimately. After the Working Group had voted to adopt the Drafting Committee text, by three to one with two abstentions, the Soviet delegate, A.E. Bogomolov, asked what was meant by sharing in the benefits that resulted from scientific discoveries. Eleanor Roosevelt answered that "the idea of the Drafting Committee had been to stress the universality of such sharing".[21] When the Soviet representative replied that the phrase seemed to imply an obligation to reveal patents of scientific discoveries, the Chairman answered that a comment could be included indicating that the text did not imply an obligation to reveal the secret scientific discoveries that had been patented.[22] It was an odd comment because divulgation of the 'secret' of a scientific discovery is the very essence of a patent.

Discussion of the provision resumed in June 1948 during the third session of the Commission on Human Rights. Cassin proposed inserting the words "in scientific research and" between the words "share" and "in the benefits". In answer to questions, he explained that "cultural life included science but that he wished to lay particular stress on the participation of even uneducated persons in scientific progress". Peng-chun Chang of China proposed replacing the last part of the sentence after "share" by "in scientific advancement", noting that the phrase was derived from Bacon.[23] At this point the Soviet delegate, A.P. Pavlov, said he favoured the article because it emphasised the right of "everyone" to participate in cultural life. He said that the "benefits of science were not the property of a chosen few but the heritage of the people". Furthermore, the task of science was

[18] UNESCO, The Grounds of an International Declaration of Human Rights, (31 July 1947) (Phil./10).
[19] Commission on Human Rights, Summary Record of the Twenty-sixth Meeting (3 December 1947) (E/CN.4/SR.26), pp. 11-16.
[20] Commission on Human Rights, Summary Record of the Ninth Meeting (10 December 1947) (E/CN.4/AC.2/SR.9), p. 2.
[21] Commission on Human Rights, Summary Record of the Ninth Meeting, *op. cit.*, p. 3.
[22] Commission on Human Rights, Summary Record of the Ninth Meeting, *op. cit.*, p. 4; Commission on Human Rights, Report of the Working Group on the Declaration on Human Rights (10 December 1947) (UN Doc. E/CN.4/57), p. 15, containing the following explanatory note: "It was understood that this does not mean that secret processes that have been patented should be revealed."
[23] Commission on Human Rights, Summary Record of the Seventieth Meeting (21 June 1948) (E/CN.4/SR.70), p. 4.

to work for the advancement of peaceful aims and to make human life better.[24] Pavlov proposed an amendment: "In the advancement of science which should serve the interests of the progress of mankind, the cause of peace, and co-operation amongst peoples."[25] The French version is no more grammatical than the English: "Au développement de la science qui sert le progrès de l'humanité, la cause de la paix et la collaboration internationale". Pavlov's amendment was immediately defeated, by nine votes to four, with three abstentions.[26] The Commission continued to debate the provision but only with respect to a French amendment concerning intellectual property[27] and a proposal from Lebanon about the rights of cultural groups.[28] When the Commission concluded its session, the Soviet Union made a statement in which it set out its difficulties with the draft text of the Declaration. Several formal proposals were submitted, including the following addition to the cultural rights provision: "The development of science must serve the interests of progress and democracy and the cause of international peace and co-operation."[29]

IV. Adoption by the General Assembly

The debate on the cultural rights provision was introduced in the Third Committee of the General Assembly by the Mexican representative, who emphasised its role in the protection of the right of the individual as an intellectual worker.[30] The Soviet text on the development of science produced at the conclusion of the Commission session in June had been transmitted to the General Assembly as a proposed amendment to be debated.[31] Comment on the Soviet amendment came first from the United States. Eleanor Roosevelt explained that the United States opposed it for "reasons both of form and substance". According to the summary record of the discussions, she "emphasised *inter alia* that the words "progress" and "democracy" applied to abstract ideas for which no uniform interpretation existed. It seemed dangerous to adopt a text which could be interpreted as a pretext for the enslavement of science." She said that the United States delegation "would under no circumstances agree that science should be placed at the service of politics. Yet that might be the practical effect of the USSR amendment."[32] The delegate from Uruguay echoed these views, insisting that "[s]cience could not serve an

[24] Commission on Human Rights, Summary Record of the Seventieth Meeting, *op. cit.*, pp. 4-5.
[25] Commission on Human Rights, Summary Record of the Seventieth Meeting, *op. cit.*, p. 6.
[26] Commission on Human Rights, Summary Record of the Seventieth Meeting, *op. cit.*, p. 6.
[27] Commission on Human Rights, Summary Record of the Seventieth Meeting, *op. cit.*, pp. 6-7.
[28] Commission on Human Rights, Summary Record of the Seventy-fourth Meeting, (28 June 1948) (E/CN.4/SR.74), pp. 2-4.
[29] Economic and Social Council, Report of the third session of the Commission on Human Rights, Statement Made by the Delegation of the Union of Soviet Socialist Republics (18 June 1948) (E/800, Appendix), p. 44.
[30] UN General Assembly, Official Records of the General Assembly, Third Session, 1948 (Meeting of 20 November 1948), p. 617.
[31] UN General Assembly, Compilation of Amendments to the Draft Declaration of Human Rights Submitted to the Third Committee before 4 p.m. 6 October in Chronological Order (6 October 1948) (A/C.3/230), p. 16.
[32] UN General Assembly, Official Records (Meeting of 20 November 1948), *op. cit.*, p. 620.

ideology; it obeyed a process of independent evolution, and very often politics, on the contrary, were influenced by science".[33]

Carton de Wiart, speaking on behalf of Belgium, described the Soviet amendment as "an attempt to assign to science a political mission". He said that although he wanted science to serve the cause of peace and co-operation among nations, "it was not for the declaration of human rights to define its role". If this had to be done, "it would have been better to say that the aim of science was to search for truth".[34] Australia endorsed Belgium's remarks, saying "the sole aim of science could only be the quest for truth".[35]

René Cassin, speaking for France, said he agreed with the Soviets "that science must be put at the service of progress and of peace, but believed that the problem raised by the USSR delegation fell outside the framework of the declaration of human rights".[36] He indicated that France would have approved the principle in the amendment "were it not for the apprehension that that principle might be invoked to justify the harnessing of science to political ends".[37] Chile, too, said it was "fully in agreement with the principles" of the Soviet amendment, but said it felt that "in the form in which it was drafted it might in practice lead to the control of scientific research for political ends".[38]

Pavlov then took the floor to explain the Soviet amendment, noting his agreement with the principle on which the original text adopted by the Commission was based. But he said that the provision as it stood was incomplete. Pavlov said he was not surprised that the Soviet Union's proposed addition to the article had met with some opposition. That was because "where science was subservient to militarism and where intellectual forces were concentrated on producing a terrible weapon of aggression for the destruction of millions of peaceful human beings, the USSR thesis that science to must be placed at the service of peace became unacceptable".[39] Pavlov spoke of "the principle that science should serve the interests of progress, democracy and peace since it could not but be aware of the atmosphere of terror which prevailed throughout the world owing to the application of scientific discoveries for destructive purposes. According to the Press of certain countries, scientists were at present engaged in perfecting a bacteriological weapon which would destroy 180 million human beings at one blow."[40]

[33] UN General Assembly, Official Records (Meeting of 20 November 1948), *op. cit.*, p. 621.
[34] UN General Assembly, Official Records (Meeting of 20 November 1948), *op. cit.*, p. 622.
[35] UN General Assembly, Official Records of the General Assembly, Third Session, 1948 (22 November 1948), p. 627.
[36] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 631.
[37] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 630.
[38] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 631.
[39] UN General Assembly, Official Records (Meeting of 20 November 1948), *op. cit.*, p. 623.
[40] UN General Assembly, Official Records (Meeting of 20 November 1948), *op. cit.*, pp. 623-624.

Throughout the General Assembly session in late 1948, the Soviets regularly skirmished with the United Kingdom and the United States. On the issue of scientific development, however, the British representative did not rise to the bait. She congratulated the Soviet Union on "tremendous progress" in the cultural field and insisted that her remarks not be taken as indicating any opposition to "the principles underlying the amendment".[41] However, "the conception of democracy and of progress did not seem to be the same everywhere. The word "democracy" could be interpreted in many ways." She said "science should not be placed at the service of an ideology". Warning that a principle could be misinterpreted and abused, she said "[i]t must not be forgotten that Dr. Rosenberg had been the propagandist of a doctrine which bestowed racial superiority upon Germany".[42] Cuba said it could not support the Soviet amendment as it expressed an idea "so vague and general that it could be interpreted in very different ways". According to the proposed text, "science should be made to serve objectives determined by States or Governments", Cuba warned. It said it was convinced that "science should remain entirely free and that the State should not interfere at any stage in scientific or literary creation. On the contrary, it was democracy which should be placed at the service of science, the latter itself the servant of truth."[43]

The delegate from Argentina said he could support the Soviet amendment "in a spirit of understanding", but only if reference to democracy was removed. He suggested the following: "The development of science must serve the interests of progress, the cause of peace and cooperation between the peoples."[44] In response, Pavlov suggested that the Soviet amendment be put to a vote in two parts, first on the principle and then on the rest of the amendment.[45] He continued:

> He thought it insufficient to state that science should serve the interests of human beings. The real problem consisted in defining the direction to be given to scientific research. Should scientific advancement be placed at the service of peaceful world progress or should it, on the contrary, be placed at the service of the forces of destruction and war? Unfortunately, the latter tendency seemed to prevail in the present state of world affairs. If science were thus placed at the service of the forces of destruction, it was to be feared that it might completely destroy all forms of human culture.

Pavlov raised the tone slightly, claiming that scientific research in the United States was controlled by the military authorities and developed for military purposes. Under the circumstances, "there was a danger of disinterested scientific research ceasing to exist. The universities were transformed into veritable

[41] UN General Assembly, Official Records (Meeting of 20 November 1948), *op. cit.*, p. 625.
[42] UN General Assembly, Official Records (Meeting of 20 November 1948), *op. cit.*, p. 625.
[43] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 627.
[44] UN General Assembly, Official Records (Meeting of 20 November 1948), *op. cit.*, p. 625.
[45] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 627.

laboratories of research for military purposes."[46] Criticism of military domination of scientific research in the United States also came from the representative of the Ukrainian Soviet Socialist Republic.[47] Poland too spoke in favour of the Soviet amendment, criticising the United States because of its difficulty with the word "democracy".[48]

The Soviet amendment was voted in parts. At the request of Pavlov, this was by roll call. The first phrase to be considered was: "The development of science must serve the interests of progress." It was rejected with eleven votes in favour (Argentina, Byelorussian Soviet Socialist Republic, Colombia, Czechoslovakia, Ecuador, India, Iran, Poland, Ukrainian Soviet Socialist Republic, Union of Soviet Socialist Republics, Yugoslavia), twenty-four votes opposed (Afghanistan, Australia, Belgium, Brazil, Canada, Chile, China, Denmark, France, Greece, Honduras, Lebanon, Luxembourg, Netherlands, New Zealand, Norway, Panama, Peru, Philippines, Sweden, Syria, United Kingdom, United States of America, Uruguay) and seven abstentions (Cuba, Dominican Republic, Mexico, Pakistan, Saudi Arabia, Venezuela, Yemen).[49] The second phrase to be voted was: "The development of science must serve the interests of democracy." It was even more decisively defeated, with Argentina and Iran switching from being in favour to against.[50] The third part, reading "[The development of science must serve] the cause of international peace and co-operation", was also rejected, by ten votes to twenty-five, Argentina have returned to the camp in favour of the amendment.[51]

Several delegations offered explanations of their vote. In his final remarks following the vote, Pavlov said it was illogical to include a statement of the purposes of education elsewhere in the Declaration yet refuse to set down a similar definition when speaking of the purposes of science. He said "science in the modern world could and often did serve the interests of aggression and reaction and was elaborating means for massacring peaceful populations".[52] Ecuador said it had voted for the Soviet amendment "in the firm conviction that science should serve the interests of life rather than death, of peace rather than war".[53] Argentina explained that its vote for the amendment was "in the conviction that science should indeed serve the interests of progress and international peace".[54]

The delegate for Venezuela said it had abstained despite agreeing with the ideas the amendment expressed "because words like 'progress' and 'democracy' unless defined in legal terms, might be misinterpreted and used to defend persecution

[46] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 627.
[47] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 632.
[48] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 631.
[49] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 633.
[50] UN General Assembly, Official Records (22 November 1948), *op. cit.*, pp. 633-634.
[51] UN General Assembly, Official Records (22 November 1948), *op. cit.*, pp. 633-634.
[52] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 636.
[53] UN General Assembly, Official Records (22 November 1948), *op. cit.*, pp. 633-634.
[54] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 636.

of scientists for political reasons".[55] Saudi Arabia, which had also abstained, said that "while science plainly should serve the interests of international peace and co-operation, that statement by itself would not have been sufficiently comprehensive and was superfluous". Its delegate explained that it might take generations to determine whether a certain action had been conducive to progress. Finally, he also expressed discomfort about using the word "democracy" because there existed "two strongly divergent views" about its meaning and "it would be better not to use it until the views had been reconciled".[56]

The United Kingdom delegate said that there was no disagreement with the ideas in the Soviet amendment, but felt it did not fit in with the rest of the article. She explained that "[h]er negative vote should consequently not be misconstrued as applying to the principle involved".[57] On the other hand, Eleanor Roosevelt insisted that "her delegation felt strongly that science, art and literature should be free from government control". She referred to a recent Soviet publication stating that all the efforts of the Academy of Sciences should be directed towards the building of Communism. But, she said, "[t]he United States delegation did not agree that cultural activities such as literature, music or science should be directed."[58] Norway said that it had opposed the Soviet amendment despite being "sincerely and strongly in favour of progress, democracy and the cause of international peace and co-operation". Its delegate said Norway also believed unconditionally in the freedom of science and was opposed to limiting that freedom on any pretext. It had been unable to accept an amendment which it considered reactionary and out of place in the declaration.[59] Syria explained that it had opposed the Soviet amendment because "the ideas it expressed would be out of place in the declaration" although they might well be appropriate in a resolution to be adopted by the First Committee of the General Assembly or the Security Council.[60] Minerva Bernardino, representing the Dominican Republic, said her delegation had opposed the amendment "because it did not wish to impose any restrictions on the free development of science which should serve all the interests of humanity".[61] Jiménez de Aréchaga of Uruguay said that although "on the face of it, an amendment which said that science should serve the interests of progress, democracy and peace was eminently acceptable, it might be interpreted as a restriction on the freedom of thought and research".[62] Lebanon said it voted against the Soviet amendment because "it confused the true aims of science with its accidental results. It was true that those results should be put to the service of peace and progress ; to say that, however, without at the same time stating that

[55] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 635.
[56] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 637.
[57] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 637.
[58] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 637.
[59] UN General Assembly, Official Records (22 November 1948), *op. cit.*, pp. 633-634.
[60] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 636.
[61] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 636.
[62] UN General Assembly, Official Records (22 November 1948), *op. cit.*, p. 637.

the purpose of science was to enquire into the mysteries of nature in the search for truth was to distort the meaning of science".[63]

V. Concluding Observations

The message that emerges from the debates in 1947 and 1948 is not entirely clear. Certainly it does not provide evidence of any consensus on the subject, yet nor can it be said that the issue was a Soviet obsession on which its views were marginal or isolated. Predictably, the Soviets were able to count on the votes of Ukraine and Belarus as well as their allies in Eastern and Central Europe. But their ideas were also accepted by several Latin American delegations. Even the United Kingdom and France did not adopt the position of wholesale rejection proposed by the United States. In assessing the import of the debates it is important to bear in mind the political context. This early phase in the Cold War was hardly conducive to serene discussion.

Despite the rejection of attempts to include language concerning the purposes of scientific research within the normative provisions concerning the right to enjoy the benefits of scientific progress, there is considerable authority for the view that a notion analogous to the text in Article 26 UDHR, concerning education, should also apply with respect to science. It is worth recalling that the only reference to science in the International Covenant on Civil and Political Rights (ICCPR) occurs in the provision concerning torture, Article 7 ICCPR : "In particular, no one shall be subjected without his free consent to medical or scientific experimentation." It recalls – indeed, its adoption was driven by – the abuse of scientific research conducted by Nazi doctors in extermination camps such as Auschwitz.

The reports of the international conferences on human rights contribute to this perspective on Article 27 UDHR. Paragraph 18 of the Proclamation of Tehran, adopted by the 1968 International Conference on Human Rights declares : "While recent scientific discoveries and technological advances have opened vast prospects for economic, social and cultural progress, such developments may nevertheless endanger the rights and freedoms of individuals and will require continuing attention." The subsequent paragraph in the Proclamation, which addresses disarmament, deals with scientific "progress" indirectly. It says that disarmament "would release immense human and material resources now devoted to military purposes. These resources should be used for the promotion of human rights and fundamental freedoms." The Vienna Declaration and Programme of Action, adopted at the 1993 Conference, also refers, though perhaps more modestly, to the objectives of science :

[63] UN General Assembly, Official Records (22 November 1948), *op. cit.*, pp. 637-638.

> Everyone has the right to enjoy the benefits of scientific progress and its applications. The World Conference on Human Rights notes that certain advances, notably in the biomedical and life sciences as well as in information technology, may have potentially adverse consequences for the integrity, dignity and human rights of the individual, and calls for international cooperation to ensure that human rights and dignity are fully respected in this area of universal concern.

It manifests shifting priorities in international human rights, away from a focus on disarmament and the harmful uses of scientific progress towards concerns about biotechnology.

The UN Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind is also of interest.[64] Its preamble notes that "while scientific and technological developments provide ever increasing opportunities to better the conditions of life of peoples and nations, in a number of instances they can give rise to social problems, as well as threaten the human rights and fundamental freedoms of the individual". The Declaration is largely focussed on the possible abusive use of science and technology in a way contrary to the protection of human rights. It calls upon States to promote international co-operation to ensure that the results of scientific and technological developments are used in the interests of strengthening international peace and security, freedom and independence, and also for the purpose of the economic and social development of peoples and the realisation of human rights and freedoms in accordance with the Charter of the United Nations. The Declaration affirms that "[a]ll States shall take measures to ensure that scientific and technological achievements satisfy the material and spiritual needs for all sectors of the population". Furthermore, "[a]ll States shall take measures to extend the benefits of science and technology to all strata of the population and to protect them, both socially and materially, from possible harmful effects of the misuse of scientific and technological developments, including their misuse to infringe upon the rights of the individual or of the group, particularly with regard to respect for privacy and the protection of the human personality and its physical and intellectual integrity."

Many other authorities could also be invoked, from declarations and treaties to the writings of experts. In her paper at this symposium, Lea Shaver speaks of "science in the service of humanity" as part of a core content of a human right to science. Professor Shaver explains that science is "not inherently good" but that it is a vehicle for values, both good and evil. She says that the Universal Declaration of Human Rights articulates a vision of "science as a public good". The proposal for an explicit recognition in Article 27 UDHR that the development of science

[64] UN Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind, Proclaimed by UN General Assembly, Resolution 3384 (XXX) (10 November 1975) (A/RES/30/3384).

should take on an orientation consistent with the objectives of the UDHR did not succeed. But nor does the Declaration contain language suggesting the rejection of such an idea. The best that can be said of the *travaux préparatoires* is that they are inconclusive. Subsequent practice tends to confirm the importance of this facet of the right to benefit from scientific progress.

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