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The ‘Human Right to Science’ *qua* right to participate in science

The participatory good of science and its human rights dimensions

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ABSTRACT

In 1948, Article 27(1) UDHR declared the right ‘to share in scientific advancement and its benefits’. Since 1966, the right has also been guaranteed by Article 15(1)(b) ICESCR as the right to ‘enjoy the benefits of scientific progress and its applications’. This equivocation on the right’s name reveals a disagreement about the object of that right, i.e. (actively) participating in the scientific practice or (passively) ‘enjoying its fruits’ only. While the importance of participation in science has recently been emphasised, no justifications thereof have yet been provided. Drawing on considerations in human rights theory, the present article proposes an interpretation of Article 15(1)(b) ICESCR *qua* ‘right to participate in scientific practice and enjoy its benefits’. It starts with an account of the genesis of the right. Second, it argues that science is best approached as a ‘participatory good’, both from the perspective of the philosophy of science and of other rights guaranteed by the ICESCR. Third, the article spells out the participatory dimensions of the human right to participate in science including its ‘collective’ dimensions. Finally, the article explores three institutional implications of the proposed participatory interpretation of the right, both domestically and internationally.

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‘11. The right enshrined in article 15(1)(b) encompasses not only a right to receive the benefits of the applications of scientific progress, but also a right to participate in scientific progress. Thus, it is the *right to participate in and to enjoy the benefits of scientific progress and its applications*’.

(CESCR General Comment No. 25, *Science and economic, social and cultural rights* (art. 15(1)(b), (2), (3) and (4)), UN Doc. E/C.12/GC/25 [30 April 2020], §11, emphasis added)

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‘[T]his right is more than simply a right to science. The time has come to speak of a much more substantial “*right to participate in scientific life*” and to see it as a component of the right to participate in cultural life’.

(Mylène Bidault, ‘Considering the Right to Enjoy the Benefits of Scientific Progress and Its Applications as a Cultural Right: A Change in Perspective’, in *The Right to Science: Then and Now*, ed. Helle Porsdam and Sebastian Porsdam Mann [Cambridge: Cambridge University Press, 2021], 140–49, 140, emphasis added)

1. Introduction

In 1948, Article 27(1) of the Universal Declaration of Human Rights (UDHR)¹ declared the human right ‘to share in scientific advancement and its benefits’. Since 1966, the right has also been guaranteed under Article 15(1)(b) of the International Covenant on Economic, Social and Cultural Rights (ICESCR),² albeit this time solely as the right ‘to enjoy the benefits of scientific progress and its applications’.

What it is a human right to and hence what interests it protects remain underdetermined. Of course, many human rights protect fundamental interests the shared characteristic of which is to be essentially contestable such as health or religion, and this explains why their content is, and should be, open to persistent and pervasive reasonable disagreement. Unlike what is usually the case with most other human rights, however, what is indeterminate here is not only the content of the right, but its object in the first place, i.e. the identity of the protected interest. This is probably why the controversy started with the denomination of the right itself.

In this regard, the comparison with another right also declared by Article 27(1) UDHR and later guaranteed by the same provision, albeit under a different letter, under Article 15(1)(a) ICESCR, i.e. the right ‘to take part in cultural life’, is telling. The contrast between the two rights and their denomination is even more striking as science may be regarded as a form of culture and protected as a ‘cultural right’ under international human rights law.³

First of all, the right to enjoy the benefits of scientific progress and its applications is usually referred to by the acronym ‘REBSPA’. This is presumably to shorten the long denomination of the right while remaining faithful to the formulation of Article 15 (1)(b) ICESCR. However, what this acronym does in practice, and quite symbolically, is erase any reference to ‘science’ in its mention. By contrast, the right to take part in cultural life is never referred to simply as the ‘RPCL’. Secondly, the right to take part in cultural life is usually taken to cover a whole range of more specific rights: so-called ‘cultural rights’. The bundle of rights captured by the REBSPA is not (yet) approached as an ensemble of ‘scientific rights’ –the term ‘scientific right’ being mostly reserved to the ‘scientific freedom’ of scientists as confirmed and guaranteed expressly by Article 15 (3) ICESCR, thereby separating the rights of those who do science, i.e. the scientists, from those of others. Thirdly, the REBSPA also often goes by the short name ‘right to science’,⁴ suggesting that science itself could be the object of a human right. Interestingly, and by contrast, one more rarely refers to the right to take part in cultural life as the ‘right to culture’ as opposed say to the right to life or food.⁵ This is because, as this article will explain, culture is a participatory good and cannot, and should not, in itself be the object of an individual right.⁶ Last but not least for this article’s project, and again unlike what is

the case with the right to ‘take part’ in cultural life under Article 15(1)(a) ICESCR, the wording of Article 15(1)(b) ICESCR no longer refers expressly to ‘participation’, ‘taking part’ in or even ‘sharing in’⁷ science as the object of the right.

This equivocation on the name of the ‘right to science’ reveals a deeper disagreement about what should be protected in science and about what could and should be the object of scientific rights under international human rights law. This was confirmed by the *travaux préparatoires* of the UDHR and again later on, during the cold war, by those pertaining to the ICESCR. The debates reflected fierce divides among State governments over the opposition between the inherent and the instrumental value of science and over the ways in which scientific progress may or may not amount to social progress.⁸ There was also persistent disagreement about what it is in science that could and should be protected by human rights, i.e. (actively) participating in the scientific practice or (passively) ‘enjoying its fruits’ only.⁹ In the end, the consensus tilted towards the latter, and the formulation of the REBSPA lost its participatory dimension in 1966: it went from entailing both participation and enjoyment with the formula ‘share in scientific advancement and its benefits’ in Article 27(1) UDHR to solely entailing the latter with the phrase ‘enjoy the benefits of scientific progress’ under Article 15(1)(b) ICESCR. This is how the REBSPA was put to sleep and became dormant.

Importantly, the last fifteen years or so have revealed a renewed interest in the REBSPA, originally in reaction to the privatisation of science and to the grip of intellectual property rights. This has gone hand in hand with a heightened interest in science as a public good.¹⁰

The project to reinvigorate the REBSPA has now spread across various organs, agencies and human rights bodies of the United Nations (UN). The most important documents to that effect are, besides the UN General Assembly 1974 Declaration¹¹ and the UN Educational, Scientific and Cultural Organization’s (UNESCO) 1974/2017 Recommendation,¹² 1999 and 2005 Declarations¹³ and 2009 Venice Statement:¹⁴ the UN Special Rapporteur on Cultural Rights’ 2012 and 2014 reports on the right¹⁵ and, most recently, the Committee on Economic, Social and Cultural Rights’ (CESCR) 2020 General Comment No. 25 on Science and Economic, Social and Cultural Rights.¹⁶ The difficulty, however, is that State practice itself has not yet caught up with the REBSPA. By way of consequence, and because those UN bodies’ interpretations have not yet been in a position to consolidate a minimal consensus based on an evanescent State practice,¹⁷ the interpretations of the right proposed by those various UN bodies, despite their respective quality and, arguably, epistemic authority, have two things in common: their lack of legal authority or bindingness under international human rights law¹⁸ and, by extension, their lack of legitimate authority from a democratic perspective.¹⁹

In conjunction with those recent attempts to reinvigorate the REBSPA at the UN level, there has also been a renewed interest in the topic on the part of international human rights lawyers.²⁰ Nevertheless, waking up the ‘sleeping beauty’²¹ of international human rights law requires more than an academic debate, however lively: it calls for the mobilisation of States, especially those that position themselves as scientific or technological powers and that have remained fast asleep or, more exactly, covering their ears, and hence and foremost for the mobilisation of their peoples.²²

It is against this political and academic background that the present article proposes to revive the original pre- and post-war participatory dimension of the REBSPA. While the

importance of participation has increasingly been emphasised in recent interpretations of the right, including in the UN Special Rapporteur on Cultural Rights' 2012 report and in the CESCR's 2020 General Comment No. 25,²³ no justifications thereof have yet been provided on the basis of the normative practice of science. Merely positing, by *fiat*, that the REBSPA is participatory is not sufficient. Not only does this claim no longer correspond to what is guaranteed by Article 15(1)(b) ICESCR, as mentioned before, but it is *prima facie* contradictory unless deeper transformations in the contemporary interpretations of the right are considered such as the ones proposed later in this paper. First of all, indeed, such a claim seems to contradict the expression and widespread belief that there could be such a thing as a right to science. As mentioned before, the latter understanding of the right seems to presume an individualistic conception of the good of science, one that could become the object of an individual right. Second, the mere claim that the right should be understood as participatory also sits uneasily with the largely individualistic definition of science that is prevalent in UN interpretations of the REBSPA.²⁴ Nor, finally, is it sufficient to hint at the 'cultural' dimension of science²⁵ without an argument for why cultural rights themselves should be considered participatory.²⁶

Turning to the literature that specifically defends a participatory interpretation of the REBSPA,²⁷ a discussion of the human rights' implications of considering science as a participatory good is hard to find there too. It contains remarkably little specification, in particular of what this would mean for the interest protected by the corresponding right, for its right-holders and for its duty- and responsibility-bearers, both domestically and internationally. To the extent that some authors have already articulated not only a detailed account of the content of the right,²⁸ but also a detailed test²⁹ or even indicators³⁰ thereof, some of their arguments may read as premature. Clarifying the object of the right, and especially the participatory good of science and the related protected interests is a prerequisite to further moves on all those fronts.

Drawing on the normative practice of science and on human rights theory considerations regarding the object and content of human rights pertaining to public goods, the present article proposes an interpretation of Article 15(1)(b) ICESCR *qua* 'right to participate in scientific practice and to enjoy its benefits'. While keeping the second prong of the protected interest, i.e. 'enjoying the benefits' of science, as declared in 1948 and guaranteed since 1966, the proposed interpretation makes the right primarily a participatory one by adding a reference to participation in the first and original prong of the protected interest. As this article argues, indeed, the right's protected interest should be understood as participatory through and through, regardless of whether it is a matter of contributing to science or of acceding to its benefits. It would be wrong therefore to oppose process to outcome, and hence participation in the scientific process to non-participatory access to its benefits.³¹ As the article also explains, however, the reason to hold on to the second prong of the protected interest in the REBSPA's title despite the participatory dimension of the enjoyment of the benefits of science is not only pragmatic. That second prong pertains indeed to the diffuse individual rights one may derive from the core collective scientific rights and which therefore deserve a separate reference and guarantee in the title of the right.

The article's argument is four-pronged. It starts with a short account of the genesis of the right, including of the rise and fall of its participatory dimension from 1948 onwards (2.). Second, it argues that science is best approached as a public 'participatory good' and

explains what this means (3.). In a third step, the article spells out the participatory dimensions of the human right to participate in the scientific practice and enjoy its benefits, including the right's 'collective' dimensions (4.). Finally, in a fourth section, the article explores three institutional implications of the proposed participatory interpretation of the right, both domestically and internationally: for the democratic specification of the right's object and content; for the public legal and institutional order of science; and, finally, for the self-government of science, and especially its internal good government (5.).

Two *caveats* are in order at this stage: one pertaining to terminology and a second one to methodology.

A first warning pertains to the terms chosen. First of all, this article refers to a human right to participate in the scientific 'practice', and not in scientific 'progress' as in Article 27(1) UDHR and Article 15(1)(b) ICESCR. The point, indeed, is to avoid reducing science to a necessarily progressive process; it may, of course, be such, but it need not. Progress, especially when it is understood as 'teleological' progress *towards* truth as opposed to 'pragmatic' progress *from* a current state of knowledge to borrow Philip Kitcher's fine distinction,³² corresponds to a specific Western and Northern conception of science that dominated the original drafting of international human rights law, and actually still does prevail over its interpretation.³³ It is one that we should be more careful about today. Secondly, and relatedly, resorting to the less progressive term 'practice' also prevents falling prey to what was back then an almost automatic inference of 'moral' or 'social' progress from the existence of 'scientific' progress.³⁴ This is even more important as the legal guarantee of science as a human right is unlike other legal guarantees: guaranteeing a human right to participate in scientific practice is as much a recognition of the existence of a fundamental and equal interest of all human beings in a certain kind or use of science, on the one hand, as it is a recognition of the vulnerability of that interest and of its need of protection against other kinds or uses of science, on the other. The right to participate in science therefore may be described as a 'dualist' right: it grounds a duty both to promote the beneficial aspects of science and to protect against its adverse effects.³⁵ Its guarantee aims precisely at not taking that promotion and protection for granted merely because there is scientific 'progress' or 'advancement'. Finally, the term scientific 'practice' is more encompassing:³⁶ it includes scientific 'knowledge' itself, of course, but also other 'benefits'³⁷ and advantages, including the applications of that knowledge. It also emphasises the process of science as opposed to its outcome only. It comes close therefore to what some philosophers of science have captured under the notion of scientific 'inquiry'.³⁸ This process *cum* outcome approach to science corresponds, as we will see, to the participatory dimension of the good of science and hence of the human right to participate in science itself.

A second *caveat* pertains to this article's method, that is human rights theory.³⁹ Starting from legal questions and categories, the article proposes what it regards as the best interpretation of the REBSPA in contemporary international human rights law: one that both fits and justifies that law. Its method consists in a combination of legal doctrine and moral and political philosophy specific to law.⁴⁰ The article is primarily conceived as an article in international human rights law. However, it also presents a human rights theory argument to the extent that it considers that the only way to account for human rights law *qua* normative social practice is to criticise, justify and make proposals to reform and guide it if required. This is particularly important as the treatment of the

REBSPA so far has been very doctrinal and, quite surprisingly given the lack of State practice, not very receptive of considerations in human rights theory, especially regarding the normative structure of the right.⁴¹

2. The genesis of the human right to participate in science: from post-war institutionalism to cold war individualism –and back?

The consensus that enabled the first declaration of the REBSPA in Article 27(1) UDHR may be attributed to two concerns: the pre-war sociology and philosophy of science's belief in the value of an institutionalised and public enterprise of science,⁴² on the one hand, and the post-war realisation of the adverse effects of science and of the dangers of its political and legal instrumentalisation, as exemplified by scientific socialism and biological laws,⁴³ on the other. That consensus brought States to give science the most fundamental of international legal guarantees: shaping that guarantee as an international human right was a tribute to science's independent and inherent value. Moreover, only such a legal guarantee could protect humanity against the adverse effects of science.

Outside of that minimal consensus, however, there was disagreement about almost everything else in the right declared in 1948. The cold war did not only deepen that disagreement, but also eroded the original consensus on the right. By the 1960s, indeed, scepticism about economic, social and cultural rights and about their distinctive social, relational or interactional and, in short, collective dimension was widespread. It was motivated, in the West, by a fierce defence of individual freedom and the free market and, in the East, by just as fierce a defence of the State as the sole relevant collective and economic force.⁴⁴ The outcome was the same, however: the intentional undermining of any social and collective dimension of social, economic and cultural rights.⁴⁵ In the case of the REBSPA, this led to the side-lining, in Article 15(1)(b) ICESCR, of the independent participatory dimension of science and of the 1948 duty of all States to institutionally and legally frame scientific practice as an end in itself: certainly as an end distinct from the market, but also as an end distinct from the State.

In turn, this explains how the wording of Article 15(1)(b) ICESCR, which refers solely to the enjoyment of the benefits of science, turns the right into a purely redistributive right on the model of all the other social rights guaranteed in 1966 separately from the other human rights.⁴⁶ It almost reads like an 'afterthought' to an otherwise individualistic practice.⁴⁷ The actual scientific practice providing those benefits was safely removed from the scope of the right, except maybe for the freedom of scientists themselves. The latter, however, received separate protection by Article 15(3) ICESCR (and in Article 19(2) of the International Covenant on Civil and Political Rights [ICCPR])⁴⁸ due to Western concerns, thereby also emphasising that the rights of those partaking in the scientific practice are to be considered as distinct from the rights of those enjoying its benefits.⁴⁹

While the world has changed since then, including the world of science, the weak compromise reached on the REBSPA in 1966 and the minimal status quo that ensued have to this date remained in the joint interest of a majority of State governments, especially of developed States, first in the West and the North and then further East and South. As a matter of fact, it is unlikely that even the minimal formulation of the right under Article 15(1)(b) ICESCR could be agreed over again today. The privatisation of science and its economic instrumentalisation in the form of 'innovation', 'research and

development' or other forms of 'applied science', especially technological applications,⁵⁰ are now well entrenched in practice. Those developments would make the debate about the inherent value of science, about its contribution to social progress and about the opposition between participation and access to benefits even more polarised than it was during the cold war. Not to mention, of course, the fact that, while the world of States has become more inclusive since the 1960s, it has also become more diverse and more inequalitarian in practice, including in terms of development of and access to (the dominant kind of) science,⁵¹ and even more divided on those issues therefore.

As a matter of fact, the compromise reached in 1966 and the now entrenched minimal status quo explain why there has been limited domestic legal practice of the REBSPA to date. There has, of course, been domestic legal regulation of science, and actually increasingly so. However, that practice generally presents itself as a purely domestic one that does not necessarily pertain to human rights law, on the one hand, and even when it does, not to an international human right guaranteed to everyone around the globe and owed by all States at the same time to those people under their jurisdiction, on the other.⁵² There has, as a result and, at least, until recently, been but only few traces of that practice in States' periodic reports under the ICESCR monitoring system and, by extension, hardly any systematisation of a minimal transnational consensus on the right by the CESCR in its concluding observations on those reports or in its views following even fewer instances of individual complaints.⁵³

Two observations may be drawn from the little practice those States' periodic reports have to show for. First of all, those States that have reported the least about specifying and implementing scientific rights have been developed States, and especially Western and European ones. Second, the specific scientific rights identified in most States' reports have been scientific freedom⁵⁴ and the right to access scientific knowledge.⁵⁵ ICESCR State Parties' practice relative to the more specific dimensions of the right by comparison to others, including its participatory dimension, is still moot – at least from what one may draw from their reports. As to the CESCR's discussions of the REBSPA, either in concluding observations or views, they have been extremely limited. This is not only a consequence of the little State practice reported on the right and the quasi-absence of individual complaints about alleged breaches of the right, but also of the instrumentalisation of science to the protection of other human rights, be it the right to health, food, expression or education.⁵⁶ This instrumental approach to science as a resource for the protection of other human rights actually still looms large in the CESCR's 2020 General Comment No. 25 where science is regularly referred to as something to be 'consumed'⁵⁷ and that could be 'owned' or, at least, 'controlled'.⁵⁸

Importantly, as mentioned in the introduction, the last fifteen years or so have revealed a change in the perception of the importance of the REBSPA caused by a renewed interest in science not only as a public good, but also as an international one.⁵⁹ More generally, we seem to have circled back to post-war concerns about the importance of both protecting a strongly institutionalised and public enterprise of science and actively protecting human persons against some of its adverse effects.⁶⁰

With respect to the former, on the one hand, the terms of the discussion have changed, of course, but they are reminiscent of the four features of Robert Merton's 'normative structure' and 'ethos' of science:⁶¹ 'communism', 'disinterestedness', 'organised scepticism' and 'universalism'. In reaction to the growing commodification and privatisation

of science, the development of a research-driven economy and a proprietary approach to science, indeed, concepts such as, respectively, ‘citizen’ or ‘participatory’ science, ‘open’ science or scientific ‘public goods’ have emerged or, at least, re-emerged. Not to forget, of course, the realisation that good science needs to be universal and that such a universal practice cannot be organised unless it is institutionalised universally: outside of the legal orders of individual States, but also outside of the order of the market and of the control of private actors. As a matter of fact, we may have reached the stage of defensive ‘self-validation’ of science again, to refer to Robert Merton’s 1942 diagnosis,⁶² albeit this time in reaction to the Charybdis of the privatisation of science and to the Scylla of its over-publicisation.⁶³ Importantly, a parallel movement may be observed in the philosophy of sciences with a renewed concern for the place of values in science,⁶⁴ for more social and collective approaches to the fabric of scientific knowledge and for the role of epistemic communities.⁶⁵

As to the rekindled concern about the adverse effects of science, on the other, it has grown in reaction to the fast development of high-risk and high-uncertainty technologies with lasting and even irreversible consequences on future generations, such as genome editing and other forms of bio- and geo-engineering. One should also mention the reaction to the rise of a new form of political and legal scientism: certain scientists and, even more worryingly, some lawyers⁶⁶ draw conclusions from human enhancement techniques and, more generally, from bioengineering for the law of persons and even for the future of human rights themselves which they see as being increasingly grounded in human ‘nature’ or as relating to the human ‘species’.⁶⁷ What this does therefore is place discussions about the human right to participate in science at the forefront of a new struggle about the growing place of science in the law and, in counterreaction, about the rightful place and role of law in science, as this article will argue.

3. Science as a public participatory good

To the extent that ‘participatory’ goods may be considered as a subgroup of ‘public’ goods,⁶⁸ arguing that science is a participatory good (3.2.) first requires establishing that it is a public good and clarifying in what sense it is the case (3.1.).

3.1. Science as a public good

Public goods are ‘social’ or ‘collective’ to the extent that they are the goods *of a collective* or goods *to that collective*: it is a dimension of their being good, indeed, that they are social or collective. This may be because the (benefits of the) good may only be enjoyed together with others in one or many overlapping communities, but also, more generally, because its value resides in it necessarily being of interest to many people at the same time. Public goods usually work as clusters with overlapping communities benefiting from the same goods and some goods being collective in some sub-communities only and others in all of them at the same time. Of course, some public goods may also, and additionally so, be of value or interest to a single individual at a time. Importantly, however, they always also amount to more than a sum of private or individual goods.

Science qualifies as a public good in this sense: it is in our collective interest to acquire and consolidate our knowledge together.⁶⁹ It is a collective interest of scientists as a

group, i.e. those who make a profession out of their participation in the scientific practice, but also, more broadly, of all of us gathered in the multiple overlapping epistemic communities we belong to. True, we may be able to enjoy some of the benefits of science individually or even conduct some scientific research individually. However, science is of value only because it is also conducted and enjoyed together with others. This becomes clear once we look at how scientific inquiry is conducted and enjoyed in natural sciences, but it is true of all forms of inquiry that may be conducted individually, say in philosophy, but only amount to scientific inquiry if conducted and enjoyed by many, say philosophers, doing this together at the same time and across time as a collective epistemic practice.

Certain public goods may also be considered ‘common’, hence the notion of ‘common’ or ‘communal’ goods.⁷⁰ Their specificity is that they are not only in the collective interest of a group, but also a *common concern* or responsibility of that group. This is what the Latin term *munus* for burden or charge in *com-munis* refers to. It is the case of science: acquiring and consolidating our knowledge is not only in our collective interest, but also a common concern and responsibility we all bear together. This includes doing our share in the practice, as scientists or in other capacities, in order not to undermine the scientific practice and to promote it. This includes, for instance, demonstrating scientific integrity.

The term ‘public’ is used here to refer to public goods as opposed to the term ‘collective’ or ‘social’ goods. It links the collective dimension of those goods to the institution of the group (whose goods they are) as a ‘public’ by law and hence to the *institutional* and *legal* identification of the goods of that public.⁷¹

Of course, some collective goods may be regarded as ‘naturally’ or independently so, like health or peace. In order to then also be recognised as public goods, they require an additional form of public legal recognition. Other public goods, however, do not pre-exist their public legal recognition as natural collective goods, however. As we will see, this is clearly the case of participatory goods: the participatory practice requires cooperation and organisation, and hence some form of public institutionalisation and legalisation. Here one may think of democracy, religion or, and this is our topic, science. It is even more the case of participatory goods that are also communal ones, like science, i.e. that trigger a common responsibility on the part of those who participate in the practice. Indeed, such a common responsibility requires public institutional channelling and legal mediation to specify and allocate individual and collective responsibilities, and possibly, as we will see, mitigate the individual burden of those responsibilities.

This conception of science as a ‘public enterprise’ with its own ‘normative structure’, to quote Robert Merton again,⁷² actually has deep roots in Western modernity. The ‘*République des Lettres*’, to cite Françoise Waquet,⁷³ dates back to various Medieval institutional frameworks of science, but culminated in the formation of the domestic Academies of sciences in the seventeenth Century.⁷⁴ According to Alain Supiot, one should understand the institutional and legal structure of science as a ‘ternary order’ and the necessary third-party guarantee of the inherent and independent value of science.⁷⁵ Without such a guarantee, science could not amount to an end in itself. Its autonomous value would risk being defined by the powers at play, whether religion, the State, the market or, worse, by scientists themselves in an exercise of self-validation. To that extent, the institutional and legal guarantee of science as a public good meets Max

Weber's argument about scientists' inability to define scientifically what the ultimate value or end of science should be.⁷⁶

Depending on the level of institutionalisation and legalisation of a public good, that good may be regarded as local, national, regional or even international. The present article privileges the term *international* public good over that of 'global' or 'universal' public good. The term refers, indeed, to the many peoples of international law and therefore emphasises the many 'publics' instituting and re-instituting those goods as their 'interpublic' goods. Of course, as explained before, international public or interpublic goods may correspond to pre-existing universal collective goods. However, they need not (especially when they are participatory and communal ones like science) and, in any case, their legal and institutional dimension has to become international as well to secure their recognition as international 'public' goods. This international institutionalisation of the public good is particularly important in the case of a participatory good such as science that gathers the members of different overlapping epistemic communities corresponding to different levels of public institutional and legal organisation. One of them, of course, is the universal epistemic community. To the extent that the latter is the least publicly institutionalised and legalised of all epistemic communities, it is not only in our collective interest to institutionalise it further in order to recognise and flesh out the international public good of science, but also our common responsibility to do so.

Two further terminological delineations of the notion of 'public goods' are in order, as they also affect the way in which science should be considered a public good.

First of all, the proposed understanding of 'public goods' (including that of 'common goods') differs from that of economists or, at least, the majority thereof.⁷⁷ And this, even if the latter's use is widespread in international law, including in international human rights law,⁷⁸ and sometimes in philosophical accounts of public goods.⁷⁹ There are four reasons for this distinction:⁸⁰ first, the economic understanding of public goods defines the value of public goods contingently and exclusively by reference, and in contrast, to the pre-existing private and especially individual private good or interest; second, it approaches public goods instrumentally as 'resources' or 'commodities' that must and can be 'produced' (by the State or a community of States in case they cannot be produced independently by the market); third, it understands domestic and international law and institutions as instrumental to the production of public goods as opposed to being constitutive of those goods in the first place; and, finally, it defines public goods as outcomes or end-products by reference to non-excludability and non-rivalrousness in consumption rather than in process or practice.

It is easy to see therefore how problematic such an understanding of public goods may be when applied to the goods protected by human rights, and especially by a human right like the REBSPA. Approaching science as a public good in the economic sense justifies treating it and its benefits as instrumental to private interests and as commodities to be produced. Most importantly, it exempts the good of science from having to be guaranteed publicly at law before it can even be considered a public good.

A second remark pertains to the relationship between public 'goods' and 'rights'. What makes a public good does not depend on the existence of a right therein, be it individual or collective. Just as there may be public good-independent rights, there may be right-independent public goods.⁸¹ However, one may also consider that it is because there is a right in a given public good and a corresponding obligation that that good may be

regarded as such. This explains that often either the conceptual and normative pairs ‘goods’ and ‘interests’ or ‘goods’ and ‘rights’ are used interchangeably.

The participatory good this article is interested in, i.e. science, is precisely a good there are interests in and then a right to, i.e. the REBSPA. And, conversely, the same may be said about the participatory rights that good is related to. It is difficult therefore to argue for a participatory good like science without referring to its being guaranteed as a human right, and vice-versa. For reasons of clarity, however, this article first addresses the participatory good of science in this section, before turning to its human rights dimensions in the next section.

Proceeding in this way has two advantages. First, it reveals how the legal and institutional recognition of the public good of science as such has been enhanced by its additional legal and institutional recognition as a human right in 1948. As explained before, guaranteeing participation in science as a human right is recent. It amounts to the most fundamental of legal guarantees of its independent and inherent value: it recognises that science is constitutive of our fundamental equal status. It also makes that guarantee conditional of its being constitutive of our fundamental equal status and thereby imposes inherent limits on the kind of interest in science that may be protected as a human right, hence the dualist dimension of the human right to participate in science. Second, separating the issue of the good of science from that of its related rights prevents conflating the discussion about the collective dimension of the participatory good that is held in this section with that of the collective features of the rights pertaining to that good addressed in the next section. As we will see, indeed, the collective dimension of a good may be reflected in different ways in the corresponding rights: the interest itself may be collective, but its collective dimension may also extend to the right-holders, the duty-bearers and/or the enjoyment of the right.

3.2. Science as a participatory good

What distinguishes participatory goods from other public goods is that their social or collective value resides in participation in a social or collective activity or practice.⁸² While this article prefers the term ‘participatory’ to refer to those goods, others have also referred to them as ‘interactional’ or ‘(social) relationship’ goods.⁸³

To quote Denise Réaume, participatory goods ‘involve activities that not only require many in order to produce the good, but are valuable only because of the joint involvement of many. The publicity of production itself is part of what is valued –the good is the participation’.⁸⁴ Of course, there may be cases in which individual contribution to a participatory good is possible, and even individual enjoyment thereof. However, those cases of ‘diffuse [individual] contribution’ and ‘diffuse benefits’ for individuals are not paradigmatic of the good. Indeed, individual contribution is parasitic on the collective contribution to the good. And there can be no individual contribution and enjoyment of those goods in those cases without a collective contribution and enjoyment of those goods as well. While individuals may enjoy participatory goods, therefore, the latter may not strictly speaking be enjoyed individually only.⁸⁵

This is clearly the case of the public good of science, and especially of scientific knowledge as opposed to other forms of ‘information’. While scientific applications

(e.g. medication) may be regarded as diffuse benefits of science that individuals may both contribute to and enjoy, that individual contribution and enjoyment cannot be individual only: its value depends on others contributing to the (e.g. medical) research and enjoying its benefits as well. In turn, this explains why participatory goods like science defy the instrumental distinction that was mentioned before with respect to the economic approach to public goods: the distinction between the production of the goods and their enjoyment or consumption,⁸⁶ and hence between process or means and outcome or ends. To quote Denise Réaume again, ‘there is no end product because, in a sense, [participatory goods] are never completed, but are continuously reinterpreted and re-created by each generation’.⁸⁷ Scientific knowledge is no ‘end product’: it is never completed and is continuously developed and consolidated.⁸⁸

There are two reasons one should approach science as a participatory good in this sense: its cultural dimension and the participatory good of culture; and the participatory dimension of any epistemic cultural practice.

First of all, scientific inquiry and knowledge are culturally situated and, to the extent that culture should be considered as participatory, science may be deemed participatory as well.⁸⁹ There are many reasons for the participatory dimension of culture in the first place. While nowadays culture is sometimes referred to, in a passive way, as a dimension of one’s, individual or collective, identity,⁹⁰ it is usually also considered, in a more active fashion, as creative and as participatory in that creation.⁹¹ Indeed, the good or the value of culture in our life lies in the fact that we do not only contribute to it together, but also enjoy it together. Thus, individual fiction-writing and fiction-reading is only valuable because it is something others also do alongside and hence because it is a collective enterprise to that extent. And the same may be said about enjoying a novel: it is only valuable because others are able to read it at the same time and to share that experience with us. To quote Denise Réaume again, ‘sharing cultural experiences is the important part of the benefit of having them’.⁹²

Of course, the cultural dimension of science does not mean that all that is cultural is scientific: there should be an epistemic dimension and, additionally, a critical dimension to it for a given cultural practice to qualify as scientific. The former condition has to do with the acquisition and consolidation of knowledge, whereas the latter with its constant contestation.

This issue of delineation of science from other forms of culture is particularly sensitive when the knowledge in question is qualified as ‘traditional’⁹³ or ‘indigenous’⁹⁴ by reference to the peoples whose knowledge it is.⁹⁵ Indeed, probably because it is collective and participatory –and thereby goes against a prevalent Western individualistic, a-cultural and a-historical understanding of science⁹⁶–, the epistemic practice in question is often downgraded from scientific to ‘cultural’ and the corresponding knowledge from scientific to ‘folk’ knowledge (by reference to the distinction between *episteme* and *doxa, metis* or *techne*). This may explain why the ‘dialogue’ between these different forms of knowledge is sometimes reduced to an ‘intercultural’ dialogue,⁹⁷ instead of being approached as a collaboration embedded in a scientific practice including many epistemic communities and their relations to one another.⁹⁸

True, criticising the now common reduction of traditional or indigenous knowledge to a form of culture and the denial of its epistemic and critical dimensions begs the

question of what makes that knowledge not only a form of scientific knowledge, but also a specific kind thereof and one of many forms of ‘sciences’ in the plural. Traditional or indigenous knowledge is, indeed, just as culturally and historically situated as any other kind of scientific knowledge. However, what makes it distinctive from other kinds of scientific knowledge and also allows for differences among different kinds of indigenous or traditional knowledge themselves is both institutional and historical.⁹⁹ It lies in each kind of knowledge’s institutional and normative structure and, by extension, in a variety of forms of historical situatedness. Over the course of time, indeed, each epistemic community develops its own set of scientific norms and institutions inside a broader public legal framework of science. I will revert to the question of the communal responsibility that comes with a communal good like science and the self-government of science this calls for in the last section of the article.

Second, science *qua* epistemic practice requires at least one epistemic community for knowledge to be acquired and consolidated, and then re-acquired and re-consolidated over time. To that extent, scientific knowledge relies on participation therein. Recent studies in the philosophy and history of science and in epistemology confirm that the acquisition and consolidation of scientific knowledge is never the product of an isolated individual working alone, but of an epistemic community as a whole or, more exactly, of many epistemic communities across time and space.¹⁰⁰ This interactional or participatory dimension of the fabric of science actually corresponds to two of the four dimensions of the pre-war ‘normative structure’ and ‘ethos’ of science captured by Robert Merton: ‘communism’, and the requirement of social collaboration taking place openly and in the public domain; and ‘organised scepticism’, and the interactional contestability it requires.¹⁰¹

Of course, this interactional, historical and cultural conception of science does not always sit easy with many scientists’ contemporary understanding of the scientific enterprise. The latter has actually become dominant, including in international human rights law,¹⁰² and is a driver of the now prevalent research economy. It is characterised by three features: its individualism (culminating in the importance of intellectual property rights in science, echoed in Article 15(1)(c) ICESCR since 1966); its universalism (leading to the erasure of scientific knowledge’s culturally situated and diverse origins); and its fundamentalism (replacing the historical process of epistemic development by a pure and eternal abstraction).¹⁰³

One of the objections the proposed participatory account of the public good of science may attract is that of the burden it allegedly imposes on other individuals and on a given public’s institutional and legal order. To quote Denise Réaume –who, however, discusses the separate question of the justification of collective rights in such a good and hence of the corresponding individual obligations: ‘in order to achieve [a scientific society], for example, it is necessary that there be many who take an active and genuine interest [in science], among other things. Everyone need not participate, but a substantial number must’.¹⁰⁴

In response, one should start by emphasising that what is at stake in this article is not the recognition of individual mutual rights and duties in an interindividual account of rights, but the recognition of a public good and interest and of the corresponding institutional duties in an institutional account of rights. Institutions’ obligations do not face the same autonomy-based objection as individuals’. To the extent that science is a

communal good, moreover, and as I explained before, it does not only give rise to an interest of the instituted public group, but also to a communal responsibility. That responsibility is not a burden imposed by individuals on all the other members of the community, as a result. Regarding the potential redistribution of the institutional burden on individuals through domestic or international law, finally, one should emphasise that it is the point of institutional mediation to channel the burden and to alleviate the individual consequences of the communal burden by sharing it equally or, at least, fairly among all members of the community. I will revert to the question of the individual and institutional burden of the human right to participate in science in the next section.

4. The participatory dimensions of scientific rights

While not all public and participatory goods do give rise to rights, science does. The question to address next therefore pertains to the kind of rights it should give rise to, and especially to what their collective and participatory dimensions should amount to exactly. This section focuses on clarifying the collective dimensions of the interest protected by the corresponding cluster of what may be referred to as ‘scientific rights’, its right-holders and its duty- and responsibility-bearers, both domestically and internationally. Its argument proceeds in two steps: it specifies various collective and individual scientific rights (4.1.), before spelling out the corresponding individual and collective duties (4.2.).

Importantly, and to the extent that this article purports to interpret the existing REBSPA in international human rights law and justify a participatory account thereof, it presumes that that right is a ‘human’ right. It does not therefore provide an argument for the recognition of that right as a human right. It presumes moreover that the right to participate in science is characterised by the common features shared by all human rights by opposition to other moral rights, which, as this author has argued elsewhere, are: their dual moral *cum* legal dimension; their being held equally by all; and the institutional nature of their duty-bearers.¹⁰⁵

A preliminary terminological clarification is in order given the polysemy of the terms used when referring to the rights pertaining to public goods such as the participatory good of science. This is especially the case of the term ‘collective’ in the expression ‘collective rights’. First, it may be used with respect to different objects, to oppose a collective to an individual ‘interest’ in a collective good (i), a collective to an individual ‘right-holder’ (ii) and a collective to an individual ‘duty-bearer’ (iii). In this section, all three are addressed in turn. Second, and more strictly, ‘collective’ may be used to mean either ‘joint’, as in a joint individual interest, right-holder or duty-bearer (i) or ‘corporate’ or ‘group’ as in a group’s interest, right-holder or duty-bearer (ii).¹⁰⁶ In this section, ‘collective’ is used to refer to jointly held interests and rights, and ‘group’ to a group’s interests and rights *stricto sensu*.

4.1. The collective and individual scientific rights

As mentioned earlier, this article proposes to interpret the REBSPA as a ‘right to participate in scientific practice and to enjoy its benefits’. This interpretation brings together the two prongs of the interest protected by the right declared by Article 27(1) UDHR in 1948, thereby mending the omission of the primary participatory dimension of the right in its

1966 formulation under Article 15(1) ICESCR. This also corresponds to the CESCR's most recent restatement of the right as 'right to participate in and to enjoy the benefits of scientific progress and its applications' or 'RPEBSPA'.¹⁰⁷

It is important to understand, however, that, to the extent that the right protects an interest in the participatory good of science, this makes it a primarily participatory right or, more exactly, set of rights. Because, as argued before, science is not an 'end product',¹⁰⁸ one may not oppose participation in the scientific practice or process, on the one hand, to access to its outcome or benefits, on the other. This in turn explains how scientific rights should be deemed participatory rights or rights to participation through and through. And this, whether they then actually pertain specifically to contributing to science or to enjoying its benefits. In other words, the second prong of the interest and the right, i.e. enjoying the benefits of science, should be considered just as participatory as the first one. To that extent, moreover, not only does it not make sense to separate, as many do, the right to participate in the scientific practice from the right to enjoy its benefits, but one should not separate it from the freedom of scientists either (Article 15(3) ICESCR).¹⁰⁹ All types of scientific rights are participatory for they all require the participation of others, be they freedoms or claim-rights and whether they pertain to the participation of scientists in scientific research *stricto sensu* or to that of non-scientists in the more encompassing scientific practice.¹¹⁰ To that extent, what is usually understood by 'participatory' or 'citizen' science in the context of scientific research itself does not exhaust the participatory dimension of the RPEBSPA.

Of course, as explained before, there may be diffuse or derivative benefits of science that one may enjoy individually and without the participation of others, and this both as scientists and non-scientists. As a result, while what one may refer to as the 'core scientific rights' to participate in the scientific practice and to enjoy its benefits are participatory, one may also derive 'diffuse non-participatory scientific rights' from those core scientific rights. The former are core participatory rights to the participatory good of science, while the latter are diffuse and derivative non-participatory rights to that same participatory good.¹¹¹ Importantly, the latter are entirely parasitic on the former, and this weighs on their mutual relationship in case of conflict, as we will see. They are sufficiently widespread, however, and their general recognition as individual rights common enough for them to be reflected in the second prong of the protected interest in the proposed re-formulation of the right defended in this article.

What does this distinction and relationship between core participatory scientific rights and diffuse non-participatory scientific rights imply for the nature of scientific rights and of the right-holders of those rights, and especially for whether they should be deemed 'individual' or 'collective'?

First of all, *core participatory rights* to participate in the scientific practice and to enjoy its benefits are *collective rights*. Indeed, those participatory goods may not be enjoyed individually. They are collective rights, however, only to the extent that they are held together and need to be exercised together with others for the participation in the scientific practice and the enjoyment of benefits to be effective.¹¹² Other examples of such collective rights in international human rights law are the right to democratic participation or the right to take part in cultural life.

The right-holders include scientists, of course, i.e. those who make a profession out of their participation in the scientific practice, but also all the other members of the

overlapping smaller and larger epistemic communities constitutive of the public. The latter forms of participation in the scientific practice are sometimes referred to as ‘citizen’ or ‘participatory’ science.¹¹³ In terms of content, the core participatory scientific rights give rise to both negative and positive duties and to duties to respect, protect and fulfil. They may include claim-rights, of course, but also freedom-rights. As example of the former, one may mention the right to open access to scientific results.¹¹⁴ As to the latter, the best example is scientists’ scientific freedom as guaranteed by Article 15(3) ICESCR.¹¹⁵ Both are collective rights, however, to the extent that they are held and exercised jointly with others.

Importantly, and as explained before, these core participatory rights correspond to individual interests in the participatory good of science, and their collective dimension as ‘collective rights’ merely resides in their being held and enjoyed together.¹¹⁶ They should not therefore be confused with *group rights* that would be grounded in collective interests in the participatory good of science.

In certain cases, of course, core participatory scientific rights may also encompass group rights to the extent that their right-holders may amount to groups, i.e. specific epistemic sub-communities themselves. As argued before, indeed, those epistemic sub-communities and their relations are a central feature of the scientific practice. Importantly, this does not apply to the entire epistemic community in every State or worldwide for that group cannot hold group rights against itself (and, by extension, against the institutions that institute it as a public and hence as a group).¹¹⁷ Such group scientific rights, however, may benefit indigenous peoples, but also other kinds of epistemic communities at the sub-national or even trans-national level (e.g. the university community, the biologists’ community, the philosophers’ community or the farmers’ community).¹¹⁸

As mentioned before, however, the inclusion, through international human rights law, of so-called ‘indigenous knowledge’ in the public good of science as opposed to culture has only been limited so far.¹¹⁹ Worse, the corresponding rights to indigenous knowledge have been reduced to a set of passive individual rights (usually intellectual property rights)¹²⁰ as opposed to active participatory rights constitutive of a valuable social practice. And this applies to all scientific rights, conceived both as collective and as group rights. The CESCR’s 2020 General Comment No. 25 itself is very disappointing on this question. Not only does it not address indigenous peoples’ rights pertaining to indigenous knowledge on a par with other scientific rights and reduces them either to cultural rights or to the rights to self-determination of those peoples, but it also treats indigenous peoples and their members paternalistically as passive holders of property rights over their ‘precious’ knowledge.¹²¹ This is regrettable as including indigenous peoples and their individual members as right-holders of the right to participate in scientific practice would not only benefit those groups and individuals, but also all of us and the public good of scientific diversity itself.

Secondly, *diffuse* or *derivative non-participatory rights* to access the scientific practice and to enjoy its benefits are *individual rights*. The right-holders may indeed enjoy those benefits individually and, in some cases, have an individual interest therein.¹²² Those rights are, as explained before, diffuse and parasitic on the existence of the participatory good. They include, for instance, the right to access the scientific practice and enjoy its benefits, on the one hand, and the right to do so equally and without discrimination, on

the other. Again, the right-holders include scientists, of course, but also all the other members of the smaller and larger epistemic communities constitutive of the public.

Again, one may raise the objection of the disproportionate burden protecting such collective and group participatory scientific rights may place on those rights' institutional duty-bearers, i.e. States, and, by extension, on all individual members of the political community.

As explained before, however, the institutional mediation of those duties (of States and other public institutions) should actually be approached as a way to alleviate that individual burden. Moreover, to the extent that the public good of science is also a communal one, it gives rise to a common responsibility which our institutions enable us to bear more fairly and to allocate more equally between ourselves through (public, criminal or private) law. In any case, States' and other public institutions' international human rights duties need not be translated into equivalent individual duties under domestic law. Nor does States' institutional duty to organise science and ensure its participatory quality imply binding everyone into participating.¹²³ All it requires is that the participatory practice remains minimally sustainable –thanks, for instance, to a critical mass of participants and sufficient public funding levied through taxes– and equally accessible. In any case, the protection of the individual right to participate and contribute willingly, but also, by extension, her right not to participate and contribute¹²⁴ to the scientific practice is equally guaranteed. Finally, with respect to the burden on public institutions of the group rights of epistemic sub-communities such as indigenous peoples, one should emphasise how each epistemic sub-community's interests may in fact overlap with the overall epistemic community's as a portion thereof. This may, of course, lead to conflicts of rights and duties, but this is the case between human rights in general. Those conflicts may be resolved in an egalitarian redistributive way in each case.

Speaking of the resolution of conflicts of scientific rights, whether they are conflicts between duties corresponding to the (same or different) scientific rights of the same right-holder or of different right-holders (e.g. between the scientific freedom of two scientists), on the one hand, and whether they oppose duties corresponding to individual, collective or group scientific rights (e.g. between the group right of an indigenous people and the collective right of a scientist, or between the group right of an indigenous people and the collective or individual right of one of its members), on the other, the participatory dimension of the interests protected is key. Indeed, it is the primary dimension of the scientific rights protected, one that ties them together, thereby affecting their relations in case of conflict. This is, this article proposes, how one should understand the fact that many dimensions of the right are declared and guaranteed together in one single provision under Article 15 ICESCR. This is especially the case of the authorship rights of Article 15(1)(c) ICESCR or of scientific freedom of Article 15(3) ICESCR.

What this means, more specifically, is that conflicts of scientific rights and the corresponding duties should not be approached as any other conflict between separate individual rights or as a conflict between any individual right and an extraneous public interest.¹²⁵ Indeed, the core participatory dimension that is common to those rights should weigh on the articulation between their corresponding duties, and especially on the priorities one may draw between them. Moreover, the derivative nature of the individual rights to the participatory good of science and to the corresponding core collective rights implies that the former should have an inferior rank to the latter in case of conflict

between the corresponding duties. Finally, the participatory dimension of the rights also implies that there should be equal participation in the processes through which those conflicts of rights are to be resolved, as we will see. This egalitarian procedural requirement also applies to the resolution of the conflicts between the group rights of an epistemic community such as an indigenous people and the collective rights of its individual members.

4.2. The individual and collective duties relative to scientific rights

While scientific rights qualify as both individual and collective and, in some cases, even as group rights, the corresponding duties, like those arising under other human rights such as negative duties to respect or positive duties to prevent, protect and remedy, are *institutional* and hence are never individual. To that extent, the opposition between ‘individual’ and ‘collective’ duties relative to scientific rights cannot match that between ‘individual’ and ‘collective’ rights introduced in the previous section.

In the current state of international human rights law, indeed, human rights duty-bearers are public institutions, as opposed to individuals or private groups. They include mostly States, although other public institutions like international organisations (IOs) are increasingly considered as human rights duty-bearers as well. This ‘interinstitutional’ as opposed to ‘interindividual’ approach to the human right to participate in science’s duty-bearers, but also its ‘public’ as opposed to ‘private’ institutional dimension are justified by reference to the fact that those institutions channel or mediate the duties owed by all to all in a given political community and thereby also institute that political community as such.¹²⁶

Of course, this does not preclude moral or legal individual (e.g. scientists’ and researchers’) or even group (e.g. private research foundations’ or multinational corporations’) *responsibilities* for the right to participate in science under international human rights law. Those are responsibilities to cooperate and assist States in complying with their own (jurisdictional) duties related to the right to participate in science. Importantly, States (and IOs) incur legal *duties* under international human rights law to anchor those individuals’ or private groups’ responsibilities for the same human rights into the latter’s respective (public, private or criminal) duties under domestic law. The fact is, however, that, to date, the latter only arise at a second stage. This is justified on grounds of subsidiarity and democratic legitimacy. In fact, relying on the law of the political community in question to allocate those responsibilities is even more justified in the case of a right pertaining to a public good like science the institutional dimension of which is constitutive of the good. As explained before, moreover, to the extent that the good is participatory and communal, the need for public institutions to specify and allocate our common responsibilities for science and help us share the burden fairly among ourselves is even greater.

Still, the institutional duties corresponding to scientific rights may be said to be *individual*, albeit in a different sense of ‘individual’ than the one used in the previous section when discussing rights. Those duties arise, indeed, within the context of one State or IO of jurisdiction at a time, and are owed to right-holders situated under each State or organisation’s individual (territorial or extraterritorial) jurisdiction at a time. This is what applies to all human rights duties under international human rights law: while

they are universally held by all human persons, they are not owed to them by all States together.

A key specificity of the duties corresponding to scientific rights and one that stems from their pertaining to an international public good, however, is that they do not only have individual institutional duty-bearers, but also *collective duty-bearers* and *responsibility-bearers*. States (and other public institutions) owe their respective duties relative to scientific rights together, just as those rights' holders hold them together. Their duties are only 'collective' in this sense, nevertheless, and not 'corporate' or 'group' duties in the absence of a single institutionalised world public and corresponding single global public institution.

The justification of the collective dimension of those duties is two-pronged, as this author has argued elsewhere: it resides in the universal scope of the public good of science, on the one hand, and, by extension, in the universal scope of the standard threats to the interests in that good, on the other.¹²⁷ As a right to a public good that is universal,¹²⁸ first, the human right to participate in science can only be effectively protected if all its duty-bearers worldwide, i.e. primarily States and IOs, cooperate in specifying, allocating and fulfilling together the duties they bear separately towards people under their respective jurisdiction.¹²⁹ What this means, moreover, is that, to the extent that the public good of science is also a communal one, its public duty-bearers should also re-institute themselves as an international public community to share their common responsibility for the universal scientific practice. This requires, as we will see, re-instituting themselves as an international public epistemic community through one or more IOs. Second, the collective nature of those duties is also a condition of the feasibility of the protection of their right-holders' interests against global threats. It conditions indeed the overall fairness of the burden on each of the duty-bearing States or IOs of jurisdiction.

No wonder then that a collective positive duty of international institution-building with other States or IOs of jurisdiction should be described as one of the duties grounded in the right to participate in science under international human rights law.¹³⁰ It may even be considered as the overarching duty to fulfil corresponding to that right.¹³¹ It was mentioned as early on as 2009 by the UNESCO's Venice Statement as the duty 'to establish institutions to promote the development and diffusion of science and technology'.¹³² Regrettably, however, its international dimensions have not been specified in detail since then,¹³³ be it by the UN Special Rapporteur's 2012 Report¹³⁴ or, most recently, by the CESCR's 2020 General Comment No. 25.¹³⁵

The same may be argued about the *responsibilities* for scientific rights that may be regarded as collective in the same way as the corresponding duties. The importance of those collective responsibilities for the human right to participate in science may actually explain the separate reference to international cooperation in Article 15(4) ICESCR itself.¹³⁶ This mention echoes, but reinforces, in the scientific context, the general reference to 'international assistance and cooperation' of Article 2(1) ICESCR (see also Articles 22 and 23 ICESCR). What is at stake in those provisions are 'supporting'¹³⁷ responsibilities for the right to participate in science bearing on all States parties to the ICESCR at once and not only on the State of jurisdiction.¹³⁸ The UNESCO's 2009 Venice Statement actually referred to them as the responsibilities 'to take measures to encourage and strengthen international cooperation and

assistance in science and technology to the benefit of all people'.¹³⁹ If the argument proposed here is correct, international 'cooperation' around the right to participate in science is not only about providing bilateral aid, but also amounts to a responsibility for multilateral coordination and institution-building.¹⁴⁰ The institutional framework for that international cooperation, however, still remains to be developed.

5. Three implications of the institutionalisation of science

There are three implications of the proposed interpretation of the right to participate in scientific practice and enjoy its benefits for its institutionalisation. Those three implications reflect the three features of the good of science discussed before: its being a public, participatory and communal good.

Recognising science as a public good and, more specifically, doing so through a human right has egalitarian, and especially democratic implications for the institutional specification of the content of the right to participate in scientific practice (5.1.). Its recognition, additionally, as a participatory good calls for a public legal and institutional framework of science that is in a position not only to guarantee, but also to organise that participation effectively (5.2.). Finally, the communal responsibility that comes with a communal good like science calls, as a surplus to the public law of science, for the organisation of the self-government of science, albeit, of course, as good (self-)government (5.3.). Those three features apply both domestically, i.e. inside the institutions of each duty-bearing State, and internationally, i.e. inside the international institutions those States ought to establish to comply with their collective duties of cooperation relative to the right to participate in science discussed in the previous section.¹⁴¹

Importantly, those institutional implications of the human right to participate in scientific practice all confirm the central role the law should play in the participatory practice of science, a question that is too often sidelined by a focus on the reverse and criticisable place science increasingly plays in the law. The validity and legitimacy of law do not actually require being informed by or complying with science¹⁴² –and it is important to emphasise this in light of the threat of scientism currently weighing on international human rights law itself.¹⁴³ However, the reverse is not true: science cannot be guaranteed as an end in itself and recognised as a public, participatory and communal good without law and the corresponding institutions.¹⁴⁴

5.1. From science as a public good to the democratic institution of science

Turning the legal guarantee of the public good of science into a human right implies recognising each other an equal right to democratic self-determination over the content and the scope of that right and hence over the normative dimensions of the participatory practice of science. It follows that the specification of the content of the obligations corresponding to the right to participate in science and its implementation, more generally, should be decided upon democratically.¹⁴⁵

Of course, all human rights are to some extent participatory in that sense. Indeed, the human right to democratic self-determination guaranteed by Article 25 ICCPR implies the right to determine one's own rights democratically and hence to specify their

scope and content equally with other human right-holders.¹⁴⁶ That right to equal participation actually goes further in the case of a human right pertaining to a public good like science, however.¹⁴⁷ It also requires equal participation in the decision-making process through which science *qua* institution in itself is organised and through which its benefits are promoted and its risks are prevented.¹⁴⁸ It is only in this way that science may be regarded as truly ‘citizens’ science’.¹⁴⁹

This raises the vexed issue of the relationship between science and (democratic) politics. Scope precludes addressing that question in full here, however. Various proposals have been made elsewhere on how best to articulate them, either at the scientific or at the democratic end or both.¹⁵⁰ In short, democratic decision-making is sometimes accused of a *status quo* bias, and hence as being at odds with scientific innovation over which it may have a chilling effect. Democratic decisions over scientific funding or, more generally, the organisation of science are often also perceived as a threat to scientific independence.¹⁵¹ Nevertheless, if one approaches science as one of our public institutions under domestic and international law, as this article argues one should, then equal participation and democracy become key to its legitimacy just as the respect for the human rights pertaining to the same scientific practice and institution. What is at stake here, therefore, is not democracy *in* science and turning the scientific practice into a full-blown political practice, but democracy *of* and *about* science.

5.2. From science as a participatory good to the public law of science

Recognising science as a right to a participatory good calls for a legal and institutional framework of science that guarantees the independence of the scientific practice from the State, the market or religion, but also from itself and from the peril of scientific self-validation. The public law of science should also organise the participation that right pertains to. It is even more the case of participatory goods that are also communal ones like science. Such a common responsibility requires indeed some form of public institutional channelling and legal mediation to specify and allocate individual and collective scientific responsibilities.

Those institutional requirements of the right to participate in science include adopting a ‘participatory national framework law’ identified by the CESCR in 2020 as one of the States’ obligations under Article 15(1)(c) ICESCR.¹⁵² Critically, this institutional requirement applies both domestically and internationally. Curiously, the CESCR did not expand on what those international institutions and the participatory international framework law¹⁵³ could and should look like.¹⁵⁴ One may, however, envisage consolidating an ‘international law of science’ on the model of the international labour law of the beginning of the twentieth Century, and maybe even reforming UNESCO to that purpose on the model of the International Labour Organisation’s multipartite organisation.

Importantly, with the exception of the constitutional guarantee of the human right to participate in science, the public law of science, whether domestic or international, need not amount to public law in a strict sense. Even if science should be nested within the broader socio-political practice and institution of the State and if, to that extent, its law should amount to ‘public’ law *qua* official or third-party law, the latter need not and should actually not be equated with other public institutions and other parts of

administrative law pertaining to those public institutions. Indeed, scientific practice can and actually should be organised institutionally so as to be independent of the State, both financially and legally. We have many other examples that may be relevant in this respect, both in domestic and international public law. Think of trade unions, for instance. By reference to the two ‘positions’ of law in Ulpian’s famous quote distinguishing the public position from the private,¹⁵⁵ one may actually think of developing a third ‘position’ of law for science, one that is neither public nor private: a type of ‘social’ law along the lines of the law that applies inside social relations (e.g. labour relations).¹⁵⁶ This would be a form of social law specific to science, a form of ‘science law’ that would apply to our scientific practice.¹⁵⁷

Safeguarding the independence of the scientific institution in line with its human rights guarantee is essential, however. To the extent that its public institutionalisation guarantees its being an end in itself, distinct from the market but also from the State, the public law of science should not aim at defining science and its aims any further.¹⁵⁸ While there should be limits to ‘legal scientism’, we should keep ‘scientific legalism’ at bay. This does not mean, of course, leaving it to scientists to define the ends of the scientific enterprise either as this would defeat the purpose of the guarantee of the inherent value of science *qua* human right in the first place. To that extent, the self-government of science, while required to apply as a surplus to the public law of science, also needs to be organised so as to amount to ‘good self-government’ precisely to avoid the risk of self-validation.¹⁵⁹ This brings us to the next point.

5.3. From science as a communal good to the good self-government of science

Last but not least, the communal responsibility that comes with a communal good like science calls for the self-government of science in the specification and allocation of our common responsibilities for the practice of science.¹⁶⁰ This corresponds to one of the four dimensions of the ‘normative structure’ and ‘ethos’ of science according to Robert Merton: ‘communism’, and the requirement of social collaboration around science in the public domain.¹⁶¹ It may take the form of ethical guidelines, but one may also imagine derivative forms of self-legislation on the model of what has been developed inside trade unions, families or other social institutions nested in a private or social law framework.

Importantly, the self-government of science should amount to ‘good (self-)government’ in the political sense of the term,¹⁶² rather than any other form of ‘governance’ drawing on models of managerial self-governance.¹⁶³ This means in particular respecting principles such as equality and transparency. It also raises the question of democracy *in* science this time.¹⁶⁴ Democracy is not a prerogative of public institutions indeed, and it should also apply to self-governing ones or partly self-governing ones like science in this case. Of course, democratic principles need not have the same implications for all public institutions, and certainly not the same for the (public) institution of science as it does for State institutions. It suffices here to think of the specific and contextualised forms of economic or social democracy currently discussed for corporations or non-governmental organisations, or those applicable inside trade unions.

The requirements of the good self-government of science is, of course, even more important to the good government of epistemic sub-communities such as indigenous

peoples. In the latter cases, however, self-determination over science comes very close to political self-determination and both may even overlap. The former should not, however, be conflated with the latter, not the least because it should remain constrained by the State's and the international public law of science, including the human right to participate in science, and should be approached as part of the larger institution of science domestically. It only applies for the surplus, therefore. This is a particularly sensitive issue with respect to the protection of equality and against discrimination in the access to and participation in indigenous knowledge.

6. Conclusion

In his seminal article about the normative structure of science published in 1942, Robert Merton argued that scientists had come full circle to the point of re-emergence of science in the modern world. This came at a price, however, he said:¹⁶⁵

With the unending flow of achievement, [...] the instrumental was transformed into the terminal, the means into the end. Thus fortified, the scientist came to regard himself as independent of society and to consider science as a self-validating enterprise which was in society but not of it. A frontal assault on the autonomy of science was required to convert this sanguine isolationism into realistic participation in the revolutionary conflict of cultures.

Grounded in the post-war consensus on the value of a strongly institutionalised and public enterprise of science and on the risk of frequent dissociations between scientific and social progress, the 1948 declaration of the right to science as a human right vindicated Robert Merton's concern.

That right should have limited both a renewed instrumentalisation of science by the powers in place, be they private and market-based or public and State-based, and its counter-reaction, i.e. the scientists' self-validating approach to science. After all, a human right amounts to the most fundamental of legal guarantees of the independent and inherent value of science as an end in itself. More importantly, as a dualist right, that guarantee is also conditional on science being constitutive of our fundamental equal status and thereby imposes inherent limits on the kind of interests in science that may be protected as a human right. For the reasons presented in this article, however, things did not turn out as they should have. The public, participatory and communal dimensions of the good of science and of the corresponding right to participate in science got lost along the way. Thereby, the right was put to sleep and has remained dormant until recently.

Nearly a century later, we seem to have come full circle again. The context is different, of course, and arguably even more difficult in light of the degree of privatisation of science and economic instrumentalisation thereof in a research-driven global economy. So is the contemporary movement of counter-publicisation of science that is characterised this time by its democratic dimension. In reaction, the self-validating position of scientists themselves has fortified again, including, this time, inside the law. Hence the current critique of the role of science in law and of the corresponding struggle for the rightful place of law in science.

This time around, however, and unlike what was the case in 1942, we will be able to rely on an existing human right in this endeavour. Indeed, the formal guarantee of the

right to participate in science is given, and merely needs reviving. The task ahead of us then is to take that right to the next stage by institutionalising the participatory good of science, both domestically and internationally.

Notes

1. UN General Assembly Resolution 217 A (III), *Universal Declaration of Human Rights*, UN Doc. A/RES/217 A (III) (10 December 1948).
2. International Covenant on Economic, Social and Cultural Rights, New York, 16 December 1966, *United Nations Treaty Series*, vol. 993, p. 3.
3. See e.g. Committee on Economic, Social and Cultural Rights (CESCR) General Comment No. 25, *Science and economic, social and cultural rights (art. 15(1)(b), (2), (3) and (4))*, UN Doc. E/C.12/GC/25 (30 April 2020), <https://undocs.org/E/C.12/GC/25>, §10; United Nations Human Rights Council (UN HRC), *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'*, UN Doc. A/HRC/20/26 (12 May 2012), <https://www.ohchr.org/en/special-procedures/sr-cultural-rights/right-benefit-scientific-progress-and-its-applications>, §20. See also Mylène Bidault, 'Considering the Right to Enjoy the Benefits of Scientific Progress and its Applications as a Cultural Right: A Change in Perspective', in *The Right to Science: Then and Now*, ed. Helle Porsdam and Sebastian Porsdam Mann (Cambridge: Cambridge University Press, 2021), 140–49; Mikel Mancisidor, 'The Dawning of a Right: Science and the Universal Declaration of Human Rights (1941–1948)', in *The Right to Science: Then and Now*, ed. Helle Porsdam and Sebastian Porsdam Mann (Cambridge: Cambridge University Press, 2021), 17–32; Helle Porsdam, *Science as a Cultural Human Right* (Philadelphia: University of Pennsylvania Press, 2022).
4. UN HCR, *2012 Report*, §3; CESCR General Comment No. 25, §1. See also Ben Saul, David Kinley, and Jacqueline Mowbray, 'Art. 15: Cultural Rights', in *The International Covenant on Economic, Social and Cultural Rights: Commentary, Cases and Materials* (Oxford: Oxford University Press, 2014), 1175–232, 1212; Mancisidor, 'The Dawning of a Right', 26–29.
5. The argument of simplicity (e.g. Mancisidor, 'The Dawning of a Right', 27–29) fails to convince when the good at stake is a public and participatory one like science, by contrast to life or food. It suffices to note the similar controversies pertaining to the right 'to health' or 'to democracy' to realise how those shortened denominations actually fuel controversy by erasing the participatory dimension of the right rather than put it to rest. Two further arguments against referring to the right *to* science are the history of circumvention of the participatory dimension of the REBSPA and the political dimension of the issue in the contemporary research-based economy, as explained below.
6. See Denise G. Réaume, 'Individuals, Groups, and Rights to Public Goods', *University of Toronto Law Journal* 38, no. 1 (1988): 1–27; Jeremy Waldron, 'Can Communal Goods Be Human Rights?', *European Journal of Sociology* 28, no. 2 (1987): 296–322.
7. Indeed, 'sharing in' in the English version of Article 27(1) UDHR is translated by 'participation' in other languages, such as French, Spanish or Russian: see Mancisidor, 'The Dawning of a Right', 24. On the replacement of one term by the other in the *travaux préparatoires* of Article XIII of the American Declaration of the Rights and Duties of Men (1948) and hence on their difference, however, see Cesare P.R. Romano, 'The Origins of the Right to Science: The American Declaration on the Rights and Duties of Man', in *The Right to Science: Then and Now*, ed. Helle Porsdam and Sebastian Porsdam Mann (Cambridge: Cambridge University Press, 2021), 33–53, 50.
8. See e.g. Johannes Morsink, *The Universal Declaration of Human Rights: Origins, Drafting, and Intent* (Philadelphia: University of Pennsylvania Press, 1999); Richard P. Claude, 'Scientists' Rights and the Human Right to the Benefits of Science', in *Core Obligations: Building A Framework for Economic, Social and Cultural Rights*, ed. Audrey R. Chapman and Sage

- Russell (Antwerp/Oxford/New York: Intersentia, 2002), 247–78; Audrey R. Chapman, ‘Towards an Understanding of the Right to Enjoy the Benefits of Scientific Progress and its Applications’, *Journal of Human Rights* 8, no. 1 (2009): 1–36; William A. Schabas, ‘Looking Back: How the Founders Considered Science and Progress in Their Relation to Human Rights’, *European Journal of Human Rights*, Special issue on the Human Right to Science, 4 (2015): 504–18; Tara Smith, ‘Understanding the Nature and Scope of the Right to Science through the *Travaux Préparatoires* of the Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights’, *The International Journal of Human Rights* 24, no. 8 (2020): 1156–79; William A. Schabas, ‘Historical Considerations on the Human Right to Science’, *International Journal of Human Rights*, Special issue on Anticipation under the Human Right to Science (forthcoming).
9. See Franklin D. Roosevelt, ‘Four Freedoms’ (speech, State of the Union Address, Congress of the United States, Washington, US, 6 January, 1941) where he refers to the ‘enjoyment of the fruits of scientific progress’.
 10. United Nations Educational, Scientific and Cultural Organization (UNESCO), *Venice Statement on the Rights to Enjoy the Benefits of Scientific Progress and its Applications* (art. 15 (1) (b) ICESCR) (17 July 2009), https://www.aaas.org/sites/default/files/VeniceStatement_July2009.pdf, §7. See also Lea Shaver, ‘The Right to Science and Culture’, *Wisconsin Law Review* 1 (2010): 121–84; Lea Shaver, ‘The Right to Science: Ensuring that Everyone Benefits from Scientific and Technological Progress’, *European Journal of Human Rights*, Special issue on the Human Right to Science, 4 (2015): 411–30.
 11. See e.g. UN General Assembly Resolution 3384 (XXX), *Declaration on the Use of Scientific and Technological Progress in the Interests of Peace and for the Benefit of Mankind*, UN Doc. A/RES/30/3384 (10 November 1975).
 12. See e.g. UNESCO, *Recommendation on Science and Scientific Researchers* (1974 Revised Text), UNESCO Doc. 41 C/36 (13 November 2017), <https://unesdoc.unesco.org/ark:/48223/pf0000260889.page=116>.
 13. See e.g. UNESCO, *Declaration on Science and the Use of Scientific Knowledge*, UNESCO Doc. 30 C/15 (1 July 1999), <https://unesdoc.unesco.org/ark:/48223/pf0000116994>; UNESCO, *Universal Declaration on Bioethics and Human Rights*, UNSECO Doc. 33 C/Res. 15 (19 October 2005), <https://unesdoc.unesco.org/ark:/48223/pf0000180371>.
 14. UNESCO, *Venice Statement*.
 15. UN HCR, *2012 Report*; UN HCR, *Report of the Special Rapporteur in the field of cultural rights, Ms Farida Shaheed, on ‘copyright policy and the right to science and culture’*, UN Doc. A/HRC/28/57 (24 December 2014), <https://digitallibrary.un.org/record/792652>.
 16. CESCR General Comment No. 25. That comment closed the sequel initiated by the publication of two earlier general comments on the other two rights protected by Article 15(1) ICESCR: CESCR General Comment No. 21, *The right of everyone to take part in cultural life* (art. 15 (1) (a) ICESCR), UN Doc. E/C.12/GC/2121 (21 December 2009), <https://digitallibrary.un.org/record/679354>; CESCR General Comment No. 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* (art. 15 (1) (c) ICESCR), UN Doc. E/C.12/GC/17 (12 January 2006), <https://undocs.org/E/C.12/GC/17>.
 17. See CESCR General Comment No. 25, §2.
 18. See Daniel Moeckli, ‘Interpretation of the ICESCR: Between Morality and State Consent’, in *The Human Rights Covenants at 50: Their Past, Present, and Future*, ed. Daniel Moeckli, Helen Keller, and Corina Heri (Oxford: Oxford University Press, 2018), 48–74.
 19. See Samantha Besson, ‘The Influence of the Two Covenants on States Parties Across Regions: Lessons for the Role of Comparative Law and of Regions in International Human Rights Law’, in *The Human Rights Covenants at 50: Their Past, Present, and Future*, ed. Daniel Moeckli, Helen Keller, and Corina Heri (Oxford: Oxford University Press, 2018), 243–76; Samantha Besson, ‘Comparative Law and Human Rights’, in *The Oxford Handbook of Comparative Law*, ed. Mathias Reimann and Reinhard Zimmermann, 2nd ed. (Oxford: Oxford University Press, 2019), 1221–49.

20. See e.g. Andrea Boggio, 'The Right to Participate In and Enjoy the Benefits of Scientific Progress and Its Applications: A Conceptual Map', *New York International Law Review* 34, no. 2 (2021): 43–77; Rumiana Yotova and Bartha M. Knoppers, 'The Right to Benefit from Science and Its Implications for Genomic Data Sharing', *European Journal of International Law* 31, no. 2 (2020): 665–91; Sebastian Porsdam Mann, Helle Porsdam, and Yvonne Donders, 'Sleeping Beauty: The Right to Science as a Global Ethical Discourse', *Human Rights Quarterly* 42, no. 2 (2020): 332–56; Samantha Besson, 'The Human Right to Science: Mapping the Issues', *European Journal of Human Rights*, Special issue on the Human Right to Science, 4 (2015): 403–10; Jessica M. Wyndham and Margaret Weigers Vitullo, 'The Right to Science Whose Right? To What?', *European Journal of Human Rights*, Special issue on the Human Right to Science, 4 (2015): 431–61; Samantha Besson, 'Science without Borders and the Boundaries of Human Rights – Who Owes the Human Right to Science?', *European Journal of Human Rights*, Special issue on the Human Right to Science, 4 (2015): 462–85; Yvonne Donders, 'Balancing Interests: Limitations to the Right to Enjoy the Benefits of Scientific Progress and its Applications', *European Journal of Human Rights*, Special issue on the Human Right to Science, 4 (2015): 486–503; Amrei 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* 10, no. 4 (2010): 765–84.
21. See Eibe Riedel, 'Sleeping Beauty or Let Sleeping Dogs Lie? The Right of Everyone to Enjoy the Benefits of Scientific Progress and Its Applications (REBSPA)', in *Coexistence, Cooperation and Solidarity: Liber Amicorum Rüdiger Wolfrum*, ed. Holger P. Hestermeyer and others (Leiden: Brill/Nijhoff, 2012), 503–21; Porsdam Mann, Porsdam, and Donders, 'Sleeping Beauty'.
22. I am assuming here that such a mobilisation is possible and that it is not too late for a resurgence of public interest for the right and hence of State practice and, on that basis, for the rekindling of a productive dialogue on the right between States, civil society and the CESCR.
23. See e.g. CESCR General Comment No. 25, §9–11, §49 and §53–57; UN HRC, *2012 Report*, §3, §16–19, §20, §22 and §43–44; UNESCO, *Venice Statement*, §10; UN, *The Limburg Principles on the Implementation of the International Covenant on Economic, Social and Cultural Rights*, UN Doc. E/CN.4/1987/17 (8 January 1987), <https://www.refworld.org/pdfid/48abd5790.pdf>, Principle 11.
24. See CESCR General Comment No. 25, §4, drawing on UNESCO, *2017 Recommendation*, §1 (a)(i).
25. See CESCR General Comment No. 25, §10, by reference to CESCR General Comment No. 21, §14–15. See also Mancisidor, 'The Dawning of a Right', 29; Arjun Appadurai, 'The Capacity to Aspire: Culture and the Terms of Recognition', in *Culture and Public Action*, ed. Vijayendra Rao and Michael Walton (Palo Alto: Stanford University Press, 2004), 59–84.
26. See Céline Romainville, 'Defining the Right to Participate in Cultural Life as a Human Right', *Netherlands Quarterly of Human Rights* 33, no. 4 (2015): 405–36.
27. See e.g. Chapman, 'Towards an Understanding'; Müller, 'Remarks on the Venice Statement'; Boggio, 'The Right to Participate In and Enjoy'; Bidault, 'Considering the Right to Enjoy the Benefits of Scientific Progress'; Mancisidor, 'The Dawning of a Right'; Porsdam, *Science as a Cultural Human Right*.
28. See e.g. Boggio, 'The Right to Participate In and Enjoy'.
29. See e.g. Sebastian Porsdam Mann, Yvonne Donders, and Helle Porsdam, 'The Right to Science in Practice. A Proposed Test in Four Stages', in *The Right to Science: Then and Now*, ed. Helle Porsdam and Sebastian Porsdam Mann (Cambridge: Cambridge University Press, 2021), 231–45.
30. See e.g. Andrea Boggio and Brian Gran, 'A Proposal for Indicators of the Human Right to Science', in *The Right to Science: Then and Now*, ed. Helle Porsdam and Sebastian Porsdam Mann (Cambridge: Cambridge University Press, 2021), 268–85.
31. See also CESCR General Comment No. 25, §5.

32. See e.g. Philip Kitcher, *Pragmatic Naturalism: Progress in Science, Mathematics and Values* (Oxford: Oxford University Press, 2023).
33. See e.g. CESCR General Comment No. 25, §4 (borrowing from UNESCO, *2017 Recommendation*, §1(a)(i) and §40).
34. See e.g. Philip Kitcher, *Science, Truth, and Democracy* (Oxford: Oxford University Press, 2001), 200; Chapman, 'Towards an Understanding', 7. Contra: CESCR General Comment No. 25, §6.
35. See UNESCO, *Venice Statement*, §14(a)(b)(c) and §16(c); UN HCR, *2012 Report*, §9, §43, §74(h) and §74(m); CESCR General Comment No. 17, §35; CESCR General Comment No. 25, §6, §11 and §74–75. On the dualism of the REBSPA, see Samantha Besson, 'Anticipation under the Human Right to Science, Concepts and Stakes', *International Journal of Human Rights*, Special issue on Anticipation under the Human Right to Science (forthcoming). See also, albeit in other terms, Boggio, 'The Right to Participate In and Enjoy', 49; Schabas, 'Looking Back'.
36. Another encompassing term would be to refer to a right to participate in scientific 'life' (Bidault, 'Considering the Right to Enjoy the Benefits of Scientific Progress', 140) by analogy to cultural 'life' used in Article 15(1)(a) ICESCR.
37. Interestingly, there has also been a debate about how 'participatory' references to 'benefit sharing' under international law should be (see e.g. Elisa Morgera, 'Fair and Equitable Benefit-Sharing at the Cross-Roads of the Human Right to Science and International Biodiversity Law', *Laws* 4, no. 4 [2015]: 803–31).
38. See e.g. Kitcher, *Pragmatic Naturalism*.
39. See Samantha Besson, 'The Law in Human Rights Theory', *Journal for Human Rights* 7, no. 1 (2013): 120–50; Samantha Besson, 'Legal Human Rights Theory', in *Blackwell Companion to Applied Philosophy*, ed. Kasper Lippert-Rasmussen, Kimberley Brownlee, and David Coady (London: Blackwell Wiley, 2016), 328–41.
40. See Samantha Besson, 'International Legal Theory *qua* Practice of International Law', in *International Law as a Profession*, ed. Jean d'Aspremont and others (Cambridge: Cambridge University Press, 2017), 268–84.
41. Interestingly, while there has been a fair amount of discussion of the relationship between science and democracy in political theory to date (e.g. Philip Kitcher, *Science in a Democratic Society* [Lanham: Prometheus Books, 2011]; Zeynep Pamuk, *Politics and Expertise, How to use Science in a Democratic Society* [Princeton: Princeton University Press, 2021]), the same is not (yet) true of the relationship between science and human rights.
42. See Chapman, 'Towards an Understanding'.
43. On totalitarian 'scientism', see Hannah Arendt, *The Origins of Totalitarianism* (New York: Harcourt Brace Jovanovich, 1973), 350. See also Alain Supiot, *Le travail n'est pas une marchandise* (Paris: Fayard, 2019).
44. See Jack Donnelly, 'The West and Economic Rights', in *Economic Rights: Conceptual, Measurement, and Policy Issues*, ed. Shareen Hertel and Lanse Minkler, 1st ed. (Cambridge: Cambridge University Press, 2007), 37–55, 41–43.
45. See Besson, 'Comparative Law and Human Rights'.
46. See also Schabas, 'Historical Considerations on the Human Right to Science'.
47. Michela Massimi, 'A Human Rights Approach to Scientific Progress: The Deontic Framework', in *New Philosophical Perspectives on Scientific Progress*, ed. Yafeng Shan (New York/London: Routledge, 2022), 392–412.
48. International Covenant on Civil and Political Rights, New York, 16 December 1966, *United Nations Treaty Series*, vol. 999, p. 171.
49. For a critique, see also UNESCO, *Study the Right to Participate Freely in the Cultural Life of the Community*, UNESCO Doc. 7C/PRG/10 (2 November 1952), <https://unesdoc.unesco.org/ark:/48223/pf0000114587>. See also CESCR General Comment No. 25, §10.
50. For definitions, see UNESCO, *2017 Recommendation*, §1.
51. See CESCR General Comment No. 25, §36–38, §48 and §78.

52. See e.g. Cesare P. R. Romano and Andrea Boggio, 'Right to Science', in *Max Planck Encyclopedia of Comparative Constitutional Law*, ed. Grote Rainer, Frauke Lachenmann, and Rüdiger Wolfrum (Oxford: Oxford University Press, 2020), <https://oxcon.ouplaw.com/view/10.1093/law-mpeccol/law-mpeccol-e831>.
53. For a first survey, see Yotova and Knoppers, 'The Right to Benefit from Science'.
54. See Klaus D. Beiter, Terence Karran, and Kwadwo Appiagyei-Atua, 'Academic Freedom and its Protection in the Law of European States', *European Journal of Comparative Law and Governance* 3, no. 3 (2016): 254–345.
55. See Yotova and Knoppers, 'The Right to Benefit from Science', 677–85.
56. See CESCR General Comment No. 25, §63–71. This is confirmed, for instance, by the CESCR's Views in CESCR, *SC and GP v Italy*, E/C.12/65/D/22/2017 (7 March 2019), that concluded to the inadmissibility of the communication under Article 15(1)(b) ICESCR and decided the case under Article 12 ICESCR.
57. CESCR General Comment No. 25, §16–19.
58. *Ibid.*, §39–40.
59. UNESCO, *Venice Statement*, §7.
60. See e.g. Supiot, *Le travail n'est pas une marchandise*, 29–30.
61. Robert K. Merton, 'The Normative Structure of Science', in *The Sociology of Science: Theoretical and Empirical Investigations* (Chicago: University of Chicago Press, 1982), 223–78.
62. See Merton, 'The Normative Structure of Science', 268.
63. See also Helga Nowotny, 'The Changing Nature of Public Science', in *The Public Nature of Science under Assault. Politics, Market, Science and the Law*, ed. Helga Nowotny and others (Berlin/Heidelberg: Springer, 2005), 1–27.
64. See e.g. Kitcher, *Science, Truth, and Democracy*; Heather Douglas, *The Rightful Place of Science: Science, Values, and Democracy* (Tempe/Washington: Consortium for Science, Policy & Outcomes, 2021).
65. See e.g. Massimi, 'A Human Rights Approach to Scientific Progress'; Michela Massimi, *Perceptual Realism* (Oxford: Oxford University Press, 2022), 332–368.
66. See e.g. Bartha M. Knoppers and Henry T. Greely, 'Biotechnologies Nibbling at the Legal "Human"', *Science* 336, no. 6472 (2019): 1455–57. See also CESCR General Comment No. 25, §72.
67. For examples, see Besson, 'Anticipation under the Human Right to Science'.
68. See Réaume, 'Individuals, Groups, and Rights to Public Goods', 10.
69. See UNESCO, *2017 Recommendation*, Preamble. See also Michael Polanyi, 'The Republic of Science: Its Political and Economic Theory', *Minerva* 1, no. 1 (1962): 54–56.
70. See Samantha Besson, *The Private & Public Relation in International Law* (Leiden/Boston: Brill/Nijhoff, forthcoming), Chapter 4.
71. See Besson, *The Private & Public Relation in International Law*.
72. See Merton, 'The Normative Structure of Science', 270 ff.
73. See Hans Bots and Françoise Waquet, *La république des lettres* (Paris/Brussels: Belin/De Boeck, 1997); Françoise Waquet, *Respublica academica: rituels universitaires et genres du savoir (xviii-xxie siècles)* (Paris: PUPS, 2010). This strongly public meaning of the republic used here contrasts with the merely collective one given to 'republic' by Polanyi, 'The Republic of Science'.
74. See Supiot, *Le travail n'est pas une marchandise*, 29–31.
75. See *ibid.*, 30. See also Nowotny, 'The Changing Nature of Public Science'.
76. See Max Weber, *Wissenschaft als Beruf [1919]* (Tübingen: JCB Mohr [Paul Siebeck], 1992). See also Merton, 'The Normative Structure of Science', 268. See Polanyi, 'The Republic of Science', 62–63 on the risks of imposing a direction onto science.
77. See e.g. Paul A. Samuelson, 'The Pure Theory of Public Expenditure', *The Review of Economics and Statistics* 36, no. 4 (1954): 387–89.
78. See e.g. Inge Kaul and others, eds., *Providing Global Public Goods: Managing Globalization* (New York: Oxford University Press, 2003); World Health Organization, Richard G. Feachem, and Jeffrey Sachs, eds., *Global Public Goods for Health: The Report of*

- Working Group 2 of the Commission on Macroeconomics and Health* (Geneva: World Health Organization, 2002); UN, *Our Common Agenda – Report of the Secretary-General* (New York: United Nations, 2021), https://www.un.org/en/content/common-agenda-report/assets/pdf/Common_Agenda_Report_English.pdf.
79. See Joseph Raz, *The Morality of Freedom* (Oxford: Oxford University Press, 1986), 187.
 80. See Besson, *The Private & Public Relation*, Chapter 4.
 81. See e.g. John Tasioulas and Effy Vayena, 'Just Global Health: Integrating Human Rights and Common Goods', in *The Oxford Handbook of Global Justice*, ed. Thom Brooks (Oxford: Oxford University Press, 2020), 138–62. Contra: Gopal Sreenivasan, 'A Human Right to Health? Some Inconclusive Scepticism', *Aristotelian* 86, no. 1 (2012): 239–65.
 82. See Réaume, 'Individuals, Groups, and Rights to Public Goods', 10.
 83. See Kimberley Brownlee, 'The Right to Participate in the Life of the Society', in *Being Social. A Philosophy of Social Human Rights*, ed. Kimberley Brownlee, David Jenkins, and Adam Neal (Oxford: Oxford University Press, 2022), 71–91.
 84. See Réaume, 'Individuals, Groups, and Rights to Public Goods', 10.
 85. See *Ibid.*, 11.
 86. See *Ibid.*, 10 and 15.
 87. See *Ibid.*
 88. This is actually also what Maria C. da Cunha, *Savoirs autochtones: quelle nature, quels apports?* (Paris: Collège de France, 2012), 7, argues about traditional or indigenous knowledge.
 89. See e.g. CESCR General Comment No. 25, §10.
 90. For a critique, see Romainville, 'Defining the Right to Participate in Cultural Life as a Human Right'.
 91. See CESCR General Comment No. 21, §14–15; CESCR General Comment No. 25, §9–11; UN HCR, *2012 Report*, §3, §16–19, §20, §22 and §43–44. See also Bidault, 'Considering the Right to Enjoy the Benefits of Scientific Progress', 140.
 92. See Réaume, 'Individuals, Groups, and Rights to Public Goods', 11.
 93. See UN General Assembly Resolution 61/295, *Declaration on the Rights of Indigenous Peoples*, UN Doc. A/61/L.67 (13 September 2007), Article 31.
 94. See Gurdial S. Nijar, 'Traditional Knowledge Systems, International Law and National Challenges: Marginalization or Emancipation?', *European Journal of International Law* 24, no. 4 (2013): 1205–21.
 95. 'Traditional' or 'indigenous' knowledge usually refers to a form of knowledge acquired from generation to generation. As a result, the protection of each indigenous people and its normative framework of knowledge transmission becomes as essential as the protection of the knowledge itself. See da Cunha, *Savoirs autochtones*, 7.
 96. See Massimi, *Perspectival Realism*, 332–68.
 97. See CESCR General Comment No. 25, §39–40.
 98. On that collaboration, see da Cunha, *Savoirs autochtones*, 42.
 99. On those differences, see *Ibid.*, 9 and 46.
 100. See e.g. Massimi, 'A Human Rights Approach to Scientific Progress'; Kitcher, *Science, Truth, and Democracy*. See also Polanyi, 'The Republic of Science', 69 and 71–72, on science as 'tradition'.
 101. See Merton, 'The Normative Structure of Science', 273–74 and 277–78.
 102. See CESCR General Comment No. 25, §4.
 103. See Massimi, *Perspectival Realism*, 332–68.
 104. See Réaume, 'Individuals, Groups, and Rights to Public Goods', 13.
 105. See Samantha Besson, 'La structure et la nature de droits de l'homme', in *Introduction aux droits de l'homme*, ed. Maya Hertig and Michel Hottelier (Brussels: Bruylant, 2014), 19–38.
 106. Peter Jones, 'Group Rights', in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta and Uri Nodelman, Fall 2022 Edition, n.d., <https://plato.stanford.edu/archives/fall2022/entries/rights-group/>; Peter Jones, 'Collective Rights, Public Goods and Participatory Goods', in *How Groups Matter: Challenges of Toleration in Pluralistic Societies*, ed.

- Gideon Calder, Magali Bessone, and Federico Zuolo (New York: Routledge, 2014), 52–72. See also Waldron, ‘Can Communal Goods Be Human Rights?’
107. CESCR General Comment No. 25, §11.
 108. See Réaume, ‘Individuals, Groups, and Rights to Public Goods’, 15.
 109. Contra e.g. Boggio, ‘The Right to Participate in and Enjoy’.
 110. Note that this does not mean that there cannot be distinct scientific practices and epistemic communities and that all kinds of participation amount to the same. In short, the human right to participate in science should not be conflated with a right of everyone to become a scientist.
 111. This is a distinction that may help overcome the difficulties met by the CESCR when interpreting the right to participate in science. In CESCR, *SC and GP v Italy*, indeed, the CESCR conflated the collective scientific right to participate in scientific research with a purely individual one when it argued that ‘the authors have not substantiated this claim, as they simply argue that they wanted to donate their embryos to science, so that others would be able to perform scientific research’ (§6.17).
 112. See also UNESCO, *2017 Recommendation*, §1; Chapman, ‘Towards an Understanding’.
 113. See e.g. Effy Vayena and John Tasioulas, ‘“We the Scientists”: A Human Right to Citizen Science’, *Philosophy & Technology* 28, no. 3 (2015): 479–85; Mordechai Haklay and others, ‘What is Citizen Science? The Challenges of Definition’, in *The Science of Citizen Science*, ed. Katrin Vohland and others (Cham: Springer, 2021), 13–33.
 114. See e.g. UNESCO, *Recommendation on Open Science* (November 2021), <https://unesdoc.unesco.org/ark:/48223/pf0000379949.locale=en>.
 115. See e.g. Klaus D. Beiter, ‘Where Have all the Scientific and Academic Freedoms Gone? And What is “Adequate for Science”? The Right to Enjoy the Benefits of Scientific Progress and Its Applications’, *Israel Law Review* 52, no. 2 (2019): 233–91.
 116. On this distinction, see also Jones, ‘Group Rights’; Réaume, ‘Individuals, Groups, and Rights to Public Goods’; Waldron, ‘Can Communal Goods Be Human Rights?’.
 117. See Réaume, ‘Individuals, Groups, and Rights to Public Goods’, 14.
 118. Importantly, ‘group rights’ in this sense do not include corporations’ rights. The latter do not and should not have human rights: see Cristina Lafont, ‘Should We Take the “Human” Out of Human Rights? Human Dignity in a Corporate World’, *Ethics & International Affairs* 30, no. 2 (2016): 233–52.
 119. See e.g. Fons Coomans, ‘A Dual Perspective on the Right to Enjoy the Benefits of Scientific Progress’, in *Critical Indigenous Rights Studies*, ed. Giselle Corradi and others (London: Routledge, 2019), 89–109. For various reform proposals drawn from international biodiversity law, however, see Morgera, ‘Fair and Equitable Benefit-Sharing’.
 120. See World Intellectual Property Organization (WIPO), *Draft Articles on the Protection of Traditional Knowledge*, WIPO Doc. WIPO/GRTKF/IC/40 (19 June 2019), https://www.wipo.int/tk/en/igc/draft_provisions.html.
 121. See CESCR General Comment No. 25, §39–40.
 122. See Réaume, ‘Individuals, Groups, and Rights to Public Goods’, 10.
 123. See *Ibid.*, 17.
 124. See Jeremy Waldron, ‘A Right to Do Wrong’, in *Liberal Rights: Collected Papers 1981–1991* (Cambridge/New York: Cambridge University Press, 1993), 63–87; Samantha Besson, ‘Human Rights Waivers and the Right to Do Wrong under the ECHR’, in *Liber Amicorum Dean Spielmann*, ed. Josep Casadevall and others (Nijmegen: Wolf Legal Publishers, 2015), 23–35.
 125. See Samantha Besson, ‘Human Rights in Relation: A Critical Reading of the ECtHR’s Approach to Conflicts of Rights’, in *When Human Rights Clash at the European Court of Human Rights: Conflict or Harmony?* ed. Stijn Smet and Eva Brems (Oxford: Oxford University Press, 2017), 23–37.
 126. For the detail, see Samantha Besson, ‘The Bearers of Human Rights Duties and Responsibilities for Human Rights – A Quiet (R)Evolution’, *Social Philosophy and Policy* 32, no. 1 (2015): 244–68.

127. For a full argument, see Besson, 'Science without Borders'. See also Chapman, 'Towards an Understanding'.
128. See UNESCO, *2017 Recommendation*, §1 and §18–23.
129. See UNESCO, *Venice Statement*, §4.
130. See e.g. UN, *1975 Declaration*, §1 and §5; UN HRC, *2012 Report*, §66 and §68.
131. See also Müller, 'Remarks on the Venice Statement', 779.
132. UNESCO, *Venice Statement*, §16(a).
133. See e.g. Müller, 'Remarks on the Venice Statement', 782–83; Chapman, 'Towards an Understanding', 24–27 and 29–31.
134. See UN HRC, *2012 Report*, §70–73 and 78 on the 'reinforced duty' to cooperate internationally.
135. See CESCR General Comment No. 25, §77–84.
136. See e.g. UN HRC, *2012 Report*, §68. See also CESCR General Comment No. 25, §52.
137. See UN HRC Resolution 21/11, *Guiding Principles on Extreme Poverty and Human Rights*, UN Doc. A/HRC/21/39 (27 September 2012), <https://digitallibrary.un.org/record/732765?ln=fr>, Principle VI, §93–94.
138. See also Müller, 'Remarks on the Venice Statement', 781–82.
139. UNESCO, *Venice Statement*, §16(d). See also UN, *1975 Declaration*, §1 and §5.
140. See *Maastricht Principles on Extra-Territorial Obligations of States in the Area of Economic, Social and Cultural Rights* (28 September 2011), https://www.fidh.org/IMG/pdf/maastricht-eto-principles-uk_web.pdf, Principle 30; CESCR General Comment No. 25, §77–84.
141. For a full argument, see Besson, 'Science without Borders'.
142. Contra: CESCR General Comment No. 25, §54.
143. See Besson, 'Anticipation under the Human Right to Science'.
144. See Supiot, *Le travail n'est pas une marchandise*.
145. See CESCR General Comment No. 25, §37 and §54.
146. See UN HCR, *2012 Report*, §7 and §21; Chapman, 'Towards an Understanding'.
147. See Supiot, *Le travail n'est pas une marchandise*, 29–30.
148. See UNESCO, *Venice Statement*, §16(e); UN HRC, *2012 Report*, §22 and §43; CESCR General Comment No. 25, §53–55 and §56–57.
149. See also Sheila Jasanoff, 'Technologies of Humility: Citizen Participation in Governing Science', *Minerva* 41 (2003): 223–44; Vayena and Tasioulas, "'We the Scientists'"; Bruno J. Strasser and others, "'Citizen Science'? Rethinking Science and Public Participation', *Science & Technology Studies* 32, no. 2 (2018): 52–76.
150. See Merton, 'The Normative Structure of Science', 269; Kitcher, *Science, Truth, and Democracy*; Douglas, *The Rightful Place of Science*; Pamuk, *Politics and Expertise*. See, most recently, Faik Kurtulmuş, 'The Democratization of Science', in *Global Epistemologies and Philosophies of Science*, ed. David Ludwig and others (Abingdon/New York: Routledge, 2021), 145–54.
151. See CESCR General Comment No. 25, §55.
152. See *Ibid.*, §52 and §86.
153. Instead, *Ibid.*, §74, merely refers to 'global regulations'.
154. See *Ibid.*, §77–84.
155. Ulpian, *Digeste*, trans. Samuel P. Scott (Cincinnati: The Central Trust Company, 1932), https://droitromain.univ-grenoble-alpes.fr/Anglica/D1_Scott.htm, Book I, Tit. 1, 1, § 2: 'Hujus studii duæ sunt positiones, publicum et privatum. Publicum ius est quod ad statum rei romanæ spectat. Privatum quod ad singulorum utilitatem'.
156. See Besson, *The Private & Public Relation*, Chapter 1.
157. For a related albeit different analysis of the law of science from the perspective of Günther Teubner's autopoietic and hence entirely private so-called "social constitutionalism", see Raffaella Kunz, 'Tackling Threats to Academic Freedom Beyond the State: The Potential of Societal Constitutionalism in Protecting the Autonomy of Science in the Digital Era', *Indiana Journal of Global Legal Studies* (forthcoming).

158. See also Weber, *Wissenschaft als Beruf*; Polanyi, 'The Republic of Science', 62–63; Supiot, *Le travail n'est pas une marchandise*, 30. See, however, the definition by CESCR General Comment No. 25, §4.
159. See Merton, 'The Normative Structure of Science', 268.
160. This is the sense of the German constitutional law of science's notion of science's *Eigengesetzlichkeit*.
161. See Merton, 'The Normative Structure of Science', 273–74 and 277–78.
162. See Alain Supiot, 'Du bon gouvernement de la recherche', *Philosophy World Democracy*, n.d., 7 July 2021, <https://www.philosophy-world-democracy.org/articles-1/du-bon-gouvernement>.
163. Sadly, the CESCR General Comment No. 25, §74, refers to 'governance gaps' and to the 'management' of science.
164. See Merton, 'The Normative Structure of Science', 269.
165. See *Ibid.*, 268.

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