

# Positive intellectual rights and information exchanges

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*This paper proposes a reversal in how to consider the rights associated with information, media contents, software and other intellectual entities. Intellectual property, forgetting its original purpose, now mostly focuses on granting the ability to restrict usage of intellectual entities. It then defines a number of exceptions to cope with the adverse effects of such a restriction. On the contrary, the proposed approach sets as its basis a number of positive intellectual rights, defined as to enable wide societal production and exchange of intellectual entities. It then defines how granting of specific attributes of property is necessary as to ensure that the positive rights are not abused to the detriment of some basic values, and are implemented in reality. Such a reversal allows to exploit the benefits of information and communication technology, for instance the much greater plurality of creators and information sources, the much greater and quicker visibility and accessibility of intellectual entities, or new tools and processes for the assessment, the critic and the analysis of intellectual productions. More generally, it debates right issues for the technology of the intangible, whether biotechnology or other technologies based on the manipulation of information entities in complex processes. To derive practical features of intellectual rights, one has to differentiate in detail between varieties of intellectual entities (according to how they can be produced, used and exchanged) and between facets of intellectual rights. By doing so, one is able to propose a framework that truly serves creators without restricting unduly information exchanges.*

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## The crisis and the risk of a tragedy of enclosures

Information and communication technology has opened a new world of possible activities, of which we

have only started to understand the potential. Information, creative works in all media, software and other intellectual or knowledge entities are easier to put together individually or collectively. It is incredibly cheaper and easier to duplicate and exchange these artifacts. It is also much easier to store, locate and access them globally, compare or analyse them. Of course, as the new activities of the digital world are immature, some of the traditional quality of old media forms is initially lost, while new rules and know-how are only being invented. Despite this immaturity one can only feel enthusiasm at these new developments. The essential features of the new potential have been beautifully described in [Paul Starr's paper on the \*The Electronic Commons\*](#)<sup>1</sup>. But the same paper and books from Lawrence Lessig<sup>2</sup> and David Bollier<sup>3</sup> make clear that the realisation of this potential is by no way a certainty. History abounds in examples of technology and media<sup>4</sup> for which the imagined potential never materialised. Media and technology with increasing returns have powerful trends towards concentration, vertical integration, proprietary control of access and locking-in of funding models that can only be counter-balanced by explicit efforts to ensure diversity, freedom of choice, empowerment and openness. The information society is by no means something which is already defined and for which the only problem would be to spread it and attain it quicker. It is a space that can be filled with very different applications, activities and usage. The technology supporting it itself will be shaped by the interaction with the intellectual rights environment, as much as it will shape it.

It is already evident that there is a deep crisis of intellectual property and of use right restrictions as primary tools for the organisation of intellectual activities. This crisis creates expectations, concerns and uncertainty for intellectual creators. Intellectual property management-based businesses feel endangered. They try to compensate for the undermining of the property-based approach by asking for ever-increased protection. Old forms of businesses like music publishers or broadcasters, or recent dominant players in biotechnology or software, call for longer, stricter monopolies, to be embedded in the access devices themselves, to be completed by regulation outlawing circumvention, etc. They claim for property new domains through the extension of patentability or new interpretation of property rights such as those on photography of buildings and landscape. They are seconded or driven in their enterprise by interest groups such as heirs of intellectual property assets and intellectual property professionals (lawyers, consultants, collecting societies) and organisations, including some public organisations such as patent offices and National intellectual property institutes.

Co-operative usage of information technology and the Internet evidently points towards a much wider diversity of producers, a greater freedom of accessing and re-using information artifacts. But as there is a great uncertainty on how this will be incorporated in an economy, the lobbies of the existing economy grasp intellectual property as a life-vest, and the lobbies of the new economy try to use it to construct new vertically integrated oligopolies. This has developed to a disease with such extreme symptoms as multinationals asking governments to put 16-year olds in jail for being instrumental in distributing means of access to protected contents, patents on genetic sequences to which governments are still giving a hand despite some afterthoughts, or publishers lobbying to restrict free access to digitized public domain books<sup>5</sup>.

One could analyse this as the last effects of the old paradigm before it is replaced by a new one. But a closer look at past historical examples (in the history of writing and press for instance) show that these last effects can cause long-lasting damage, and even lock the whole development of information exchanges in restrictive paths. If we fail to develop a positive foundation for intellectual rights, we may be

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1 Paul Starr, *The Electronic Commons*, *The American Prospect* (11)10, March-April 2000, <http://www.prospect.org/archives/V11-10/starr-p.html>

2 Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World*, Random House, 2001, ISBN: 0375505784.

3 David Bollier, *Silent Theft: The Private Plunder of our Common Wealth*, Routledge, 2002, ISBN 0415932645.

4 See for instance Eszter Hargittai, *Radio Lessons for the Internet*, *Communications of the ACM*, (43)1:51-57.

5 The author personally witnessed it in France in the early 90s. Pressure from availability in the public domain has now led the publishers to adopt a more reasonable position.

witnessing a new *tragedy of enclosures*<sup>6</sup>. This time, it would be the public domain of the future that would be made the property of a few. Instead of enabling new production techniques to develop at the expense of societal damage (like in the agricultural enclosures), we would witness a restriction of innovation and its usage, together with the societal damage.

## Digging the foundations

One cannot just declare intellectual property defunct. John Perry Barlow's paper on "[Selling Wine without Bottles: The Economy of Mind on the Global Net](http://www.eff.org/Publications/John_Perry_Barlow/HTML/idea_economy_article.html)"<sup>7</sup> created a salutary shock, but did not lead to a practical re-foundation, because it did not set a new basis on which positive intellectual rights could be asserted<sup>8</sup>. Many writers, creators, innovators or policy makers still accept to be enrolled by intellectual property lobbies in their defense. That's because they see intellectual property as the only way they know to get authorship acknowledged, ensure reward and remuneration, encourage investment, or allow redress of libel. However poorly the existing intellectual property framework achieves all of this, they will not jump in the unknown if one cannot outline how a new framework will address intellectual rights.

But attempts at working out a new balance within the existing intellectual property framework are also bound to fail. I have myself supported such an approach in the past<sup>9</sup>, and European research programmes have supported many technology projects claiming to work in this direction by enabling efficient, low-entry cost intellectual property management. But because these well-intended efforts have been fed into a restrictive property-based regulatory environment and practice, they have often failed to reach their goal. Despite their good intentions, we witness ever more monitoring of usage through technology, more embedding of restrictive technology into devices making innovative user functionality harder or almost impossible to implement, no clear enlargement of diversity of offer, little empowerment of authors towards producers and distributors, and a public domain which remains narrow and lacks accessibility.

Since neither the *tabula rasa* nor the reform approach can work, one has to go back to the foundations: what purpose was intellectual property to fulfill? What positive rights was it supposed to give to people? That is we must rebuild the full edifice of intellectual rights, starting with the knowledge of its history, its aims and principles, and the concepts it has built to deal with different objects such as books, scientific ideas, journals, inventions, photographs, films, or algorithms. But forgetting some implicit hypothesis about technical forms of production and exchange of information, and business models that are built in intellectual property legislation, since quite a few of these hypothesis have become erroneous.

Let us start by an attempt at defining what an intellectual entity is. Some essential clarification have been moved to footnotes for sake of readability of the full definition.

An intellectual entity is:

*an artifact constructed under control of human mind(s)*<sup>10</sup> ...

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6 From the 16<sup>th</sup> century, in most of Western Europe, the communal land freely usable by all was turned into private property. This created major social disruptions leading to powerful revolts and a related slow down of the process. This also allowed the development of much more intensive agricultural production (with related technology innovation). Refer to Karl Polanyi, *The Great Transformation*, 1944 for a detailed analysis. The expression *tragedy of enclosures* is a paraphrase of the *Tragedy of the commons* used by Garrett Hardin in 1968 (Science 162(1968):1243-1248) to claim that the management of scarce resources cannot be based on free interaction of individuals, without some correction like property or regulation implementing the constraints of necessity. The notion of a tragedy of commons was often used, including in information exchange contexts (cf. E. Adar & B. A. Huberman, [Free Riding in Gnutella](http://www.firstmonday.dk/issues/issue5_10/adar/index.html), First Monday 5(10), [http://www.firstmonday.dk/issues/issue5\\_10/adar/index.html](http://www.firstmonday.dk/issues/issue5_10/adar/index.html)). It was criticised by ecological thinkers, in particular in developing countries. One can find previous usage of the expression tragedy of enclosures, for instance in a paper by J. Martinez-Alier, [Environmental Justice, Sustainability and Valuation](http://www.bu.edu/cees/jma.html), <http://www.bu.edu/cees/jma.html>.

7 John Perry Barlow, [Selling Wine Without Bottles: The Economy of Mind on the Global Net](http://www.eff.org/Publications/John_Perry_Barlow/HTML/idea_economy_article.html), [http://www.eff.org/Publications/John\\_Perry\\_Barlow/HTML/idea\\_economy\\_article.html](http://www.eff.org/Publications/John_Perry_Barlow/HTML/idea_economy_article.html)

8 Even though it provides useful concepts for the valuation of information.

9 Dominique Gonthier, Philippe Aigrain, Perspectives pour la gestion et le négoce de la propriété intellectuelle, *Document Numérique*, 1(3), 1997. <http://www.editions-hermes.fr/periodiques/revues/p0301031.html>

10 Is computer code generated by an automatic code generator still an intellectual entity? Yes, just as a poem generated by

*using other such constructs, and signals or information extracted from the physical world<sup>11</sup>, ... that can be made perceptible to other human beings, or executed to control technical processes ... and that can be separated from the carrier or signal that embodies it<sup>12</sup>.*

Here are now a few examples of direct rights, expressed without any of the restrictions or additional rights that may prove necessary to make them enforceable or avoid perverse effects:

- R1. To create<sup>13</sup> new intellectual entities, including by making use of pre-existing ones
- R2. To make one's creation public (original meaning of publishing)
- R3. To be acknowledged as creator of all or part of an intellectual entity.
- R4. To obtain economical or non-economical reward for one's creation, in proportion<sup>14</sup> of the interest others have had for it.
- R5. To access any intellectual entity that has been made public.
- R6. To quote extract(s)<sup>15</sup> of an intellectual entity whatever its media, for the purpose of information, analysis, critic, teaching, research or the creation of other intellectual entities.
- R7. To redress mistakes, libellous statements, false information, erroneous attributions.
- R8. To give reference, link to, or create inventories of intellectual entities produced by others as soon as they have been made public<sup>16</sup>.

Let's consider this list only as a foundation, the first step of a thought experiment. If it was to be implemented as such, intellectual property thinkers would announce a tragedy of the commons. They would claim it would destroy the incentive to create new entities by not setting precise schemes ensuring the remuneration of their creators. Or that it would destroy the incentive to invest into the media that ensure the accessibility and promote the quality of intellectual entities. Most moral rights defenders would

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rules that the poet applies mechanically but has chosen with knowledge of what they were likely to produce.

- 11 For painters, it was already clear, at least from the Renaissance, that a technical way of recording light was one of the instruments of creation. Photography has made clear that control on that process (choice of subject and time, framing, lighting, exposure control) was in itself creation.
- 12 In the analogue world, this separability realises itself only through complex processes, such as the work of the copyist for manuscripts. But it is nonetheless already at the core of what defines an intellectual entity at the origin of laws on author rights, copyright and *privilèges* for publishers. In the digital world, it has become very easy to separate an intellectual entity from any of its particular realisations. One key general effect of digital separability is that more and more creative functions are moved towards the final realisation / perception / usage of an intellectual entity. Media and technology are deeply reshaped by that process. But this does not mean that one can forget about the possible forms of the realisations of intellectual entities. The fact that in each medium, one can easily separate signal from carrier, or even that one can map an entity from one medium to another does not mean that entities have become "medium-less": moving image contents can be re-purposed from the theater to the TV and vice-versa, but within the realm of one overall perceptive medium with its rules of narration and perception; interactive music still has the real-time listening properties of music.
- 13 In this text, creator and create are used to refer generically to authoring, innovation, creation in the artistic or technical sense, whether in an individual or a collective context.
- 14 The nature and size of this reward, or the relation it has with the number of people interested and the intensity of their interest, are out of the scope of our discussion of rights. Similarly, how this right can be transferred to investors in a creative venture instead of the creators themselves is left for discussion later.
- 15 This looks as a restriction, but the distinction between reproducing an entity and quoting it (that is reproducing only part of it and making that part only a part of a newly created entity) is a valuable asset of existing intellectual rights, and it is worth including it from the start in positive rights: some restrictions that might prove necessary to the right to reproduce, use or present intellectual entities will not apply to quotation.
- 16 This may seem not a primary right (not part of a minimal set of rights from the which all others could be derived), but as in the case of quotation, the ability to create and publish inventories pointing to creations that have been made public is at the core of the definition of what public means. It is a matter of social contract: by making something public, one accepts that it can be criticised, and referred, linking being the modern form of referring.

claim it to kill culture itself by not including explicit rights to defend the integrity of a creation in its future usage. Even the free software license specialists might object because these licenses are based on writers of software having *rights to* their creation<sup>17</sup> to which we have not referred directly above. But before we define property rights and other restrictions, it is better to fully explore mentally what can develop on the basis of positive rights.

To outline this potential, one will have to differentiate between different types of intellectual entities. Here are some of the essential parameters that influence which positive rights or property-based scheme can be deployed:

- C1. The size of the initial investment necessary to create an intellectual entity before it can first be used or accessed.
- C2. Whether the entity is created once, and then accessed without modifications, or in the contrary incrementally created and revised through sequences of usage and (re)-creation. A particular case of entities which are created once (possibly through a complex process) and then accessed without or with little modifications are those referring to a live process (such as music performance) or resulting in a real-time consumption process (such as viewing a movie in a theater). One should note that the intellectual rights framework influences the nature of entities: if it sets freedoms of re-use, it is more likely that intellectual entities that are iteratively re-created will flower, while if it restricts rights to modify, one will see mostly created-once-and-for-all entities.
- C3. Whether the creation is individual or collective.
- C4. Whether the creation is or not the embodiment of knowledge about the physical world, or about society.
- C5. The relation between the entity and action on the physical world ranging from intellectual designs of physical devices (machines, for instance) at one extremity to intellectual entities whose only link with physical processes arises when they are mapped into physically perceptible signals.
- C6. Whether the usage of the entity is of such a nature that one needs to allow long lasting appropriation to make possible for this usage to develop in a sustainable manner.

Now that we have basic tools, let's start by putting the public domain first, and organising the public space of intellectual exchanges on its basis.

## **Public domain and public space**

What should be in the public domain? Is the public domain truly public, is there a public space in which one can in practice freely access and re-use public domain entities?

Let's first take an historical look at this issue. In modern but pre-digital times, the situation was simple: some entities were considered as not appropriable<sup>18</sup> and fed naturally the public domain, for instance, ideas, mathematical and scientific theories, algorithms, knowledge about the physical world and society<sup>19</sup> as well as of some other entities excluded from patentability in the text of the Munich convention<sup>20</sup> and in US practice until the 80s. Apart from these entities, the public domain was fed by extinction of rights. Copyright stock owners<sup>21</sup> have successfully lobbied to prevent recorded media documents to fall into the public domain, and obtained the extension of the duration of protection to 50 and later 70 years after the

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<sup>17</sup> Rights *in* their creation in the wording of the Berne convention.

<sup>18</sup> The fact that these entities were not appropriable did not mean that their authors and creators had no rights. Rights R1, R2, R3, and R7 were fully recognised to them, and even right R4 (reward) cared for through indirect mechanisms.

<sup>19</sup> Both physical world and society must be interpreted here in the widest sense, including entities such as plant or animal genome data, knowledge about human behaviour, or societal process models for instance

<sup>20</sup> The Munich convention is an inter-governmental text which defines the scope and rules of the European patent. With regards to exclusions, see <http://www.european-patent-office.org/legal/epc/e/ar52.html>

death of the last right owner in most cases. In addition, the analogue character of documents and the difficulty of analogue telecommunication restricted accessibility to the premises of organisations caring for public domain documents. These documents consisted mostly of old books, journals and prints, as well as of old photographs. With the advent of digital documents for all media, the birth of new digital media, and the development of free software, a new situation has arisen. The most important aspect is that extinction of rights is no longer the main source for the public domain: there is now a powerful stream of intellectual entities that people directly contribute to the public domain, as free software<sup>22</sup>, and as free information. In addition, some countries have enacted public access laws that put information produced by governments in the public domain. In parallel, networked digital technology has made the public domain potentially accessible to many at low cost. But potentially only, because legal<sup>23</sup>, or economical<sup>24</sup> factors and related interest group pressure still restrict it in practice. Free software is the only really flourishing and truly accessible public domain. Many are now calling for the creation of a real public space for general interest information of diverse types, non-individual genome data (sequence and structural databases of genomes of various organisms) being just one prominent example in the news.

Going back to positive right thinking, it is worth asking oneself if there can be any valid reason to restrict voluntary contribution to the public domain. The question may seem surprising, or even obscene, but the extent of the intellectual property crisis is such that we must be ready to witness the most incredible restrictions. Intellectual property owners can imagine that the development of a public space for intellectual entities could take away from them one scarce and valuable resource: the attention time of people. Of course, studies (for instance on public libraries) seem to indicate that on the contrary, the more people access freely intellectual entities, the more they are able and willing to spend time accessing and creating valuable entities. But who knows, it may be that in the long run, the public domain will become so rich that only entities that are truly unique<sup>25</sup>, novel or creative will be marketable. If this happens, so much the better, as it will lead to rewards to creation and innovation rather than to assets owners<sup>26</sup>. In any case, we must adopt a clear principle: *the voluntary contribution of one's creation to the public domain is a right that cannot be restricted by any commercial interest*<sup>27</sup>.

The next question concerns precisely those entities that have always been considered as naturally belonging to the public domain, because of a major societal interest at never allowing their appropriation, and because making them public domain did not result in a tragedy of the commons as sufficient incentives or schemes existed for their creation. For instance some scientific discoveries can be achieved only after huge investment. But one does not wish to grant property rights on numerical values of properties of quarks even if it is necessary to build particle accelerators to measure them or confirm them.

21 Audiovisual media firms, and heirs of authors or composers being the most active.

22 Richard Stallman [insists on the fact that free software is not public domain](http://www.gnu.org/philosophy/categories.html#PublicDomainSoftware), (<http://www.gnu.org/philosophy/categories.html#PublicDomainSoftware>) because in the existing framework, public domain means "not copyrighted". See our section on creator rights, in which property rights are also introduced for such entities. But for our discussion of the public domain, we can temporarily forget that the entities have been contributed to the public domain by people who had rights on them. Stallman adds that one needs schemes to prevent things that are contributed to societal property to be appropriated and turned against it. This makes necessary to implement a *copylefting* scheme that forbids to incorporate at least some strategical freely contributed entities into proprietary products. I do not introduce such a scheme in my basic framework because it is not based on positive rights, but only a reaction to possible abuse of property. But one needs it to handle transition to the new framework. See section on transition issues.

23 For instance, legal deposit laws (where they exist) restrict access to the sites of the organisations caring for the legal deposit. Even if this applies only to non-public domain documents, it leads to a situation in which even public domain entities are not in practice made accessible as much as they could.

24 Pressure put in many countries on those public organisations holding public domain entities to make money out of public access by entering in partnership with private entities commercialising them.

25 For instance live events.

26 One potential risk is that artificial or inflated events will be engineered, possibly at a large scale, to attract attention. A healthy development of public criticism is needed to keep that process under control.

27 It is the basic implementation of rights R1, R2 and R5, and there is no convincing evidence that it can seriously damage the implementation of other positive rights or societal benefits.

When an intellectual entity is the embodiment of knowledge about the physical world or about society, governments or society invest in the means of creating this knowledge and making it available to all. Sometimes, the reason for this is that the value of this knowledge is so unpredictable and long-term, that even if one allowed appropriation, no private party would have interest in investing in it<sup>28</sup>. Most often, the reason is of a moral nature: the equitable implementation of the re-use aspect of right R1, that is the possibility for all to use such knowledge, is so binding, it is so morally unacceptable or absurd that even for a short period some parties could limit the use of knowledge to their benefit, that other schemes than property rights are needed. A new dimension has recently arisen: in some cases it is needed to limit the use of knowledge in industrial applications to prevent some unethical consequences. When this is likely, putting knowledge in the public domain is the condition of a true public debate on whether and how this limitation should occur.

It is a very sad fact that one has departed, hopefully not for long, from this wisdom, and started throwing these entities in the basket of industrial property, by removing exclusions to their patentability, for instance by allowing patents on gene sequences<sup>29</sup>. This process has occurred under pressure of some industries, and under the conduct of the interest groups of intellectual property consultants and organisations. The peak of this process was reached around 1998, and since then a growing and powerful opposition has built up. Europe in particular is a battlefield between promoters and opponents of gene sequence patents or computer program patents. One must fight with utmost energy those who want to make increased patentability irreversible, for instance by pushing maximalist interpretations of the TRIPS agreement<sup>30</sup>.

A [specific section](#) of this paper is devoted to the issue of which domains should fall under patentability, but for what concerns the public domain, we should remember the default rule: *intellectual entities belong to the public domain, except if allowing their temporary appropriation is absolutely needed and does not result in unacceptable consequences*<sup>31</sup>.

Extinction of rights is the general scheme that is supposed to bring everything in the public domain after some time. At the origin of copyright law, this time was defined (14 years) as the time needed for an intellectual entity to reach any of its potential users. It was assumed that any owner of copyright had had enough time to make value of its creation in that period. The same definition would lead today to a protection time ranging from a few days to 10 years depending on the type of entities<sup>32</sup>. When dealing with property exceptions to positive rights, one needs to go back to the old wisdom of keeping them short enough and to further take in account the much faster accessibility of intellectual entities.

The public space is endangered not so much by explicit attempts at restricting it, than by the indirect effects of restrictive management of intellectual property. The development of "protection" technology, its embedding in access devices and telecommunication technology are a major risk in that respect. In many cases, the exigence of keeping the public space free is not included in the requirements for the design of these devices and technology. The history of DVD player technology is a good illustration of this point. So the principle stated above is not only of a declarative nature, it must be binding in future decisions on technology implementation, and such decisions must also include the consideration of the limited duration of property exceptions. Finally, the public space is centered around the access of all to the public domain,

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28 In other terms, C6 does not apply.

29 The fact that these sequences are extracted from human, animal, vegetal or fungi genome is not the key issue here. Arguments developed by some to the effect that in reality sequences were not truly made patentable per se in Europe since they are patentable only if a related function is mentioned are not convincing – to say the least. If claims on sequences are allowed, sequences are patentable, dot.

30 [http://www.wto.org/english/tratop\\_e/trips\\_e/intel2\\_e.htm](http://www.wto.org/english/tratop_e/trips_e/intel2_e.htm)

31 See section on patentability for examples of entities such as medical drug production processes, which have all attributes to fall under patentability, but for which exceptions must be allowed to throw them back in the public domain.

32 This does not mean that entities do not have value after this period is over, but that the justification for allowing them to be private property no longer holds.

but also around the access for some usage<sup>33</sup> to all entities. Provision should also be made for this to turn into reality: protection technology must not block the possibility of quotation for the sake of criticism for instance, or access by the disabled.

## Creator rights

Let's now look at intellectual creation from the angle of reward for creators (right R4). Other creator rights such as attribution and integrity will be dealt with in a [later section](#). Positive rights enable a new synergy between a rich public space and creators' rights to be rewarded for their creations. These rights are presently very poorly served by the intellectual property framework, which favours asset owners and intermediaries with limited added-value (for instance distributors or financial investors) to the detriment of creators, editors<sup>34</sup> and prescriptors (high added-value intermediaries).

When one entity does not fall naturally in the public domain under one of the conditions listed in the previous section, property-rights are to be granted when the investment<sup>35</sup> needed to create an intellectual entity is high (C1=big), and this high investment is needed before one can start using the end result (C2=all at once). When only a very small investment is needed to obtain an intellectual entity (C1=small), or when more complex ones are put together through a long series of small incremental steps (C2=incremental), economic remuneration may still be needed or useful, but does not have, and generally can not take the form of property rights. The reason for this impossibility of using property rights is simple: if only a small effort is needed to create an intellectual entity, then it is likely to be created at the same time by many different creators. And if it is created through a multitude of incremental steps, then the attribution and management of property rights will result in excessive transaction costs. Of course there are many intermediate situations such as software, news reporting, or photography<sup>36</sup> for which both property-based schemes and non-property based schemes are likely to coexist and compete. *In those intermediary situations, contributing such entities to the public domain can only result from a free choice by the creators.* Property rights must thus be granted, but their nature and enforcement should be such that the competition between the 2 schemes remains a fair one: it must not be possible to abuse some property rights on critical entities (for instance a basic software, a hardware device or a telecommunication protocol) in such a way as to force the systematic usage of property-based schemes on other entities such as contents.

So we have a continuum of situations with at one end entities like a motion picture feature film or a complex invention in manufacturing that fall naturally in the realm of property-based rights and at the other end information fora that fall naturally out of property-based schemes<sup>37</sup>. In the latter case, reward (right R4) is granted through access to the creations of others and through the reputation, attention, or simple pleasure of well doing that one gets from contributing.

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33 See for instance list in the definition of right R6.

34 Publishers and broadcasters today have both an editorial role, through selection, editing, packaging and indexing, and a distribution role associated with specific business models. In a new framework, there is continued need for the editorial role, but it will re-designed by the new organisation and economy of exchanges. For instance, selection will often be moved from being a step prior to publication, to being an evaluation of already (self)-published materials.

35 Investment is used here for both work or efforts and financial investment. In practice, different players are generally involved. It maybe that a particular intellectual entity can be created by a very simple action, but that considerable skills and efforts have been needed to build the ability to produce the right action at the right time. This must of course be taken in account: it is the full process leading to the creation of entities that defines the size or intensity of the investment.

36 There are are at least 30 billions photographs taken in the world every year, and this number will grow enormously with the dissemination of digital photography. For Raymond Depardon (my preferred photographer), it may be quite natural to use property-based schemes since the value of each of his photographs is high. For me, I had rather contribute mine to a cooking pot where I put my photographs and get the rights of access to photographs of others. Enabling a continuum of positions in which one can move with no major barrier from the latter position closer to the former is probably one of the most important conditions for creating a positive coupling between information exchanges at large and the economy.

37 Dan Sperber has identified this process, but he is wrong in assuming that it can be extended to all entities. Cf. Dan Sperber, [L'utopie communiste devient possible](#), Libération, 13-14/11/99, <http://www.liberation.fr/multi/neweconomy/991113.html> (in French).

When property-based rights have to be granted for the sake of remuneration, the main choice is between granting them on some embodiment (protected by copyright) of the entity, or on a class of possible embodiments of the entity (protected by a patent)<sup>38</sup>. The key criterion for choosing one or the other is the scope of the protection that one wants to grant. Patents can be used only if the scope of use of an intellectual entity can be assessed at the time at which it is created<sup>39</sup>, if this scope is not too general, and if its novelty and originality can be evaluated at a reasonable cost by examiners. *In practice, this leads to reject patents as a possible intellectual property scheme for all intellectual entities that can be manipulated as pure information contents.* In other terms, patents should be restricted to entities for which C5=design of physical devices and processes. See the next section for additional conditions on patentability.

For most entities, copyright will thus be the major intellectual property scheme. But what does copyright cover exactly? We must here fight two illusions. The first one is John P. Barlow's wine and bottle metaphor<sup>40</sup>, which sees the scope of protection by copyright only as the container. The second one is the claim often made by patent fans that copyright protects only a given expression in an extremely narrow sense, and thus can be turned around easily by counterfactors, simply by giving a different expression to a "functionally" identical entity. Copyright protects an equivalence class of realisations of an entity, but this is more than a container and it can be enough to reward creators. One of the effects of information and communication technology is that a precise shape is imposed on an entity later and later in its production process, most often at presentation time, and under user control or under the effect of technical parameters that are only partially controlled by the creator of the entity. This means that the embodiment of an entity which is protected by copyright becomes more abstract and more general. The definition of the scope of protection for each medium needs some rehaul, most likely to be explored through case law and later harmonised. Provided that this adaptation is done when needed, past history has shown that copyright has an extremely adaptable scope: for instance, if we consider a given recording of a given performance of a given musical work, we can see that each of these dimensions can be protected by copyright. If we look at software, we can see that copyright protection can apply across languages (from source code to binary form, for instance), to a class of equivalent (for some technical context) expressions.

But is copyright enforceable in the digital era? Of course it is, if objectives are set to a reasonable level with regards to pricing and with regards to what should be enforced. If we want to understand the conditions for a possible enforcement of remuneration through copyright, we must accept a brief detour through discussing business models. In today's (or is it already yesterday's?) situation:

For centralised media (broadcasting for instance), many intellectual entities are made available to their end-users for free due to indirectly funded business models, with a predominance of advertising.

For decentralised media, high prices for intellectual entities are artificially maintained through oligopolies or the organisation of rarity (in particular by concentration of promotion and control on distribution channels).

Both cases lead to low diversity, and an inefficient economy of remuneration (at macro-economical level, that is the total value distributed to creators is incredibly low if one compares it with the total time spent by users accessing these entities, for instance). Of course some specific creators can benefit from this situation. Now, when intellectual property businesses try to maintain this situation in the digital world, they will find themselves in a much weaker position to do so. The ease of copy, transmission and sharing of intellectual properties undermine the ability of anyone to maintain artificially excessive prices for licensing property rights on intellectual entities. Even more, the alternative possibility of direct production in the public domain and by service business models and/or reputation sets a reference point that makes evident for everyone the artificially restricted diversity and excessive pricing of the old models. Since copying, storage and exchange of information is much cheaper<sup>41</sup>, the usual practice of sharing contents with others develops to a new scale, to the point at which it becomes a distribution channel of its own.

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38 This paper does not discuss intermediate regimes of protection such as utility models and trademarks, as this would lead to too complex a presentation, without real conceptual benefit.

39 This is not the case for software for instance, but only for a given use of software in a device or process.

40 Leaving aside the obvious fact that when one drinks wine nobody else can drink it anymore.

When analysing this extended practice, one should carefully distinguish 2 forms of it, that intellectual property lobbies have a strong interest to consider as identical. Industrial piracy can seriously undermine remuneration, but there is no indication that it is harder to fight in the digital world than in the analogue world<sup>42</sup>. One has yet to prove that the other form, decentralised individual copying and exchange, harms the remuneration of creators globally. Recent claims for instance that it would be due to it that the audio CD market would have suffered a decrease are unsupported<sup>43</sup>. Of course, these claims point to an unavoidable fate for the centralised business models based on concentration of promotion on a few titles: the birth of new musical media will one day take away attention and business from CD distribution and centralised publishing. The challenge is to ensure that before it occurs, new forms of creator remuneration, such as the one suggested by Richard Stallman<sup>44</sup>, will have developed.

The exact form it will take is yet unknown, but there is clear evidence that copyright-based remuneration can be enforced by assignment of most to pay licensing rights, provided these rights are obtained simply, at a fair price, without infringing on privacy, and give rights to a sufficient range of possible uses. Who will really want to do illegal copies for resale of the equivalent musical content of a CD if it sells for 2 or 3 euro<sup>45</sup>? Since we discuss property rights, it must of course be evident that owners of such rights are free to choose whichever licensing model they desire<sup>46</sup> within the limits of positive rights and consumer protection<sup>47</sup>. The purpose of the discussion was just to state that the practical enforceability of copyright will depend on this choice. One can also add that the implementation of possible restrictive licensing (in particular in access devices and networks) must not be of a nature to make liberal licensing more complex or impossible. More generally, protection mechanisms should always make appropriate provision for the practical implementation of rights R1, R2, R6 and R8.

A difficult case arises for collective creations. Two approaches exist, one which consists in granting to each author rights similar to those that would be granted to the single author of the work, and the second which is to create a special status of collective creation that basically stripes all rights from the authors to give them to the producer or publisher of the entity. Both these approaches have major drawbacks, at least with present licensing rules: the first one because it unduly restricts the usage of collectively created entities by making extremely complex to obtain licenses, the second one because it does not respect

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41 Though far from free: downloading 100 MB of MP3 contents costs today (in July 2001) at least 0.5 euro in connection cost at the best available ADSL subscription fees – counting connection at both ends. This ignores costs of hardware and time spent at both ends.

42 Most of the fight against industrial piracy on copyright occurs at intergovernmental level, in negotiations with countries that have encouraged its development.

43 Statistics on sales for an insignificant market segment (singles in the US) have been highlighted while ignoring global growth in both volume and turnover of sales.

44 Richard Stallman, to turn around some difficulties associated with the development of micro-payments, suggested a scheme based on voluntary contributions, available in context (send \$1 to the artists would be possible anytime when listening to their music) but decoupled from rights to access or any form of content "protection". Cf [http://media-in-transition.mit.edu/forums/copyright/index\\_transcript.html](http://media-in-transition.mit.edu/forums/copyright/index_transcript.html). If one tries to associate micro-payments with rights to access contents, it creates unacceptable transaction costs and user choice overhead. Cf Clay Shirky, "The Case Against Micro-Payments", O'Reilly Network, 19 December 2000, <http://www.openp2p.com/lpt/a/p2p/2000/12/19/micropayments.html>. This generally leads to a preference for subscription schemes for paying on-line contents, which in turn results into a poor remuneration of creators, and an often poor quality and diversity of contents.

45 This figure is a guesstimate, since of course nobody has yet an idea of what will be the a fair pricing in the digital economy of various media.

46 For some specific media, licensing and rights collection are handled at the level of a profession and not individually. This has clear benefits in terms of providing an uniform licensing framework, provided that transaction costs are kept reasonable (in other terms that usage does not have to be monitored at an excessive level and that fees are indeed redistributed to creators and not used to a large extent for the functioning of collecting societies). Unfortunately, this condition is generally not met.

47 Limits that the Digital Millennium Copyright Act, or UCITA ignore bluntly, and the European directive on Copyright in the information society ignores in good part.

positive author rights<sup>48</sup>.

Another special case occurs when one re-uses a great number of entities to such an extent that each of them no longer accounts in the final results for more than the partial of a note in a symphony. John Oswald remix music has made fun of the maximalist interpretation of copyright protection, for which there is total protection on each micro-segment of recorded music, even when this segment is mixed with hundreds of other segments from other sources, is no longer assignable to any creator (and thus can not lead to moral damage<sup>49</sup>), and when the original right owner can not claim any commercial damage from such usage. This is a useful reminder of the purpose of copyright, that is to ensure reward to creators, not to set an unlimited possibility for right owners to decide how copyrighted items can be used.

Finally, as already stated in the section on the public domain, the duration of copyright should be made much shorter. It is hard to imagine how policy makers have been convinced of the usefulness of granting copyright type of intellectual property for longer than a few years after the death of a creator<sup>50</sup>.

## **Keeping patentability where it belongs**

Historically, patents have been developed to stimulate and disseminate mechanical inventions that needed a complex elaboration process and for which a costly investment in production infrastructure was necessary. That is, it was designed for cases where C1=big investment, C4=not a discovery and C5=design of physical devices and processes, in particular when C6=long lasting appropriation needed for deployment of usage<sup>51</sup>. Patent protection is characterised by a-priori examination, and thus a relatively complex preparation and high entry cost. The exact definition of the scope of protection offered by a patent is complex. This makes it prone to litigation. All these properties led to the creation of a rich network of consultants, lawyers and administrative offices. None of this raised major difficulties while the scope of patentability was kept in its original definition. But the birth of information technology and more generally of information-based technology<sup>52</sup> such as bio-technology, has challenged traditional patent protection and gave rise to a drift towards extending patentability to entities that do not meet the conditions stated above.

The origin of this recent crisis can be simply understood if one examines what happens when a classical technology is reshaped by the introduction of software components, or by the introduction of layers of information entities (such as gene sequences). The information entities themselves have properties that clearly exclude them from patentability, but a physical invention including them often still meets the criteria for patentability. This tension has led to an intense pressure for an increased patentability of the information entities themselves, which has progressively introduced itself in case law and in the practice of patent offices. A number of dangerous mistakes have developed, such as the idea that a gene sequence ~~— clauses granting recovery by~~ creators of all rights transmitted to producers and distributors when these have not been properly exploited, but these clauses are always difficult to enforce.

51 Though this last argument is often brought up by promoters of wide patentability if fields like biotechnology, one has to recognise than in recent history, the rise of shareholder value reasoning has made many private businesses radically incapable of investing in such long lasting deployment. In such a situation, the exact frontier between what can be supported by private appropriation and what can be supported only through public support to deployment is yet unclear. This is made even more difficult to analyse by the fact that a great part of public support can be hidden in indirect support schemes (for instance drug reimbursement by public medical insurance, or military spending).

52 That is technologies that are based on the isolation of information entities such as gene sequences and the modelling of the relation between this information layer and physical functional phenomena- in an organism or in a technical environment.

"would represent a biological function, and its usage in a possible drug, treatment of biotechnological process" or that a computer program "would represent its execution on a generic computer, and the usage of this execution in a technical process". These statements are factually wrong<sup>53</sup>, and they have been used to justify the unjustifiable: patenting discoveries, human expression and ideas, when none of the criteria for patentability was met. Some now claim that because some patent gene sequences or computer programs, all should do it, to defend themselves in competition. This is what can be called the National Rifle Association argument. Not only is this unethical, inefficient economically and in terms of innovation, but it simply won't work. Unfortunately, if we are late in recognising it, the cost of returning to common sense will be higher and higher.

One important aspect of this discussion is that one must assess what patent protection will become for technical devices and processes when larger and larger chunks of them will be accomplished under the control of software or information processes (for instance bio-informatics). As a thought experiment, let's imagine that a set of formerly mechanical processes would become one single meta-mechanical machine-tool, where a software would control which of the former individual processes is accomplished by the meta-machine. The meta-machine itself would deserve patent protection for its technical implementation innovative aspects. But each of the individual instantiating software should not be covered by patents. To understand why, one can consider 2 aspects of this change. The first one is that the motivation to introduce it is naturally to replace a complex and rigid mechanical design process by a less costly and flexible to rearrange software development or information process. It is exactly because the software part of the new process no longer meets the criteria (C1=big investment) for patentability that investors might want to introduce it. But in addition, contrarily to what classical patent thinkers always assume, the software components, considered themselves, are not mechanical inventions. They are nothing but algorithms mapped though the particular semantics of an execution process into the realm of mechanical processes.

In conclusion for this rationale to keep patentability into the restricted corner of physical devices and processes, which can be absolutely enough to guarantee positive rights and investment in the domain of material inventions, one must further consider the case of what exceptions to patent protection must be allowed. We live in a world in which one waits for millions of sick people to die without receiving existing treatment before allowing to decide that there is a dysfunction of the system of property. Only then are governments of poor countries allowed to commission the manufacturing of patent-protected drugs at production cost in their countries. The claimed justification is that not offering this extremely strong protection would have deterred investment that made it possible for these drugs to exist. Recent treaties and related agreements have been imposed to many developing countries that will restrict further in a few years their ability to override intellectual property for major health reasons (for instance). Isn't it time to reverse the order of steps?

## **Integrity, libel and redress**

There is a true tension between the development of new information exchanges and the moral rights of creators and more generally of any human being. Increased possibility of re-use, new intermediary and end-user empowerment on presentation, all this means that a given contents will be used in a context that is less and less under control of its original creator. Quick transmission of information, diversification of sources, evidently create an environment that is prone to the propagation of false or libelous information. The possibility for all to acquire images and sounds anywhere and to make them available also threaten privacy. But the same processes that threaten integrity, or seem to call for powerful mechanism of redress, can also contribute to a much better acknowledgement of authorship, a quick correction of false information, a limitation of the damage created by libel.

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sequence and the complete cellular expression machinery that constitutes a biological process. For software, people are often confused by the reference to universal computers as being equivalent one to another, which would seem to support the fact that indeed a software "represents its execution". But as early as 1948, John von Neumann ("The general and logical theory of automata". Hixon Symp. lecture, Pasadena. In *Collected Works* 5:288-338, 1948) developed a luminous analysis of why this theoretical equivalence was practically inoperant, and in any case it applies only to programs with predetermined input/output. In practice, a software technical effect can be understood only if its full execution environment is specified, including compilers, run-time, input-output devices, input-output contents.

In such a situation, two approaches can be followed. The first one is to reinforce a-priori control on information publishing (to use a polite wording for censorship and restriction to the right to publish), to enforce strong penalties on publishers of false information or those who distribute it, to protect integrity by limiting the ability of users of intellectual entities to control how they access them (presentation for instance) or by restricting their freedom in re-using them to a degree going beyond what is needed for the sake of the remuneration of creators. In addition safeguards would be put in place to forbid the publishing of entities resulting from the capture of information associated with persons without their agreement. The second approach is to try to constitute positive counterweights to the potentially dangerous trends. Develop formats and related standards to enable creators to define how they would like their creation to adapt to user-controlled context changes<sup>54</sup>. Develop and disseminate tools for information authentication and information assessment. Exploit to the largest degree the extraordinary potential of co-operative information sharing to spot and redress false or libelous information. Develop tools to enable users to build a representation of complex sets of information coming from multiple sources or complex sets of arguments.

Not all problems of integrity or libel can be solved by using the new social organisation of exchanges and the technology that contributed to create them. The publication in 2000 in the UK of names and addresses of alleged sexual offenders has provided an example of types of perverse usage that can probably be prevented only by outlawing them. But if we do not invest enough in the positive approach, one can easily imagine a situation in which we would get the worse of all worlds. Centralised media and restriction to criticism together with low quality information, no integrity of creation (even for entities created once and for all) together with no privacy for one's image and deeds. To avoid this nightmare scenario it is worth investing as much as possible in the positive right approach of building expression and criticism tools and encouraging their usage. Not all problems will be solved in that way, but we will be able to develop restrictive approaches only when they are truly necessary. We will also be surer that we develop them for the benefit of all and not just for the opportunistic defense of some particular interests.

## **Transition issues**

How do we go there from here? How can the positive rights approach turn into a widespread reality? Of course political awareness and resulting legislative action can stop the production of restrictive property-based regulation. But even assuming a strong mobilisation in favour of positive intellectual rights, considering the inertia of regulation, the real feasibility of transition rests on the existence of a critical mass of exchanges that follow by choice the positive rights approach. The free software movement has here shown the way, by successfully reaching this critical mass in a domain in which it was far from easy. It also demonstrated that some additional safeguards are necessary to ensure that an approach based on voluntary contribution is not stopped before reaching critical mass. Without these safeguards, it is too easy for opportunistic players to use the richness of what has been created and made freely available and to turn it against itself by making it proprietary through some minor additions or control on necessary environments for usage. The copylefting schemes of the GNU General Public License are a vaccine against such misuse. When critical mass is reached, the illustration of the benefits of a positive rights approach in terms of value creation, true author benefits and user empowerment become so clear that the balance of power shifts quickly. Those players in property-based business models who have the necessary creative resources are able to re-engineer their practice, and find new opportunities based on the infrastructure of sharable intellectual entities. This process took a bit more than 15 years for software, and we see only the premises of it for other types of intellectual entities. But these premises are those of a true Renaissance.

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<sup>54</sup> For instance XML-based media or presentation description formats such as SMIL.

## **About the author**

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## **Notes**