

Reflections on the Cultural Foundations of IPRs

A discussion paper

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1 Introduction

The purpose of this paper is to further stimulate discussion about the foundations of IPRs, be they cultural or not. This is of course as interesting as it is challenging in itself, but such discussions may also in the end be useful in the turmoil of present debates about various IPR issues. The paper is in no small measure speculative, attempting to involve various relevant but perhaps so far ignorant disciplines. As such, the paper is a cross-disciplinary voyage in a vast deep sea with limited equipment and admittedly adventurous. It will first travel through various contexts, searching for IP notions, then give a brief history account of IP developments and finally an account of notions in the history of ideas, brief as well.

For the discussion that follows we can think of intellectual property in broad terms as property directly related to the creativity, knowledge and identity of an individual. Intellectual property of a collectivity of individuals may in turn be broadly thought of as property directly related to the creativity, knowledge and identity of that collectivity. The collectivity may be a legal person, such as a company or a nation, or it may be a less well-defined group, such as a team or a community. The basic notion of property in general is to have the right of way to exclude others at will from using and/or deriving benefits from the underlying resource, thereby exercising some semblance of control. Thus, ownership is associated with the right to at least partially retain or regain control over the benefits derivable from a resource. At the same time a sense of ownership may derive from a sense of control, deriving in turn from possession of some resource. If the resource is scarce and competition about it accrues, priority has to be established, usually on the grounds of first and sole possession when it comes to physical property. As will be discussed, this presents fundamental problems when applied to immaterial things. What constitutes the basic notions of property and the fundamentals of rights, and how these notions have evolved over time in various societies could be further elaborated at length. (See e.g. Demsetz 1967, MacPhersson 1978 and Bouchaert 1990. See also Winter 1987 for a good review of some basic notions like knowledge, asset and property from an economist's point of view.)¹

¹ In what follows, we will focus primarily on notions of intellectual property, however. The first and sole durable possession of a naturally scarce physical resource or good (like a caught fish) has traditionally (at least in Western societies since Medieval times) been considered as the general basis for defining an original property right (provided it is not too costly to enforce the right). However, as will be discussed below, such a notion has inherent shortcomings when applied to non-physical or immaterial resources and goods.

2 IP notions in various contexts

2.1 IP notions in individuals

How do notions about intellectual property arise in individuals and collectivities? How do they arise in a child? How do they arise, if at all, in a primitive society? Very little seems to be known about such questions. In fact, psychologists studying child development have hardly asked the question of whether and how IP notions arise in a child. To explore this question a bit further, we can then ask ourselves some more specific questions. First, does a child in the absence of instructions (e.g. from parents) have a sense of natural right to its secrets and creations? Will a child easily accept a demand that it hand over a secret in any circumstance? Second, if a child for some reason discloses a secret, say about a discovery it has made, does the child sense a right to exclude others (children in particular) from taking advantage of the disclosed information if disclosure puts the child at a disadvantage? Third, does a child object to others imitating a creation or design of some kind that it has developed? For example, if the child builds a sand castle on the beach with a specific design, does it object in some way to other children imitating that design? Does the child object stronger to imitation if it has laboured more on the castle? Do other children feel it is fair to imitate and unfair to be stopped from doing so? Fourth, does a child have a sense of exclusive rights to a name or a symbol it has chosen to attach to itself or its creations or belongings?²

All these questions are open for further observation and reflection.³ Let us start with establishing a parsimonious set of fundamental observations of characteristics of individual possession and control of information or knowledge.⁴ Thus:

- A1. It is possible for two individuals to independently acquire and possess the same new knowledge, even simultaneously (same discovery possibility; multiple possession possibility).
- A2. Dispossession of an individual's knowledge is impossible at will (control).
- A3. Control of an individual's knowledge is possible through secrecy.
A3 may be reformulated:
A3': Outside inspection of an individual's knowledge is impossible.
- A4. It is possible for an individual to acquire new knowledge from another individual.
- A5. It is possible for an individual to acquire new knowledge not previously known to other individuals.
- A6. Acquisition of new knowledge is always possible (permanent scarcity possibility).

² Certainly a child is comfortable with having the same name as many other children, but personal names are given to the child not chosen.

³ It should be noted that all four types of questions are amenable to experimental situations, although it may still be difficult to trace underlying factors to any experimental observations, separating influences from instructed behaviour, etc.

⁴ Common distinctions between (embodied) information and knowledge are not essential at this level of analysis. The concepts knowledge, possession, control, individual etc. can be regarded as undefined givens here.

Although trivial and often observed, characteristics of this kind do not have trivial implications for property notions. They are moreover not characteristics of knowledge solely as “a thing” or collection of “pieces” but characteristics of human acquisition and possession of knowledge and hence biological in nature.

Thus, individual possession of knowledge is possible and in fact permanent (A1 and A2), and so is first and sole possession (A1, A2 and A5), as well as first and multiple possession (A1, A2 and A6). Moreover, first possession may be only temporarily sole (A1, A2, A5 and A6) and A3 further implies that it is impossible to prove first and sole possession.

Thus, it is possible to have a notion of individual knowledge property, based on first and sole possession of something scarce, but then of an inherently uncertain temporary nature with inherent difficulties of proof. Basically, such a property notion establishes at best a many-to-many correspondence between an ever expanding set of knowledge elements and an ever changing set of individuals.

Cogito ergo sum with a twist

Going back to the child, its developing sense of control of its thoughts, information and ideas may develop into notions of ownership to them, which partly (but only partly) are extensions of the child's development of notions of physical property arising from its sense of physical control of material things (including its bodily parts). Thus, it can be argued that the biologically founded possibility of an individual to acquire, possess and control secrets is fundamental to the rise of ontogenetic IP notions.⁵ It may also be fundamental to the identity formation of the child. Detecting the possibility not only to have thoughts, giving a sense of existence, but to have thoughts perceived as unique gives the child or individual a sense of existence as a unique individual. In contrast to control of material things, the identity formation through individual secrecy control is strengthened by the dispossession impossibility.⁶ On the other hand the multiple possession possibility may weaken identity formation, but then the individual is far from always knowledgeable about it. In addition lying offers a limited possibility for an individual to check sole possession.⁷

Identity formation in turn is linked to the use of individual names, marks and symbols. However, an individual may be dispossessed of these.⁸

So far, there has been no need to characterize knowledge and the use of names, marks etc. in economic terms of costs and benefits and in particular no need to assume that trade (or 2-way exchange) takes place. Thus, one can claim that IP notions oriented around personal secrets are the most fundamental ones and their foundations are biological rather than cultural

⁵ Religious belief systems (RBS) incorporating an omniscient god (knowing all thoughts, including who possesses what) may then weaken this IP notion of course.

⁶ Note that exercising secrecy control is not the same as being secretive, but includes other behaviors as confessing (at will), being confidential and intimate, gossiping etc.

⁷ One can even speculate further that the experience of getting away with an undetected lie strengthens a child's IP notion and identity formation (apart from any moral considerations).

⁸ Note that multiple possession of names, marks and symbols is possible as well, although communication efficiency in a collectivity is enhanced by sole possession, enabling a one-to-one correspondence.

or economic. In this sense they (the IP notions) are natural rights. Moreover, the naturalness of these rights does not stem primarily from notions of rights to the fruits of one's arduous labor, nor are they a direct consequence of extensions of one's identity. On the contrary it can be claimed that identity formation is enhanced by acquisition and possession of personal secrets.

The step from personal secrets and personal names and marks to trade secrets and trademarks presupposes that trade takes place of course and in that sense these IP notions are extensions at societal level, thereby becoming economically and culturally founded.

2.2 IP notions in primitive societies

A next set of foundational questions concerns how IP notions emerge in primitive societies. How do such societies look upon ownership and control of ideas, knowledge, secrets, creations, names, marks, symbols and cultural expressions in general? Again, it seems as if questions like these are not frequently asked in the relevant academic circles, e.g. in anthropology or in the legal sciences.⁹ Questions regarding how notions of physical property (land, animals, etc.) emerge and develop (mostly from public to private property) in primitive societies have been greatly studied on the other hand. (See e.g. Bouchaert 1990 and Demsetz 1967, both of which give further references.) Rousseau's philosophical discourses on the origin and foundations of inequality in primitive societies describes the emergence of general property notions as a point of departure for his evolutionary view of human rights, but in fact have little to say specifically on IP notions in primitive societies. Nevertheless, Rousseau considerably influenced the emergence of the natural rights movement in 18th century France, which claimed that IPRs were limited to an individual's natural right to his own intellectual works rather than being means for society to stimulate further intellectual works.

Lacking empirical evidence let us again resort to some fundamental observations and their possible implications. Consider especially how two individuals can possibly conduct a market exchange of information, i.e. to trade information (in contrast to physical goods). Arrow (1962) describes the inherent difficulty to prevent information theft in this case when the information offered for exchange has to be irreversibly revealed to the buyer in order to determine its value.¹⁰ However, the difficulty may be overcome, at least partly, if the buyer perceives the seller (or someone else) as able to enforce penalties in recurrent contracting (that could be ensured by offering over time pieces of information, provided it is divisible) or in exercising rent control (e.g. by controlling complementary resources). Part of the difficulty may also be overcome if the value of the information could be concluded on other grounds than revealing the information itself, e.g. by revealing what a food source contains without revealing where it is. (Cf. what-info vs how-info.) Thus in certain information exchange situations, the information offered has what can be called a second order codifiability sufficient to indicate the exchange value without revealing too much of the information

⁹ A prolific writer on law such as Posner only touches upon the issue, see Posner (1983, p. 149, pp. 279-79). Posner finds that primitive societies (at least some) give protection to a name, a spell, a song and the like but not to a productive idea or invention.

¹⁰ New information is taken to mean invention here, as in Arrow (1962). "New" then means new to the world.

content. However, then the seller is in a position to cheat. Thus, pure information could not be traded between two individuals without at least one taking a risk of being cheated, a risk that could only be mitigated by recurrent contracting or control of complementary resources (or honesty).

Introducing a third party introduces an increased possibility of collective enforcement, given that proofs of cheating could be demonstrated. Since selling information presupposes the seller possesses it while the buyer does not, proofs of this pre-exchange state of possession have to be provided *ex ante* or *ex post* the exchange. Proving non-possession is likely to be costlier than proving possession and proving *ex post* is likely to be costlier than proving *ex ante*. Thus, there is an incentive for society to enable proof of possession *ex ante* which leads to some sort of process for registration or recognition of information (or knowledge) to facilitate enforcement of corresponding property notions, originating at the individual level as discussed above.¹¹

Finally, a religious belief system could also be introduced in society to facilitate production and trade in general. An omniscient god who rewards honesty and hard work and penalizes disbelievers without being too generous with immediate forgivings on request then simply lowers transaction costs, directly or intermediated by a church.

2.3 IP notions among animal societies

To stretch our present type of inquiry even further, one can also ask if animals develop any IP notions. For example, if a monkey discovers a new technique for food collection, will it readily share this discovery with others in the group? Will there be any enforcement behaviours or any rewarding behaviours in the flock? Again, these types of questions have not frequently been asked in the relevant academic disciplines, like zoology, although some relevant observations of animal behaviour have been made. For example, information sharing among groups of the same species is universal in social species from insects to primates (in fact it characterizes a social species) while information sharing between different species is almost non-existent (see Wilson 1975). Chimpanzees, being the closest relatives to humans, have developed more subtle and human-like ways of information sharing and secret keeping (see de Waal 1982). However, there are no signs of any communication between groups associated with negotiation and trading purposes.¹² (Thus, there is support for Adam Smith's well-known proposition that the propensity to barter and trade is specific to humans¹³).

¹¹ One can speculate further whether recognition of inventive or creative individuals also has a survival value to societies, human as well as animal ones. There are allegedly some bird species that increase their mating success by displaying creative nests.

¹² I am grateful to Prof. Edward Wilson for helping me with these issues.

¹³ Brain research suggests that certain human propensities are traceable to certain parts in the brain. Thus, some institutional developments such as property rights and trade could perhaps generate some kind of imprints in the brain, during its phylogenetic evolution, perhaps traceable by measuring activities in different parts of the brain (such as blood flows) when e.g. a creator/inventor is confronted with evidence of piracy or plagiarism.

2.4 IP notions in mythology and religion

IP notions can clearly be found in the fabric of mythology and religion. In Greek mythology the gods punished Prometheus for stealing fire and giving it to mankind. Fire symbolized technology, which was the property of the gods. Thus, Prometheus was punished as a kind of IP thief. But once fire was given to mankind, the gods could not take it back and thereby prevent mankind from using technology to challenge the gods. The gods, in turn, punished mankind for receiving and using fire, although it was not stolen by mankind.¹⁴ This myth counters the present practice of absolving punishment from a third party for receiving stolen property in good faith.¹⁵

In the Bible, Genesis provides a parallel story about how God punished Adam and Eve for eating the fruits of the knowledge tree that belonged to God. Both stories carry the notion that knowledge is basically divine intellectual property, and that once mortals have illegitimately obtained access to it, through an intermediary or not, they can never be dispossessed of it and are therefore subject to eternal damnation (cf. royalties), i.e. they must pay for it forever. To the extent that Christian kings and priests historically considered their earthly powers to have been divinely sanctioned, it is reasonable to believe that they also found religious justification for controlling intellectual property. However, it is unclear whether this justification was an important factor behind the custom developed among rulers in Renaissance Europe of granting certain privileges to intellectual workers. In this context, it may be noted that the mythological theme of divine penalty to mankind for using technology has an earthly parallel in 18th-century Japan, where the Tokugawa rulers in 1718 proclaimed a new law, which forbade ‘new things’, that is, technical innovations (Shinkihalto no Ofuregaki – ‘Ordinance Prohibiting Innovations’) on penalty of death. This further underscores the importance of power and the political aspects of intellectual property, in addition to its economic aspects. Knowledge is power as long as it is not widely diffused.

The Talmud in Jewish religion expresses another IP notion that is at least 2000 years old. It is said that he who cites the source of his teaching “brings salvation to the world”.¹⁶ Thus, anyone is free to use information as long as attribution is made to the source, just as in science where the use of information is free of charge as long as appropriate references are made. In this way, the reputation of the idea or knowledge creator is increased during the diffusion of the knowledge. This Talmudic rule could be interpreted as an economic incentive for producing and disseminating information in ways that benefit both the producers and users of new knowledge.

¹⁴ The punishment took the form of handing over in a cunning way Pandora’s box, filled with misfortunes but with hope at the bottom, neither of which mankind could dispossess.

¹⁵ The gods could, of course, charge mankind with not acting in good faith, but knowing in advance that fire belonged to the gods, so that mankind should have rejected Prometheus’ offer. The gods could perhaps even have made the claim that Prometheus and mankind had conspired against them. This is in fact suggested by the oldest source, Hesoid (ca. 700 BC), where the conspiracy was a misuse of fire in sacrifices to the gods. Unfortunately the myth ‘Prometheus vs. Zeus’ is not as well documented as contemporary legal cases.

¹⁶ See the Talmud Tractate Megilla. Prof. R. Aumann drew my attention to this passage. A similar importance attached to correct citations can be found in Islamic religious texts (Prof. J. Hjärpe, personal communications). Muslim jurists considered the legality of IP already in the 11th century (Azmi 1996).

2.5 IP notions in ancient societies

Were there any recognized intellectual property rights (IPRs) in Hammurabi's Babylonia, in pharaonic Egypt, in ancient Greece, in ancient China, etc., and what was the philosophy behind them? There are various indications of the recognition of IP in these societies, but it is difficult to find historical material on the supporting philosophical issues, and it is also difficult to find historians who have tried to deal with the questions in any depth. It is also difficult to find explicit treatments of the IP issues by ancient philosophers like Plato, Aristotle, etc (although regarding physical property Plato clearly advocated public property while Aristotle advocated private property, both being moreover critical to trade and finance.). One can of course speculate that Plato would not have approved of any private ownership of ideas that he thought of as universal, subject to discovery by noble men and belonging in some sense to a societal collectivity. However, he belittled industrial crafts and technology and would perhaps not have been concerned if some IPRs had been attached to inventive work in such a context.¹⁷ At the same time he would probably have been concerned if his writings had been copied and published with someone else making claim to them. That there was a concern in ancient Greece over who originated ideas and writings is illustrated by the fact that Aeschines was (apparently wrongly) accused of having appropriated material from Socrates after Socrates' death without acknowledging it properly.¹⁸

There is also a well-documented proliferation, long before Plato, of semi-religious organizations such as "mystery cults" (e.g. at Eleusis) whose initiates claimed to possess secret knowledge, often of practical value concerning metallurgy and agriculture (and trade).¹⁹ Moreover, a patent like right was established in Sybaris around 700-500 BC for innovative food dishes (see below).

Although basically an open question, it is not far-fetched to assume that contemporary views on IPRs are, after all, influenced by Greek philosophy. The distinctions between science and technology, between discovery and inventions and between idea and expression are central in contemporary decisions regarding IPRs.²⁰ The distinctions are often difficult to make and perhaps more so in contemporary science and technology (S&T), as well as in contemporary cultural arts, not the least since they increasingly become penetrated by technology as well as by science.²¹ Nevertheless, there is a widespread acceptance of these

¹⁷ As is well known, it was typical among elite citizens in ancient Greece to belittle craftsmen, artisans and the like, although their output could be appreciated (see e.g. Austin and Vidal-Naquet 1980, p. 12). One illustrative observation is that, although there were many well-known potters and sculptors, who also attached their names and symbols to their work, their names seldom appeared in the literary writings of their times.

¹⁸ See Vlastos (1991, p. 103). I am grateful to Prof. T. Amemiya for drawing my attention to this point. Another example (pointed out to me by F. Marcus) of concern in ancient Greece over truthfulness to original works is the law introduced in 330 B.C. by the Athenian statesman Lycurgus, requiring that a transcript of the works of the great poets should be deposited and read to the actors by the city secretary in order to have them keep to the original text (see Easterling et al 1985). Thus there was concern over not only plagiarism but also distortion, i.e. the creation and the creator were jointly recognized and protected as a basic IPR bundle.

¹⁹ This was pointed out to me by J. van Leuven. The Pythagorean school from 500 BC is another example.

²⁰ Under current law scientific discoveries and mathematical formulas are not patentable. Artistic expressions are copyrightable but not their underlying ideas (such as the idea of a special type of plot or motive).

²¹ For example, some mathematicians refer to certain proofs as inventions rather than discoveries and some poets speak of discovering a new poem.

distinctions, which more or less became articulated in Greek philosophy. Likewise, Western-type academic institutions concerned with the furtherance of knowledge in non-proprietary ways have intellectual and ethical roots stretching back to Plato's Academy and Aristotle's Lyceum.²²

Thus, one can recognize the emergence in ancient societies of different sets of IP notions or IP regimes, pertaining to science, technology, culture, military activities and religion with clear connections to the major IPR types as we know them (patents, copyrights, trademarks, trade secrets and designs).

2.6 IP notions in science and technology

The scientific society or community has, over the centuries, also developed IP notions but at first glance quite different from the IP notions in the industrial-technology community. Priority for new creations is important in both communities but is decidedly more vague in science on the basis of the "first to publish" principle, rather than on the "first to file" (a patent application that is) or the "first to invent" principle as is the case with technical inventions. A publisher's decision to "grant" a publication is based on some criteria of newness, non-obviousness and usefulness of the publication, similar to but not exactly the same as the criteria used in granting patent rights for an invention, see Table 1. The newness criteria and priority ground moreover foster secretive behavior prior to publication and patenting in both regimes. Scientists then use each other's works and, in so doing, are expected to cite them as a basis for recognition and further career, funding and award possibilities. Certainly citing fulfils other functions in academic work as well, but in this respect, citing is thus analogous to paying a royalty for using the results of someone else's work. (Cf. Trajtenberg 1990.) However, the "payment" is made "liquid" in quite a different manner. Peer recognition for contributions that are scientifically innovative is perhaps the biggest "payment" to academics, albeit a non-monetary reward. The monetary rewards in science are partly oriented around prizes, grants and salaries. These forms of rewards are in fact alternatives to patent rights as means to promote technological progress. Much can be said and debated about the differences and relations between science and technology.²³ However, technically speaking there is nothing in principle that prevents science and technology from having more similar IP regimes. One could e.g. have a patent-like system in science as easily as one could have a prize or grant or inventor reward system in technology.²⁴

²² See further Farrington (1963), Finley (1965) and also Prior (1991). Cf. with Long (1991).

²³ See especially the works by D. de Solla Price and N. Rosenberg, being two leading scholars on this topic, e.g. de Solla Price (1973) and Rosenberg (1982). For a discussion of the traditional IP regime in science, see e.g. Nelkin (1984), Merton (1988) and Long (1991), and Stephan (1996) and Eisenberg (1987) for how it may clash with the IP regime in technology and industry. The distinction between science and technology is becoming blurred, however, (see e.g. Narin and Noma 1985). The division of intellectual labour between universities and companies is also less clear, with companies doing basic research (see e.g. Rosenberg 1989) and universities taking out patents (see e.g. Bertha 1996).

²⁴ The latter was in place in e.g. the former Soviet Union. Note that for a patent system to be effective as an economic incentive some kind of competitive market economy is necessary. However, since patents give several types of advantages to individuals and firms, patenting may also occur in monopolistic industries. For example, patenting has been frequent in the telecommunications service sector in the USA, Europe and Japan in the 20th

The information in a "scientific patent" could be freely used, respecting citation practices, until it is commercially exploited in some specified sense, similar to patents in technology.²⁵

Thus, science may be called open only in a specific sense and certainly open science is not synonymous with IP free science. Moreover, the IP regimes in science and technology are fairly similar at a more fundamental level.

century, although the sector has mainly consisted of national telecom service monopolies, regulated by the government.

²⁵ To illustrate further, it is quite conceivable (whether practical or not) to have an international system of "publication offices", examining scientific publications in more standardized ways, following explicitly defined criteria.

Table 1. Comparison of intellectual property regimes in science and in technology

Regime feature	Science	Technology
Priority	First to publish (First to discover/write)	First to file (First to invent)
Criteria	Newness to the field Non-obviousness	Newness to the world Non-obviousness Industrial
Examination system	Publishers Journal editors and referees	Patent offices Patent examiners
Opposition system	Informal	Formal
Sanction system	Informal	Formal
Legal basis	Copyright matters codified in law, otherwise weak Professional norms	Codified in patent law
International coordination	Strong in some disciplines. No unifying framework or treaties	International treaties and cooperation
Licensing provision	General permission to use “publication pool”	Usually subject to patent holders’ discretion
Remuneration system	Citations Reputation Community prizes and job offers Research grants Non-contract-based Promotion	Royalty or lump sum payments or barter Product or license sales Contract-based

2.7 IP notions in culture

In the heterogeneous cultural communities of artists and artisans of various sorts (authors, potters, painters, musicians, dancers, goldsmiths etc.) and among parties interested in their output (ruling elite, publishers, audiences etc.), a variety of IP notions have developed over

time. IPRs were given to potters and chefs early in history, and IP notions in the cultural field may very well have been precursory and generic in some sense.²⁶

Many of the IP notions in culture are different from those in science and technology, although there are clear similarities as well (perhaps increasing due to technology's penetration of cultural activities). It seems that certain rights and rewards (individual/societal, tangible/intangible) have always been associated with cultural innovations, based on their innate newness, uniqueness and "goodness" and more or less regardless of the labour effort involved. In this sense the criteria for granting rights and rewards to cultural innovations are similar to the corresponding criteria used in science and technology. However, the distinction between a specific artistic expression and the underlying idea (e.g. a theme or motive) has also been important, where expressions could be privatized (temporarily) through copyright but not the underlying idea. Variations on a theme or different works within a style have been appreciated, while outright plagiarism has always been frowned upon, even if it has been tolerated. This is seemingly in contrast to criteria for granting patents to inventions, where the underlying idea is also protectable (cf. doctrine of equivalents). However, this difference could be interpreted as a difference in scope of protection and level of invention required, which is a matter of degrees.

2.8 IP notions in the military

The military community has historically developed quite different IP notions compared to both areas of culture and science and technology (at least compared to IP notions in civilian S&T). For military operations it is essential that secrecy protection is the primary concern, since there must be reliance on self-enforceable measures to prevent imitation and control over the dissemination of information in general. The closed, secrecy-oriented military IP regime obviously clashes with the open IP regimes in science and (civilian) technology.

2.9 Other closed IP regimes

Secrecy-oriented or closed IP regimes also prevail in other parts of society, e.g. in criminal organizations or certain religious or professional organizations. Again, it has been deemed essential to resort to such an IP notion when institutionalized enforcement of rules by any third party is deemed to be ineffective. The impossibility to dispossess allegedly stolen information from the perpetrator makes the damage from leakage irreparable, and explains the extreme sanctions often inflicted in closed IP regimes upon spies, traitors and undesirable informants in general.

An interesting scheme for the fragmentation of information for the purpose of preserving a trade secret is the one allegedly used by the Benedictine monks for protecting the recipe to their liqueur. Only the abbot knew the whole secret, while two monks knew different halves of it. When the abbot died, one of these two monks was promoted to abbot, thus being informed by the other monk, while informing a new monk replacing him in turn. One can note that such a scheme for preserving a trade secret with minimal risk of leakage is probably

²⁶ Cf. what was said about IP notions in primitive societies above. Also note how IP notions regarding innovative chefs and their new and good dishes have changed over time, as patents no more are granted to them.

optimal in some sense from a business point of view. On the other hand, one can also question whether such long-lived secrets benefit consumers in the long run.

2.10 Other open IP regimes

Besides science being an open IP regime (in a certain sense – see above) there are other examples of IP regimes that could (and are) referred to as open. It is important to find out their nature, how they came into existence and how – if at all – they could be sustained in order to find out how fundamental and prevalent IP oriented notions and behaviors are. Old examples of open IP regimes could be found in various societies (animal, primitive, ancient – see above) but these pertain to trade secrets and are only locally open but globally (outwardly) closed. Tales, songs etc were IP free in the past but hardly any more. Jokes on the other hand have interestingly enough always been free to use, retell and modify. They are culturally significant but economically less so.²⁷

Contemporary examples of open IP regimes could be found in certain regions, industries and periods, with the current open source movement as a prime example (see e.g. Lerner and Tirole 2000). However, it is doubtful how sustainable they are when e.g. economic costs and benefits loom large, early stage common-cause spirit and fun start to ebb, the perceived external threat (e.g. Microsoft) weakens and so on. As an economic organization, similar to a generous licensing scheme, it may very well be unstable, especially since the use of IPRs tends to be self-reinforcing or escalating.

²⁷ Of course, a country like Boredomia could conceivably legislate that jokes are IP protectable subject matter in an attempt to increase the production and distribution of jokes

3 History of the IPR system

Here the historical evolution of IPR systems will be briefly outlined with a focus on its early period up to the first codification of a patent law in Venice 1474 (which is a common starting point for history accounts of IP law). This account is a chronological complement to the preceding account of early IP notions across different contexts. There are several excellent IPR history accounts providing a richer history, for example by David (1993) on patents, copyrights and trade secrets; Penrose (1951), Machlup (1958), Kaufer (1989) MacLeod (1988), and the special issue of the journal *Technology and Culture* 1991 on patents; Plant (1974), Rose (1993), Goldstein (1994) and Kretschmer (1997) on copyrights; Coleman (1992) on trade secrets; and Diamond (1983) and Wilkins (1992) on trademarks.

As discussed above, IP notions have evolved from the dawn of history, especially oriented around secrets, although identity-related symbols are also of early origin.²⁸ IP for gaining trade-related advantages was less important in prehistoric times, but secrets and symbols as means to gain and preserve power were important, especially in political, military and religious settings. Ancient cultures, as in Egypt and Greece, were not known to have had any patent-like institutions for technical inventions, nor did the Roman Empire (Kaufer, 1989, p.1).²⁹ But there are clear indications of other forms of IP in these cultures, see Table 2. Particularly noteworthy is the use of trademarks and a patent like system for "food chemistry" in the Greek colony Sybaris on the East coast of the Italian peninsula.³⁰

²⁸ These symbols correspond to trademarks, but could also be seen as related to designs and copyrights since they involved visual expressions. Copyright of written material requires a written language, of course.

²⁹ Roman property law was strongly centered around physical property and physical possession.

³⁰ Athenaeus in "Deipnosophistae", book XII, p. 521 tells the following:

"The Sybarites", Phylarchus says, "after drifting into luxury passed a law that...if any caterer or cook invented a dish of his own which was especially choice, it was his privilege that no one else but the inventor himself should adopt the use of it before the lapse of a year, in order that the first man to invent a dish might possess the right of manufacture during that period, so as to encourage others to excel in eager competition with similar inventions." (As cited in Charles Burton Gulick's translation, Vol. I-VII, London/New York 1927-41, in Vol. V, p. 349).

Table 2 Chronological overview of early major events in IPR development

Year(s)	Event
3,200 BC	Potter marks found on fired clay pots, including jars buried in tombs of the First Dynasty Egyptian kings, providing a precursor to trademark protection. Stone seals or cylinder seals bearing such marks were used from about this time onward in both the Near East and Greece.
700-500 BC	Chefs in Sybaris, a Greek colony in southern Italy known for luxurious living, were granted one-year monopolies on the preparation of an unusual or outstanding dish. This right applied to no other art or science.
Ca 350 BC	One of the first recorded unauthorized copying events occurred when Hermodorus copied Plato's speeches and without passing them off as his own, he took them abroad to sell for his own profit. An early "bootleg" incident. ³¹
100 BC	Trademarks used in Rome on an everyday basis to mark products such as cloth, lamps, glass vessels, cheese, and medicine.
40 – 100 AD	the roman poet Marcus Valerius Martialis were so upset when others used his poems without reciting his name that he equalled it to kidnapping for which in latin is the word "plagium" (plagiarism). ³²
Ca 100 AD	An acknowledgement of intellectual work and effort in the Roman empire is visible in the legal institute of specificatio. Specificatio was a method of acquiring ownership by the creation of a new thing out of someone else's materials. If someone created a marble statue out of someone else's marble the statue could be considered a "nova species" (a new thing) whereby the statue came to belong to the creator. ³³
337 AD	Roman emperor Constantine decrees that artisans of certain critical trades are exempt from all civil duties. Chariot makers, engineers, and locksmiths are especially favoured.
483	Roman emperor Zeno decrees that no monopoly can be granted to clothing or food, even if the monopoly was previously required by order of an emperor.
1297	A Venetian decree allows physicians to retain within their guild the secret for preparing new and novel medicines.
1323	Johannes Teuthonicus is granted a patent-like privilege by the Venetian government for a grain-mill
1324	Edward II (England) grants letters of protection to skilled German miners to induce them to come to England.
1331	John Kempe of Flanders receives a royal grant (patent) for the purpose of building a clothing industry in England. The policy is later extended to other skilled trades.

³¹ Copyright Theft, John Gurnsey, Aldershot 1995.

³² Lärobok i Immaterialrätt (in swedish), p. 25, Levin, M, Koktvedgaard, M, Norstedts Juridik, 2000.

³³ Textbook on Roman Law, Andrew Borkowski LLB, Blackstone Press Ltd, 1994.

- 1332 The Venetian Grand Council establishes a special fund for a foreign constructor of windmills.
- 1353 An English statute enables a foreign merchant to obtain restitution for lost goods if his mark proved ownership.
- 1416 Franciscus Petri in Venice received a letters patent for building and maintaining a waterworks.³⁴
- 1450 Johann Gutenberg develops the printing press.
- 1451 The newly acquired ease of copying written materials creates the necessity for copyright protection.
- 1452 Earliest recorded trademark litigation; a widow of a London bladesmith is awarded a particular mark that formerly belonged to her husband.
- 1469 Johann von Speyr receives the first printing privilege in Venice which duration was five years.³⁵
- 1474 Venice enacts the first codified patent ordinance. Inventors were permitted 20-year monopolies. Infringers would be fined 300 ducats.³⁶
- 1584 The first judicial recognition of trademarks stems from the common law system in England beginning with the “Sandforth’s case”, where it was stated that a mark deserved protection at common law to indicate source or origin of goods.³⁷
- 1624 The first legislation of patent law that to a large extent resembles our present, were the Statute of Monopolies.³⁸
- 1709 The first legislation of copyright law that to a large extent resembles ours were the Statute of St Anne. This legislation were influenced from older common law concepts that were formed during the 15th century.
- 1712-1737 Legal protection of design rights for textile patterns were afforded in France to silk weavers.³⁹
- 1751 In line with the french enlightenment movement, the french encyclopédia was first printed, containing many never before published trade secrets from different guilds.⁴⁰
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³⁴ Lärobok i Immaterialrätt (in swedish), p. 26, Levin, M,Koktvedgaard, M, Norstedts Juridik, 2000.

³⁵ Urheberrecht, Kohler, Stuttgart 1907,pp.34.

³⁶ Patentskyddets omfattning, Godenhielm (in swedish), Helsingfors, 1994, pp2.

³⁷ How Early Did Anglo-American Trademark Law Begin? An Answer to Schechter’s Conundrum, Keith, M. Stolte, 8 Fordham I.P., Media & Ent L.J. 505 (1998).

³⁸ Lärobok i Immaterialrätt (in swedish), p. 26, Levin, M,Koktvedgaard, M, Norstedts Juridik, 2000.

³⁹ Lärobok i Immaterialrätt (in swedish), p. 270, Levin, M,Koktvedgaard, M, Norstedts Juridik, 2000.

⁴⁰ The business of enlightenment: a publishing history of the Encyclopédie,1775 – 1800. Cambridge Mass.1979.

1790 America's first patent and statute, The Patent Act, was signed into law on April 10, 1790 by President George Washington.⁴¹ The same year the Copyright Act was also enacted by the U.S. Congress.

⁴¹ Fundamentals of United States Intellectual Property Law: Copyright, Patent and Trademark, Sheldon W. Halpern, Craig A. Nard, Kenneth L. Port, Kluwer Law 1999.

As trade and technology developed in the Middle Ages, IP notions developed. A need to protect technological advantages by other means than secrecy arose. For example, a ruler could feel overly dependent on the secret-based "natural" monopolistic power of professional guilds and societies, as well as on that of an individual artisan such as a clever weapons smith. Furthermore, skilful artisans could take their professional secrets with them into the grave. The idea of remunerating the disclosure of secrets, which is an ancient practice in itself, became increasingly important as technical know-how gained importance. It is likely that various types of compensations were considered: prizes, grants, patent privileges, etc. What probably made a patent-like privilege particularly attractive to a ruler was its financial feature. A privilege that protected the privilege holder from competition allowed him to charge higher prices. To the extent that competitive trade existed, the privilege holder was remunerated by the ruler but in such a way that the ruler, i.e. the privilege granter, did not have to fully and directly pay for it.⁴² A patent privilege also carried the advantage that the remuneration was tied to the actual working of a device and the demand for that device. This advantage could be achieved by a prize system as well, but then the ruler had to finance the prize. The disadvantage of a patent system from the patent holder's point of view was that a patent privilege implied a remuneration *ex post*, i.e. in connection with commercial success, based in turn on technical success, and it financed neither any necessary investments *ex ante* nor any failures *ex post*. This disadvantage could be mitigated by a grant or a loan in combination with the patent, however, but then at the discretion of the ruler. Thus, the emergence of the patent system can be seen partly as a reaction against secrecy in a context of the rising importance of technology and trade, and as a scheme for promoting inventions that provided an attractive mode of financing for the privilege granter.

A patent-like system also emerged in connection with ore mining sites as described by Kaufer (1989, pp. 2-4). In that context, the priority rule "first to invent" emerged, with the term "invention" then having a meaning closer to "discovery" in present-day language.⁴³ According to Kaufer, there had been a long common-law tradition in mining areas in the European Alps of granting property rights to those who were "first to invent" an ore site.⁴⁴ As mining became a more technically complex operation, e.g. going deeper into the ground, more technical devices were needed, e.g. for removing water ("Wasserkuenste" or "water arts"). Patent-like privileges were then granted to originators and financiers of these devices by

⁴² Thus, a patent privilege, in a way, functioned as a privilege to tax consumers for a period of time. Also in modern times a strong patent system is attractive to a government in an advanced country as a policy measure since it is easy to finance. The government does not have to pay subsidies and the patent offices and court system can be largely self-financed. There need not be any losses to the government through business tax money, either. On the contrary, tax revenues might increase due to monopolistic pricing.

⁴³ The "first to invent" rule means that the one who first makes an invention has priority to the rights attached to it. This property concept is analogous to the physical property concept based on the first possession of a physical thing. However, the difficulty of establishing who is the first possessor of an intellectual thing, i.e. who is the idea's creator, has led to the alternative priority rule that the one who registers an invention, i.e. files a patent application, gets priority to any rights granted. The latter rule prevails in Europe and Japan, while the USA has stuck to the former rule.

⁴⁴ This is an example of how property concepts were extended from the physical to the intellectual world.

extending mining law principles. Often remuneration took the form of rights to a certain share of the mine's output, again an attractive mode of financing.⁴⁵

In the 14th and 15th centuries the Republic of Venice was engaged in mining and "water arts" as well. Kaufer (1989, p. 304) as well as David (1993, p. 46) reports on how several engineers were granted special patent-like privileges by the Venetian government. The first known example is Johannes Teuthonicus in 1323 for a grain mill. Another example is Jacobus de Valperga, who received a special privilege in Venice in 1460 for a water pump. The privilege prevented anyone from imitating Jacobus' pump without his permission as long as Jacobus lived. On the other hand, there was a compulsory licensing provision requiring Jacobus to grant licenses to anyone who offered reasonable royalties. At this time, Venice had two types of privileges, invention privileges and trade privileges. Jacobus' privilege was an invention privilege that gave protection from unlicensed imitation, while a trade privilege gave protection from competition.

In 1474 Venice promulgated a formal patent code, the first one known in history. The code incorporated various ideas practised in preceding cases. Inventions shown to be workable and useful received ten years of protection subject to compulsory licensing provisions. The preamble of the 1474 code stated:⁴⁶

"We have among us men of great genius, apt to invent and discover ingenious devices".... "Now, if provisions were made for the works and devices discovered by such persons, so that others who may see them could not build them and take the inventor's honour away, more men would then apply their genius, would discover, and would build devices of great utility to our commonwealth."

The 1474 patent code and its preceding practices were a way for Venice to attract engineers from the outside and stimulate orderly technical progress, although it was not the only way. This first patent law had a slow start, something that happened later with the first patent laws of other nations as well, e.g. in Japan. However, these laws signified the emergence of a new era: what we can call the patent era, or rather the *national patent era*, since the patent system was a national or local phenomenon pertaining only to single city-states or countries. The rest of the history of the patent system is more widely known. Table 3 summarizes the history, divided into different eras.

⁴⁵ As mining in one way or another is among mankind's earliest technological and economic endeavours in various parts of the world, similar legal practices could conceivably have occurred in other places and possibly earlier as well. For example, silver mining became important in ancient Greece. (See Austin and Vidal-Naguet 1980, pp. 310-313.) However, it is unclear whether there were any incentive schemes used to generate and/or deploy new techniques, such as schemes for bringing in skilled workers and inventors.

⁴⁶ As translated in Gilfillan (1964, p.11) and cited in Kaufer (1989, p. 5), who also provide a fuller text in original Italian.

Table 3. Eras in the history of patents and IP ¹⁾

Era	Characteristics
1. Non-patent era Ancient cultures (Egypt, Greece, etc.)	Emergence of science separated from technology Emergence of cultural and industrial arts Secrecy and symbols emerging as recognized IP No patent-like rights or institutions for technical inventions
2. Pre-patent era Middle Ages to Renaissance	Emergence of universities Secrecy, copyright and symbols (artisan/trade marks/names) as dominant IP, also collectively organized Emerging schemes to grant privileges and remunerate disclosure Extensions of mining laws to inventions
3. National patent era Late 15th - late 18th century	Breakthrough of natural sciences Local codifications of patent laws (Venice 1474, England 1623, etc.) Regulation of privileges Conscious stimulation of technical progress at national level, linked to economic policies (e.g. mercantilistic)
4. Multinational patent era Late 18th - late 19th century	Emergence of modern nation-states Industrialization Continued international diffusion of the patent system Local anti-patent movements Emerging international patent relations (e.g. disputes)
5. International patent era Late 19th - late 20th century	Emerging industrial and military R&D International coordination of IP (Paris Convention 1883, WIPO, PCT, EPO etc.) Separate IP regimes in socialist countries and LDCs
6. The pro-patent and emerging IC era Late 20th century - ?	IC surpasses physical capital for many entities Intensified international competition Global activism for IP from industrialized countries, especially from the US Almost worldwide adoption of the patent system Increased international patenting
7. The global patent and IC era ?	Global harmonization and integration of IP Emergence of supra-national and global patents, IP offices and clearing procedures? ?
8. ?	?

Notes:

¹⁾ Discerning eras, epochs or stages in a historical stream of events may be a useful sorting device but it always involves some arbitrariness, even if good criteria are used. (Here the degrees of codification and geographical diffusion of the patent system are used as primary criteria for distinguishing different eras.) Also, beneath the events that surface in an era is often an undercurrent of events that lead up to a later era.

In the 20th century, industrial and military R&D emerged, entailing very different modes and settings for inventive work. The individual inventor, who was the original target for patent laws, gradually has become relatively less important. Inventions increasingly require large resources, and industrial firms and the military establishment have become the prime movers of technology, in both the East and West. Similarly, cultural arts have become big business, with more professional artists than ever. Socialist countries with planned economies have set up separate IP regimes. Economic and industrial differences between various categories of countries have increased and become alarmingly large, creating tension among institutions, including national IP regimes in developed and developing countries. Two global wars have transformed the world, including its various institutional frameworks. Science and technology have progressed and accumulated tremendously at an increasing pace. Still the IP system and its essential ideas have survived and continued to diffuse internationally, not least after the downfall of the Soviet Union and the corresponding planned-economy systems.⁴⁷ This resilience of ideas and persistent adoption of a fairly well preserved and long-standing institution such as the IP system is indeed surprising. Its current context has changed radically since 15th-century Venice and 17th-century England, while its basic features of being a temporary monopoly reward for certain inventions for a certain length of time etc. have changed comparatively little.⁴⁸ There are naturally numerous variants of patent laws in different periods and places, but as a whole the patent system has become a dominant institutional design. In fact the similarities among IP laws in various countries are more surprising than their differences (which are numerous at a finer level of detail). There has also been a convergence, both of national patent systems and of IP regimes, although slow and with many substantial differences remaining.⁴⁹

⁴⁷ The various IP components (patents, copyrights, trade secrets, trademarks, etc.) have had separate histories, which were weakly interrelated until recent decades and hardly constituted an “IP System” other than in a loose sense. Nevertheless, or rather because of this, the similarities between different IPR types and their underlying criteria are more surprising than their differences.

⁴⁸ Note e.g. the small difference between 14 years of protection in 17th-century England and 17 years of protection 350 years later in the USA and parts of Europe (now changed to 20 years).

⁴⁹ Ideas for radical reform of the patent system have been far from missing, however.

4 IP Notions in History of Ideas

4.1 IP notions in philosophy

Apart from Greek philosophers, what have other traditional philosophers had to say about various notions of intellectual property? This wide question cannot be dealt with at any length here, but to make a few remarks and references to the literature.⁵⁰ Property notions in general have been discussed considerably by traditional philosophers, but intellectual property has mostly been treated as a side issue. Among Western philosophers who have had an influence on IP notions, either directly or indirectly, Locke, Hume, Kant, Hegel, Rousseau and Bentham deserve mention (see e.g. MacPherson 1978 and Palmer 1990).

Inspired by the (differing) ideas of Locke and Rousseau, a so-called "natural rights" school or movement emerged in the 18th century and became especially influential in 19th century France. The individual was looked upon as having a natural claim to the results of all his or her labours, mental or physical. In particular the results of an individual's intellectual labour were seen as an extension of that individual's identity, an extension of which the individual could not be deprived by others, and especially not by societal institutions. In opposition to the natural rights school, which eventually declined in influence, stood the notion that patent rights were creations by society for the purpose of serving the economic interests of its members at large.⁵¹ This more economically or utilitarian (Bentham) oriented IP notion dating back to ancient times and clearly codified in 15th century Venice, gradually became strengthened as economic concerns grew in connection with industrialization. The IP notions of the natural rights school, which, as we have seen above, possibly has roots extending to primitive origins, eventually declined markedly in their influence over IP legislation.⁵² The philosophical debate over IP has then shifted more to the arenas of law and economics. Nevertheless, the current debate about IPRs in connection with software, Internet, universities and culture might broaden into general philosophical issues, perhaps also reviving natural rights arguments. The distinction between natural rights and economic (utility) oriented rights should not be overlaid, however.

4.2 IP notions in law

Among legal and economic scholars, the general concept and justification of property has been dominated by notions of physical property. There is a certain convergence of general notions defining property as a bundle of rights, being enforceable within limits and bound to the use or benefits derivable from a resource that is scarce and possible to possess. Property

⁵⁰ Again, this seems to be a question that has not been researched much by historians of philosophy or other scholars.

⁵¹ See e.g. Penrose (1951). In a famous letter Thomas Jefferson wrote in 1813 (as cited in David 1993, p. 26):

"Inventions then cannot, in nature, be a subject of property. Society may give an exclusive right to the profits arising from them, as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint from anybody..."

⁵² When it comes specifically to copyrights and IP notions regarding literary works, philosophers with their hands-on experience from publication have been far more outspoken, however. Thus, for example, Kant wrote an essay "On the injustice of the pirating of books".

then embodies the right to include some beneficiaries and exclude others, where the ability to exclude is paramount. Several attempts have then been made to carry such notions over to intellectual property.⁵³ This tendency to generalize from physical to intellectual property raises a question about the *extendibility* of legal and economic concepts and principles from the area of physical property to the area of intellectual property. We cannot go into a deep discussion of that question here, but a few points will illustrate some basic differences between physical and intellectual property and at the same time edify some relevant philosophical issues in the law and economics of IP.⁵⁴ Any extendibility from physical to intellectual property appears to be strongly limited by the obvious differences between physical objects and intellectual objects (typically ideas and knowledge), even if property is seen as a bundle of rights, which should be distinguished from the underlying objects themselves. For example, the rights of an individual to a certain piece of physical property can be seen to derive in principle from the circumstance that the individual either has had the first (non-momentary) possession of that physical property or has had the property rights transferred to her.⁵⁵ The possibility of extending that principle to intellectual property then seems to be limited by the fact that possession of a physical object fundamentally differs from possession of an intellectual object as described above. In contrast to physical things, information can be shared irreversibly at will, cheaply and almost limitlessly among individuals. In that sense, a given piece of open information is not scarce so scarcity would not warrant defining a property right to it.⁵⁶ On the other hand, an individual can also choose to keep information secret, perfectly contained and at no direct cost, and thereby enforce scarcity. However, there is no guarantee that others thereby will remain excluded from the use of that information or idea, since someone else may come up with the same information or idea.⁵⁷ The exclusion from direct use of someone's secret proprietary information is perfect but sole possession and thereby scarcity cannot be kept permanent at will. In other words, exclusion from a secret may be temporarily perfect, but for how long is uncertain. Exploiting valuable information often necessitates some disclosure, therefore excluding others from its use also implies an indirect cost for the information-holder and thereby lowering the incentives to create information in the first place. It is moreover impossible for an individual

⁵³ See e.g. Posner (1983) and Palmer (1990). See also below about the "first to invent" priority rule as an example of an extension of a physical property concept to the IP field.

⁵⁴ For good discussions, see the set of papers from the symposium on Law and Philosophy, published in Harvard Journal of Law & Public Policy, Vol. 13, No. 3, 1990, with Bouchaert (1990), Palmer (1990), Mackaay (1990), and Mainers and Staaf (1990), with a summary by Nance (1990).

⁵⁵ For a classic analysis in 19th century Anglo-American law of how property rights should be derived from observable possession, see the writings of Oliver Wendell Holmes. However, Holmes does not specifically address problems with the derivation of intellectual property.

⁵⁶ Plant (1974, p.36) stresses this point, arguing that property rights as patent rights and copyrights are different from rights to physical property since they are not a consequence of scarcity. Rather such rights (i.e. patents and copyrights) make it possible to create scarcity. However, Plant only focuses on scarcity in a static sense, not on scarcity of new ideas and information over time.

⁵⁷ The phenomenon of independent and nearly simultaneous discoveries or inventions has been repeatedly recognized by scholars (even independently from each other) with classic studies reported in Ogburn and Thomas (1922), Kuhn (1962), and Merton (1973), see Winter (1989, p. 44).

to prove *ex post* that he or she was in possession of some information, unless the information was disembodied and stored or registered in some form or unless something in the individual's behaviour revealed the truth.

In summary, inherent differences between physical objects and intellectual objects make it much more difficult, and frequently impossible, to establish and verify states of possession for intellectual objects, especially the states of first and sole possession. Thus, using circumstances pertaining to possession as a basis for deriving necessary property rights is less straightforward for intellectual property rights than for physical property rights. This in itself does not mean that a better basis exists for deriving intellectual property rights. Still, considering the obvious fundamental differences between physical and intellectual things, it would seem to follow that extendibility of the legal principles for property rights from the physical to the intellectual domain is limited. Even if property rights are to be distinguished from their underlying tangible or intangible objects, a closer specification of the nature of the rights can hardly be made fully independent of the nature of the underlying objects. At the very least there is some burden of proof to be carried by those claiming that extensions can be made.⁵⁸ Nevertheless, it appears that legislators and courts traditionally have attempted such extensions without a very unified or general theory of intellectual property.⁵⁹

So, given the fundamental difficulties in extending traditional property notions from physical property to intellectual property, what philosophical and theoretical justifications of specific IPRs have been voiced? Generally, such justifications are categorized as *deontological* and *consequentialist*.⁶⁰ Very briefly, deontological justifications are based on moral rights and rules that are largely exogenous to the economic system (they are 'natural rights'), while consequentialist justifications are based on the good (economic) consequences of the legal recognition of IP. Deontological justifications mostly refer to rights associated with one's labour (the "labour theory" of property associated with Locke) or rights associated with one's personality or identity (the "personality theory" of property associated with Hegel).

Consequentialist justifications are often classified as being utilitarian, referring to fulfilment of consumer preferences or utilities, or being teleological, referring to fulfilment of the proper ends of human life. Consequentialist justifications focus on the nature of incentives which legal recognition of IPRs can afford. Incentives can take the form of rights to a reward,

⁵⁸ There is a similar problem of extendibility when intellectual property notions for old types of intangible objects such as old technologies are tried out for new types of objects, such as computer software or genetically engineered living things. In IP legislation in the latter cases, legal pragmatism in some sense seems to have dominated, at least in the USA. For discussions of problems in extending current IPRs to new technologies, see NRC (1993) and Weil and Snapper (1989).

⁵⁹ An obvious (but still limited) possibility to let IPRs "piggy-back" on physical property is to link IPRs with the rights to some tangible matter or substrate which embodies the idea or creation. This may be argued from the point of view of legal pragmatism in contrast to legal foundationalism, i.e. the philosophical inclination in jurisprudence to find unifying concepts.

⁶⁰ It should immediately be noted that the general categorizations of justifications for IPRs are closely related to those for physical property as well, which gives possibilities for extendibility at a higher level of abstraction, e.g. defining rights in terms of control of rent streams of a piece of property rather than in terms of control of the property per se.

such as a monopoly right, a prospect right, a contract, a prize or some other kind of right or privilege.

The monopoly right reward has by far been the most popular approach. The main idea is that the IPRs should be tailored in such a way that the IPR holder through a limited monopoly can get a share of the benefits which can be derived from the intellectual creations. The rent-sharing should be designed by limiting the monopoly in such a way that creators are sufficiently stimulated to create wealth for themselves as a means to create wealth for others (e.g. a ruler, a community, a society). This idea could be taken one step further, so as to create the best or optimal rent-sharing arrangement in some sense. The underlying presumption then is that a market economy does not sufficiently or optimally stimulate creative or inventive work.

Consequentialist justifications, and especially utilitarian ones, dominate in the contemporary legal and economic philosophy of IPRs. This does not imply that there are no objections to such justifications or to some of their parts or features. Some authors object that IPRs are not compatible with the justifications of property rights in general, while some object that IPRs conflict with other more fundamental rights like liberty and justice, and still others object that IPRs are not instrumental in providing the desired consequences and so on. For further discussions of legal and economic philosophy of IPRs, see e.g. Plant (1974), Penrose (1951), Machlup (1958), Dreyfuss (1989), Kuflick (1989), Davis (1989), Nance (1990), Bouchaert (1990), Palmer (1990), and Petrusson (1999).

4.3 IP notions in economics

It is regrettable that it took such a long time in economics to recognize the predominant role of technology in economic growth and transformation. The minor attention paid to technology and innovations has characterized economics for the major part of the 20th century and for earlier centuries as well. As a corollary, it is not surprising that IPR issues have played a minor role as well in the history of economics. Simply expressed, a small share of economists account for a small share of IP literature. True, there has been a pulsating debate over the centuries about the pros and cons of the patent system, but the debate has been conducted in a kind of "invisible college," indeed not very visible to the economics profession at large, nor to the legal profession at large.⁶¹ The leading economists have had fairly little to say about the patent system, and even less about other IPRs, their rationales, functioning and possible reforms. This is remarkable in view of the long history of the patent system as an economic institution, actually preceding industrialization as well as preceding both the modern firm and the modern nation-state as economic institutions. It is also remarkable in view of the worldwide spread of the patent system with its basic ideas remaining much the same, although with many national variations over time. The adoption of a patent system or an IPR system in a nation was not a trivial matter.

⁶¹ For a review of the debate of the patent system in the 19th century, see Machlup and Penrose (1950). Patent issues were widely and heatedly debated in connection with the anti-patent movements in the 19th century, with controversies among economists as well as between economists and lawyers. After the 1870s, when patent protection had largely been accepted by legislators, the interest in patent issues among economists dropped markedly and was not revived until after World War II.

What did the leading economists in the past have to say about the patent system? To answer this is a research task in itself, and only a few observations can be offered here.⁶² Adam Smith in *The Wealth of Nations* barely touched upon the patent system. Charles Babbage, who made a significant but little recognized pioneering contribution to economics of industry and technology,⁶³ was largely pro-patent but did not have much to say either about it in his 1832 book *On The Economy of Machinery and Manufactures* except than to complain about its costs and difficulties to defend English patents in court (Babbage 1832, pp. 359-361).

There has been a tendency concerning patent issues to divide analysts into advocates and outright critics (rather than reformers) with fairly polarized pro- and anti-patent standpoints. This has much to do with the monopoly feature of patents, and the general hostility among economists as well as others (including Aristotele) against monopolies. Smith, Bentham, Mill, Say, Walras, and von Mises accepted patents as exemptions from monopoly prohibitions, while Marshall, Hayek, Robbins, and Taussig were generally sceptical towards patents. A most outspoken critic in the 20th century was Sir Arnold Plant (see Machlup 1958).

Marx, of course, was critical of the patent system as part of his general criticism of private property and technological change under capitalism, but he did not devote much attention to it. Schumpeter is generally seen as the founding father of economics of technology and innovation, with his pioneering emphasis on the decisive role of innovations and entrepreneurs in economic dynamics. Yet it is perhaps fair to say that, while he scrutinized the advantages of monopolies for R&D and innovations, he did not take a corresponding interest in the patent system, or the IPR system as a whole, as a way of fostering a certain breed of temporary monopolies that were advantageous to entrepreneurs and their innovations.

Needless to say, many economists before World War II had emphasized the role in economic development of knowledge or information (Marshall, Hayek, etc.), but the role of the IPR system for its production and distribution was largely unexamined.⁶⁴ This started to change after World War II, with increasing industrial and military R&D and a gradual recognition among economists of the role of R&D. Fritz Machlup wrote a major review in Machlup (1958) and (1980). Jacob Schmookler made careful empirical studies of patenting and started to use patents as economic indicators (see e.g. Schmookler 1966). Kenneth Arrow made an important analysis in Arrow (1962) of the tendency in a society to underinvest in R&D, for which the patent system was one possible corrective by raising the private rate of return on inventions. Edwin Mansfield later showed empirically that the economic returns on inventions were greater to society than to inventors on average across industry, although with large variations. Early theoretical works by Frederic Scherer analyzed e.g. R&D rivalry and

⁶² The best exposé still up to date is made in Machlup (1958).

⁶³ See Stigler (1991), Rosenberg (1994) and Granstrand (1994, Ch. 1) for accounts of Babbage's contribution to economics.

⁶⁴ A notable example is A. Plant, see Plant (1974).

patent races. William Nordhaus produced a major theoretical analysis along neo-classical lines, addressing e.g. the socially optimal patent protection time (Nordhaus 1969).

Misplaced notions have grown especially around the patent system in the historical absence of sufficient attention to it. Two misplaced notions are of particular importance. The first is the notion that a patent directly gives the patent rights holder a monopoly on output markets. In the history of economics, patents have always been linked to the much broader discussion of monopoly issues. The temporary nature of a patent-based monopoly has then generally been sufficiently recognized, but not the fact that it is basically a monopoly on an input factor market, not on an output product market, just as a private property right to a resource. The second misplaced notion is that a patent is entirely anti-competitive. This is not true, even if the input monopoly is perfectly converted to an output monopoly. A patent-based monopoly restricts short-run price competition for a certain product, but at the same time stimulates the generation of new products and processes that typically increase performance-based competition or Schumpeterian competition in the longer run. Thus, a patent is partly anti-competitive, partly pro-competitive, depending upon what type of competition is considered. Therefore a trade-off must be made, but not a trade-off between the purposes of patent legislation and the purposes of anti-trust legislation, by and large perceived of as incompatible in the US before the 1980s, but instead a trade-off between different means to accomplish common purposes. In conclusion, one may claim that the relatively little attention historically paid in economics at large to the patent system paved the way for some possibly costly confusion about its impact on static vs. dynamic efficiency, and concerning its input rather than output monopolistic nature.

5 Summary and conclusions

This paper has tried to trace the basic notions of intellectual property to its historical, cultural and even biological origins and to describe how a diversity of IP notions have evolved and which roles they have played. There are indications that IP notions are fundamental and prevalent in human nature and societies, with clear signs of several IP notions in ancient societies as well as in different religious belief systems, with trade secrets being perhaps the most fundamental ones, followed by trademarks. Systems for registered IPRs, such as patents, then are derivatives of these rights to some extent. Different IP regimes have also developed since ancient times pertaining to science, technology, culture, military activities and religion.

In summary IP notions have evolved gradually as a social construct but in a fragmented way with many IP regimes, IP types and IP systems. Still their similarities across types, nations and periods at a more fundamental level are striking, indicating common underlying notions, in particular notions of novelty, originality and value.

Among philosophers, property notions have commanded considerable interest, while IP has not, with a few exceptions, and the same could be said about economists. Physical property has also dominated property notions among jurists. This is somewhat paradoxical considering the importance of intellectual resources and creations and their inherent differences to physical resources and creations. The extendibility of physical property notions to IP was found to be severely limited as both scarcity and possession fails to serve as a basis for justifying and defining property rights in the intellectual field.

The philosophical as well as practical complexities of intellectual property offer grounds for forgiveness of any sins of omission historically among philosophers, legislators, economists, policy-makers etc. Another ground for forgiveness is that a legal IPR system has apparently been neither necessary nor sufficient for neither technical nor industrial and economic progress historically.

However the grounds for forgiving any sins of omission regarding IP have receded since the 1980s. We have entered a new IP era triggered by the events in the USA in the 1980s. There are many reasons to believe that this era is here to stay and develop further, warranting further institutional innovations in the IP field.

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