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SCIENTIFIC QUESTIONS OF FACT BETWEEN FREE EVALUATION OF EVIDENCE AND PROOF BEYOND ANY REASONABLE DOUBT IN THE CRIMINAL TRIAL

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ABSTRACT: In contemporary legal epistemology it is common to talk about the «*paradox of expert testimony*», which can be formulated as follows: «how can the judge assess information provided by an expert witness if he needs him precisely because of his own lack of adequate specialist knowledge?». The *goal* of the *paper* is to show that this paradox is only apparent. To pursue it I first of all review the history of the ideas of free evaluation of evidence and proof beyond any reasonable doubt in the civil law and common law traditions, in order to address the theoretical problem of their nature in contemporary law systems. Then I propose a taxonomy of the judicial approaches to the role of experts at trial, concluding that none of these approaches, except one («the gatekeeper judge»"), is consistent with both above-mentioned principles. Lastly, I look in depth at the gatekeeper judge approach, showing that a real *assessment* of expert information is possible, so that the paradox of expert *testimony* depends only on a faulty understanding of both activities.

KEYWORDS: Question of fact, Free evaluation of evidence, Proof beyond any reasonable doubt, Expert testimony, Scientific evidence.

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1. INTRODUCTION

The main questions every court must address are of two kinds. On the one hand, there are the questions of law (*lato sensu*) [1], which concern the application of law to the disputed facts of a trial. In particular, the question of law *stricto sensu* (hereafter: *question of law*) concerns whether the case presented in support of a claim to justice is legally relevant (the so-called "case"). On the other hand, there are the questions of fact (*lato sensu*) [2], which concern the ascertaining of the disputed facts. In particular, the question of fact *stricto sensu* (hereafter: *question of fact* or *factual question*) concerns whether the case actually happened.

The *evidential judgement*[3] is the means by which the fact finder (judge or jury) resolves the factual question and is based on two activities. The fact finder has to assess the evidence to determine the *probative value* – *reliability* and *cogency* – of each item of evidence (evidential *evaluation*), and to establish whether all the collected evidence is *sufficient* to prove the case (evidential *decision*)[4]. In this paper I assume that the fact finder is a judge in a *civil law* system, but my conclusions apply – all things being equal – also when the fact finder is a jury in a common law system.

In many contemporary *criminal* trials, the evidential decision is underpinned by two fundamental ideas: *free* evaluation of evidence (hereafter: FEE) and proof beyond any *reasonable doubt* (hereafter: PRD). According to the first idea, the judge is autonomous in selecting criteria to assess the probative value of the evidence, namely he is not bound by any statutory provision. According to the second idea, the judge may consider the case to have been ascertained only if the evidence in no way supports hypotheses different from the charge.

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[1] Canale, D., Tuzet, G., 2019: 35-44, 61-66; Choo, A. L-T., 2018: 9-10; Laudan, L., 2006: 206, 216; Twining, W., 1990: 238-242.

[2] Canale, D., Tuzet, G., 2019: 35-44; Laudan, L., 2006: 216; Twining, W., 1990: 228-238.

[3] Anderson, T., Schum, D., Twining, W., 2005: 224-245; Ferrer Beltrán, 2012: 51-160; Ferrua, 2017: 183-207; Gascón Abellán, 2010: 140-167; Laudan, L., 2006: 117-146; Taruffo, M., 2009: 193-245; Tonini, P., Conti, C., 2012: 43-59, 66-67; Tuzet, G., 2016: 119-142¸ Ubertis, G., 2015: 158-178.

[4] On the weight (probative value and sufficiency) of evidence, see Ho, H.L., 2015: § 3. See also Roberts, P., Zuckermann, A., 2012: 228, 248-249, 347.

Since the last century, one of the biggest problems regarding this subject is assessing *scientific evidence*. By «scientific evidence» I mean information provided by a scientific expert acting as such in order to ascertain a fact that, on the one hand, is disputed during the trial, and on the other, is a research topic in his field of discipline. In this case the evidential decision is problematic above all because the judge usually does not have sufficient scientific competences.

On this issue, in contemporary legal epistemology it is common to talk about the «*paradox of expert testimony*», which can be formulated as follows: «how can the judge assess information provided by an expert witness if he needs him precisely because of his own lack of adequate scientific knowledge? ».

The *goal* of my *paper* is to show that this paradox is only apparent. To pursue it I first of all review the history of the ideas of FEE and PRD in the civil law and common law traditions, in order to address the theoretical problem of their nature in contemporary law systems (§ 2 and § 3). Then I propose a taxonomy of the judicial approaches to the role of experts at trial, concluding that none of these approaches, except one (the «gatekeeper judge»), is consistent with both the above-mentioned principles (§ 4). Finally, I look in depth at the gatekeeper judge approach, showing that a real *evaluation* of expert information is possible, so that the paradox of expert *testimony* depends only on a faulty understanding of both activities (§ 5).

2. FREE EVALUATION OF EVIDENCE

The idea of FEE[5] emerged in English legal culture, was imported into the American trial system, and finally penetrated the Continental sphere. In this paragraph I will first of all draw a sketch of this genealogy, taking the Italian legal system as a Continental example (§ 2.1.). I will then concentrate on this system, asking whether the idea of FEE gives rise to a legal rule, a regulatory trend, or a legal principle, reaching the conclusion that it produces the first constitutional principle of the evidential decision in many contemporary criminal trial systems (§ 2.2). Even though this thesis is applied to the Italian criminal law system in this case, it aims to be general in scope, valid for any system that considers the claim to rationality and reasonableness of the judicial activity as constitutional principles.

2.1. Historical evolution

The idea of FEE came to light as an alternative to the mandatory regimes of evidential evaluation[6]. In simple terms, these are similar because they establish specific criteria to predetermine the probative value of the elements that emerged during

[5] See Carlizzi, G., 2018; Clermont, K.M., 2009: 481-482, 487; Nobili, M., 1974; Gascón Abellán, M., 2010: 140-144; Tournier, C., 2003; Walter, G., 1979.

[6] On this historical evolution, see Carlizzi, G., 2018: 11-24.

trial. They in fact establish the kinds of evidence apt for ascertaining the case, as well as the degree of their weight. There are two kinds of regimes regarding evidential evaluation: irrational and rational. This binomial allows us to distinguish between the origins of FEE in the English and Continental legal systems respectively.

2.1.1. The English legal context

In England the idea of FEE emerged in the 13th century[7], after the IV Lateran Council (1215), when the ordeal procedure was no longer used to establish a question of fact, which was now entrusted to a jury. From that moment, the guilt or innocence of the accused no longer depended on the result of an almost impossible challenge (e.g. surviving immersion with bound hands and feet)[8] but on the autonomous assessment of evidence by a group of jurors. At first (13th-15th century), moreover, this assessment was not wholly neutral, because the jurors belonged to the same community as the accused, thus acting as witnesses and decision-makers at the same time[9]. The jury, in the modern sense of the term, namely a group of people without direct knowledge of the case, would be introduced only later, in the 16th century[10]. Of course, the mandatory regime of the ordeal procedure was typically *irrational*, given the unfailing connection established between God's will and the probative value of the outcome of the ordeal. In fact, overcoming the ordeal was considered a proof of innocence in accordance with an assumption like the following: «since it is unthinkable that God wills an innocent to succumb to the ordeal to which he is subjected, and since it is unthinkable that something happens that God does not will, then overcoming the ordeal unquestionably indicates the innocence».

2.1.2. The Continental legal context

On the Continent, the idea of FEE emerged only at the end of the 18th century, when the French Constituent Assembly decree of 16th-29th September 1791 ascribed the duty to resolve the question of fact to a jury similar to the English one, therefore a jury fully endowed with evaluative autonomy («*intime conviction*») and free of any obligation to state its reasons[11]. This choice was a reaction not to the

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[7] On the antecedents of this idea: in ancient times, see Nobili, M., 1974: 82 fn. 1, with regard to a rescript of the emperor Hadrian (76-138 CE): «[…] *non utique ad unam probationis speciem cognitionem statim alligare debere, sed ex sententia animi tui te aestimare oportere, quid aut credas, aut parum probatum tibi opninaris*» (D., 22.3.5.3.2.); shortly before the IV Lateran Council, see Giuliani, A., 1988: 529-537, esp. 532, concerning a passage of the *Policraticus* (V, 14) of John of Salisbury (1120-1180): «*In ipsa vero testium examinatione, non potest ex regula aliqua diffiniri, quid magis judicem sequi oporteat*».

[8] Baudi Di Vesme, C., 2013; Cordero, F., 1981: 468-475, esp. 468 and fn. 2; Whitman, J.Q., 2008: 51-90.

[9] Anand, S., 2005: 417-418; Taruffo, M., 2009: 20-22.

[10] Anand, S., 2005: 418-425.

[11] Nobili, M., 1974: 150-162; Padoa Schioppa, A., 1994: 122-162.

ordeal procedure but to the equally mandatory regime of evidential evaluation that had replaced it in Europe from the 13th century onwards, namely that of legislative positive evidence[12]. In the latter case, the proof was not the result of a challenge but information collected during the trial. Therefore, the judge as a fact finder was obliged to perform two duties devoid of discretion, namely to verify the correspondence between the elements emerging at trial and the legislative types of evidence (e.g. confession of the defendant), and identify the probative value the legislator assigned to these types (e.g. the confession had the greatest value). The regime of legislative positive evidence was as mandatory as the ordeal procedure but differed from it in its rationality. This regime did no more from rendering the probative value of quite reasonable empirical criteria absolute (e.g. if the defendant pleaded guilty, then he very probably was not lying, given the adverse effects of his confession). Democratic aversion to this despotic rigidity, deemed to be in contradiction with the autonomy of the jurors as representatives of the people, is the reason why the French Constituent Assembly[13] and the legislators of other European countries based their regimes of evidential evaluation on the idea of FEE.

With particular regard to Italian law, this idea was implemented in the main criminal procedural codes (or statutes) throughout the 19th and 20th centuries but led to different models[14]. In short, some codes relied on the free evaluation of the *judge* without imposing any obligation to state his reasons (e.g. the 1807 Napoleonic Code of the Kingdom of Italy); other codes followed a slightly different solution, establishing such an obligation (e.g. the 1819 Bourbonic Code of the Kingdom of the Two Sicilies); other statutes returned to the French model of free evaluation by the *jury* (this was the general regime in force after the unification of 1861 until the code of 1930); the current code of 1988 (like that of 1930) re-establishes the second model and therefore provides that the *judge* may assess the evidence autonomously but must state reasons. More specifically, the current code of criminal procedure (hereafter: CCP) establishes, on the one hand, that all legally significant facts must be proven: not only the case but also the facts relevant for punishability, the establishment of the penalty or the security measure, the application of procedural norms, and civil liability (art. 187). On the other hand, it provides that «The judge evaluates the evidence, setting out in the reasoning the results obtained and the criteria adopted» (art. 192, § 1). Briefly, today's CCP requires the evidential evaluation to take the form of a reasoning.

2.2. Theoretical outlines

The main theoretical problem regarding the idea of FEE concerns its legal nature. Even though a classificatory solution depends on the choices of each legal system, it

[12] Alessi Palazzolo, G., 1979.
[13] Padoa Schioppa, A., 1994: 63-162.
[14] Nobili, M., 1974: 200-266; Ruggieri, F., 2012.

is possible to propose such a solution in broad terms. Indeed, a solution of this kind may be inferred from a specific legal system, but it is also valid for every legal system sharing the same logic of classification. This is exactly the path I aim to follow, taking the Italian legal system as my starting point[15].

The above-mentioned problem could be resolved in one of three ways, whereby the idea of FEE gives rise either to a legal rule (hereafter: rule), or to a regulatory trend (hereafter: trend), or else to a legal principle (hereafter: principle). The right answer to the problem can be found by clarifying these three concepts, as the difference between them, especially between the former and the latter, is still quite controversial.

2.2.1. The idea of FEE as source of a rule

Rules are prescriptions that deontically qualify (as obligatory, forbidden, allowed etc.) facts described with varying degrees of specificity (e.g. prohibition of undue enrichment to the detriment of others through misrepresentation, under article 640 of the Italian criminal code – hereafter: CC – on the crime of fraud)[16]. Given the artificial character of every legal system, these qualifications and descriptions are ultimately functional to the protection/promotion of the values recognised in the community subjected to that system (e.g. patrimony *lato sensu* and good faith in contractual relationships, in the case of art. 640 CC). The functional connection between rules and axiological sphere raises the problem of distinguishing them from principles, which too regard values. I will address this problem in § 2.2.3, where I explain my conception of principles.

In terms of the CCP, one could speak of the «rule of FEE" only if this code established judicial autonomy solely for a *specific* evidential assessment (e.g. assessment for ascertaining the case). But this is not the case, because, as seen in § 2.1.2, the code *provides* for judicial independence from absolute evidential criteria in general terms, namely for all the facts relevant to the trial (examples of such criteria are: a statement by a public official is *always* supremely reliable; the fingerprints of the defendant on the body of the victim *always* proves that he is the murderer). Conceived as an element of a rule, the idea of FEE would be barely relevant from the doctrinal point of view[17], but not at all relevant from the theoretical and normative one[18]. Indeed, this

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[15] On the judicial discretion in common law systems, see Roberts, P., Zuckerman, A., 2012: 29-30.

[16] Ferrajoli, L., 2007: 109-179; Hart, H.L.A., 1961: esp. §§ II-III; Kelsen, H., 1960: esp. §§ III.

[17] On the various functions of «legal dogmatics», see Mengoni, L., 1996: 25-65.

[18] On the relationship between theory of law, legal dogmatics, philosophy of justice and sociology of law, see Ferrajoli, L., 2007: 39-43; on the relationship between «*dogmatische Rechtswissenschaft*», «*Rechtsphilosophie*», «*Rechtspolitik*», «*Rechtsgeschichte*», «*Rechtsvergleichung*», and «*Rechtssoziologie*», see Radbruch, G., 2003: 106-107.

idea would add nothing to the specific content of such a rule and could be cancelled out by derogating or even abolishing the same rule.

2.2.2. The idea of FEE as source of a trend

Trends are social effects regularly and actually resulting from a set of rules concerning a specific subject[19]. Even though they are not the goal of the set (otherwise they would be principles), these effects arise with a certain frequency through its application. An example could be a set of rules on safety in the workplace: they aim to protect the workers' health, but they actually entail general limitations to the employer's organisational freedom.

In terms of the CCP, the idea of FEE may not be reduced to the label for a trend, because it is not a mere side-effect of the regime of evidential evaluation but rather its basis. Conceived as an element of a trend, this idea would be relevant only to a sociologist of law[20] but not at all to a jurist. Such a trend, albeit based on a set of rules, would not be an autonomous rule and could be either limited or eliminated by reforming the regime that produced it.

2.2.3. The idea of FEE as source of a principle

Principles are norms, as are rules and unlike trends[21]. They differ from rules because they do not deontically qualify (as obligatory, forbidden etc.) *specific* facts that realise or cancel out a certain value but *generically* demand this value to be realised in the legal system[22], and are therefore the *basis* of the rules themselves. In brief, the principles are the *rationes* underlying homogeneous sets of rules, which are in this way legally justified[23]. Let us cite an example limited to the central but not exclusive field of constitutional principles. The principle of formal equality (art. 3, § 1, It. Const. – hereafter: IC) demands *everyone* (legislator, judge, employer etc.) concur to bring about the equal treatment of similar cases *in some way*. This principle therefore justifies various rules: on universal suffrage (art. 4, dpr 361/1957), on the invalidity of dismissal, *inter alia*, for political reasons (art. 4, l. 108/1990), on the crime of the dissemination of ideas based on racial or ethnic superiority or hatred (art. 604-bis, CC), and so on.

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[19] Luhmann, N., 1974: § IV.

[20] Griffiths, J., 2017: 121-125.

[21] On the distinction between principles and rules, see Alexy, R., 1994: § III.1-2; Dworkin, R., 1977: §§ II-III.

[22] On the relationship between law and values, see Radbruch, G., 2003: 8-20, 34-37, esp. 37 («*Recht ist die Wirklichkeit, die den Sinn hat, der Gerechtigkeit zu dienen*»).

[23] For this conception of principles, see Guastini, R., 2011: 173-180; for a more complex conception, see Pino, G., 2016: 76-96.

With regard to the CCP, it has often been said that there is a «principle of free evaluation of evidence" («*principio del libero convincimento*»[24]) but without clarifying the reasons for this morphological conclusion. I will try to identify these reasons[25]. As seen at the end of § 2.1.1, the CCP essentially establishes that, in order to prove every fact relevant to the trial, the judge has to assess the evidence that emerged therein, above all setting out the criteria adopted in doing so (combined provisions art. 187-192, § 1). Furthermore, the CCP does not usually predetermine these evidential criteria, and when it does[26], it establishes them only to some extent, so that the judge may use alternative criteria to justify his decision (e.g. art. 273, § 3, CCP, presumes that if someone is charged with the crime of mafia association, there are precautionary necessities, unless proven otherwise)[27]. Since the CCP, on the one hand, *does not bind* the judge, establishing *absolute* evidential criteria, on the other hand, it only *requires* the judge to set out his freely chosen criteria, it can be concluded that the CCP recognises the *mandatory freedom* (or autonomy in Kantian terms[28]) of evidential evaluation, which represents the highest evolution of the idea of FEE (see once again § 2.1.1). But this idea is implemented here as the basis for all rules making up the described regime, because the values to which it refers are precisely the values realised by these rules. On the one hand, the rules that specify general judicial freedom from absolute criteria concur to realise the value of *concreteness* of evidential assessment, i.e.: fully taking into account all the aspects of the evidence. On the other hand, the rules that specify the general judicial obligation to state reasons concur to realise the value of *logicality* of evidential assessment, which is fundamentally guaranteed by that obligation. Both realisations, in turn, are demanded by the idea of FEE because they foster the rational ascertaining of the truth of the case, which is the ultimate goal of every kind of judicial proof[29].

Moreover, the principle of FEE can be conceived as constitutional in nature. With regard to the Italian Constitution, on the one hand, the first component of this principle, the demand for *concreteness*, arises from the principle of *reasonableness*, which has been considered as an expression of the principle of equality provided for in art. 3 IC, and more broadly as the central parameter of constitutional justice

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[24] Canzio, G., 2004: 306; Giuliani, A., 1997: 143; Nobili, M., 1974: *passim*. In terms of principle, see also Gascón Abellán, M., 2010: 140. Other scholars use different phrases, for example «*regola*» (Daniele, M., 2009: 167), «*standard*» (Tonini, P., Conti, C., 2012: 75), «*criterio*» (Paliero, C.E., 2006: 73), «*canone*» (Ubertis, G., 2015: 163).

[25] Carlizzi, G., 2018: 37-46.

[26] Daniele, M., 2009: 98-106 («*regole di valutazione positiva*»), 123-140 and 147-165 («*regole di valutazione negativa*»).

[27] On the legal presumptions, see Gascón Abellán, M., 2010: 123-140.

[28] Kant, I., 1922: 43 («Jene Unabhängigkeit *aber ist Freiheit im* negative*, diese* eigene Gesetzgebung *aber der reinen und als solche praktischen Vernunft ist Freiheit im* positiven *Verstande. Also drückt das moralische Gesetz nichts anderes aus als die* Autonomie *der reinen praktischen Vernunft. d.i. der Freiheit* […]»).

[29] Carlizzi, G., 2019: 67-79; Caprioli, F., 2014: 201-202; Ferrer Beltrán, J., 2005; Haack, S., 2014: 27-46; Laudan, L., 2006: 1-26; Taruffo, M., 2009: 74-134; Tuzet., G., 2016: 75-79.

(together with the principle of proportionality)[30]. Indeed, given that the principle of reasonableness requires the law to consider all the interests involved in the legally relevant facts, the concreteness of the evidential assessment constitutes a specific form of this due consideration. On the other hand, the second component of the principle of FEE, the demand for *logicality*, arises from the principle of obligation to *state the reasons* for the judicial decision provided for in art. 111, § 6, IC[31]. Indeed, as seen above, this obligation guarantees the logicality of the evidential assessment[32].

Recognising the fundamental rank of the principle of FEE has important implications. As a constitutional principle, it is addressed not only to the judge, requiring him to reason in a certain way, but above all to the legislator, imposing either the duty to, or the prohibition from, introducing certain rules. On the one hand, the demand for *concreteness* forbids the legislator to establish absolute evidential criteria, and obliges the judge to find for himself criteria of assessment that take into account all the aspects of the evidence as much as possible. On the other hand, the demand for *logicality* obliges the legislator to establish rules to give the evidential evaluation the form of a reasoning, and the judge to follow these rules. All these obligations are relevant, as breaching them leads to a declaration of illegitimacy: in the first case by the Constitutional Court, and in the second by the *Corte di Cassazione*.

3. PROOF BEYOND ANY REASONABLE DOUBT

In this paragraph, I will follow the same route as the previous one. Firstly, I will review the main stages of the evolution of the idea of PRD, referring, for the Continental area, to the Italian legal system (§ 3.1). I will then ask whether, in this system, the idea of PRD inspires a legal rule, a regulatory trend, or a legal principle, concluding that it comprises a further constitutional principle of evidential decision in all legal systems that demand the due process of law in criminal trials (§ 3.2).

3.1. Historical evolution

The idea of PRD too was addressed for the first time in English legal culture, later adopted in the American criminal trial, and finally transplanted into the Continental area[33].

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[30] Cartabia, M., 2013: 1-2, 8-14.

[31] Canzio, G., 2004: 303.

[32] The demand for logicality is normally of constitutional rank also in contemporary legal systems where the trier of fact is required to search but not to state the reasons of his evidential judgment (e.g.: in the American criminal trial, where the jury is bound by the judicial instructions on the application of the BARD standard of proof: see § 3.1.2). In particular, in these systems, the constitutional rank of the demand for logicality can be inferred *a fortiori* (*a maiori ad minus*) from the due process of law as a principle that presupposes a demand, the demand for optimal certainty of criminal proof (see § 3.2.4), which is more strict than that for logicality.

[33] On this historical evolution, see Carlizzi, G., 2018: 51-65.

3.1.1. The English legal context

Like the idea of FEE, the idea of PRD is a product of English legal culture and a result of the replacement of the ordeal procedure by the jury trial[34]. It arose in the second half of the 16th century, albeit for a goal that is still disputed and under different names[35]. In the first case, while the main thesis is that the idea of PRD emerged to protect the defendant's freedom, a famous scholar has argued that this idea «was originally concerned with protecting the souls of *the jurors* against damnation»[36] and so with preventing them from evading their fundamental duty. Concerning the different names of the idea of PRD, until the end of the 18th century, the requirement that the jury convict the accused only if the charge was fully proven was not labelled «proof beyond any reasonable doubt»[37] but in different ways, especially «*satisfied conscience*»[38]. Despite these latter labels referring to the jurors' internal sphere, they carried no meaning related to intuition or will, because such a meaning was incompatible with moral theology and the Protestant spirit of the time, according to which «the judgment of conscience was a rational decision»[39].

The idea of PRD assumed a clearly rational stamp only in the 18th century, albeit once again going under different names, above all «*moral certainty*»[40]. In this case, English jurists capitalised on the objections that some philosophers and Protestant thinkers had formulated against two diametrically opposed approaches[41]. The source of inspiration was, on the one hand, John Locke's critique in his *Essay Concerning Human Understanding* (1690) against the sceptical assumption that scientific knowledge is *absolutely* impossible; on the other hand, the polemics in John Wilkins' *Of the Principles and Duty of Natural Religion* (1699) against the Catholic assumption that dogmas of faith are *absolute* certainties. The spirit of both objections was the same, deriving from the *relativistic* warning issued in Aristotle's *Ethics*: «it is the mark of an educated man to look for precision in each class of things just so far as the nature of the subject admits»[42]. With regard to knowledge of human things, this approach made it clear that such knowledge, despite being unable to aspire to the full certainty of mathematical proof, is not even doomed to total uncertainty, being capable of reaching the intermediate level of «moral certainty». This concept was soon adopted by jurists, who were developing what we today call «theory of evidence»[43],

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[34] Whitman, J.Q., 2008: 52-53; see also Ruggieri, F., 2017: 311.

[35] Waldman, T., 1959.

[36] Whitman, J.Q., 2008: 3.

[37] Waldman, T., 1959: 299 («As a result of a study he had made, [Judge] May observed that its first occurrence […] was in the high-treason cases tried in Dublin in 1798»).

[38] Shapiro, B., 1991: 16.

[39] Shapiro, B., 1991: 16.

[40] Laudan, L., 2006: 33.

[41] Waldman, T., 1959: 300-306; see also Shapiro, B., 1991: 7-10.

[42] Aristotle, 2009: I, 1094b24.

[43] Waldman, T. 1959: 311, 314-315.

in particular by Geoffrey Gilbert, the author of the first significant treatise on the subject: *Law of evidence* (1756)[44].

3.1.2. The American legal context

The first use of phrases like «*proof beyond any reasonable doubt*» occurs in some American legal documents dating back to the end of the 18th century[45]. In particular, some scholars referred to the *Boston Massacre* Trials (1770)[46]. The search for a precise definition of the concept of «PRD» began only in the following century. It occurs in a 1850 judgment:

Then, what is reasonable doubt? […] It is not mere possible doubt; because every thing relating to human affairs, and depending on moral evidence, is open to some possible or imaginary doubt. It is that state of the case, which, after the entire comparison and consideration of all the evidence, leaves the minds of jurors in that condition that they cannot say they feel an abiding conviction, to a moral certainty, of the truth of the charge […] a certainty that convinces and directs the understanding, and satisfies the reason and judgment, of those who are bound to act conscientiously upon it[47].

This passage is very interesting, because it weaves in the same weft all the threads of the history we are recounting and shows for the first time the stamp of rationality that today characterises the idea of PRD: «evidence», «minds», «moral certainty», «understanding», «reason», «judgement».

In the American legal system, the PRD standard has been further developed along three lines:

A) *the consolidation of its apical rank*. This is grounded in the famous *Winship* judgment of the U.S. Supreme Court (1970)[48]. Given that the nature of the PRD standard was still disputed, this judgment clarified that it is not a mere verbal formula but a fundamental norm dating «at least from our early years as a Nation" and forever considered in the opinions of the USSC as «constitutionally required".

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[44] Shapiro, B., 1991: 26-27

[45] Wigmore, J.H., 1940: § 2497 (« [a] precise distinction seems to have had its origins no earlier than the end of the 1700's, and to have been applied at first only in capital cases, and by no means in a fixed phrase, but in various tentative forms»).

[46] Newman, J.O., 1993: 981-982.

[47] Laudan, L. 2006: 33. In the above-mentioned definition we note the correspondence between the concepts of «moral certainty» and «proof beyond any reasonable doubt», and therefore their common rational hallmark. Both aspects are also present in the works of some American and English scholars. For example, in Thomas Starkie's influential *Practical Treatise on the law of Evidence* (1824), which contains some distinctions that are typical of the doctrine of PRD and still current in the lexicon of its scholars (e.g. «moral certainty/metaphysical certainty»; «reasonable doubt/fanciful suppositions»; «exclusion of every reasonable doubt/preponderance of assent»): see Shapiro, B., 1991: 35-36.

[48] *In re Winship*, 397 U.S. 358 (1970).

More specifically, the real virtue of the 1970 judgment is that it made explicit for the first time the «cogent reasons" for the apical rank thesis. Briefly, the PRD standard best guarantees the basic interests enshrined in the criminal trial («good name and freedom» of the defendant, «moral force of the criminal law») and arises from the constitutional Due Process Clause. The underlying ideology is that «it is far worse to convict an innocent man than to let a guilty man go free».

B) *the extension of its scope*. The PRD standard has gradually become a general evidential requirement in the criminal trial, working not only for the proof of the case, but for «every element of the offence, as well as for the circumstances influencing the penalty» [49]: *mens rea* [50], absence of self-defense in first-degree murder [51] and aggravating circumstances [52]. But there is more to it than this. The same standard has been applied also in practical terms in order to establish procedural rules, namely that «the State cannot […] compel an accused to stand trial before a jury while dressed in identifiable prison clothes" [53].

C) *the formulation of instructions for its application*. This has proven to be the most problematic aspect of the PRD standard [54]. Indeed, intuitively understanding this psychological state is of little use if the conditions for achieving it are not clear. In the American legal system the problem is not purely theoretical. Given that the judge has to instruct the jurors on these conditions, if he gives inappropriate instructions, the Supreme Court may quash the judgment. The trial judges usually define the PRD standard either in quantitative or in qualitative terms. The quantitative model was adopted describing reasonable doubt as a probability of guilt equal to or less than «seven and a half» [55] or «95%» [56] (so that these thresholds have to be exceeded for the conviction). The qualitative model was followed defining reasonable doubt as a «doubt [which] give[s] rise to a grave uncertainty […] an actual substantial doubt» [57], «a doubt for which you give a reason» [58] or «a serious or strong or substantial well-

[49] Stella, G., 2003: 182

[50] *Rose v. Clarck*, 478 U.S. 570 (1986).

[51] *Moran v. Ohio*, 469 U.S. 948 (1984).

[52] *Jones v. United States*, 526 U.S. 227 (1999).

[53] *Estelle v. Williams*, 425 U.S. 501 (1976), which states these reasons: «Jurors required by the presumption of innocence to accept the accused as a peer, an individual like themselves who is innocent until proved guilty, may well see in an accused garbed in prison attire an obviously guilty person to be recommitted by them to the place where his clothes clearly show he belongs».

[54] For a criticism of some definitions of «PRD», see Laudan, L., 2006: 5-15 («*that Security of Belief Appropriate to Important Decisions in One's Life*»; «*the Sort of Doubt that Would Make a Prudent Person Hesitate to Act*»; «*an abiding conviction of guilt*»; «*Doubt for Which a Reason Could be Given*»; «*High Probability*»); Newman, J.O., 1993: 982 («a doubt which would cause a reasonable person to hesitate to act in a matter of importance in his or her personal life»).

[55] *McCullough v. State*, 657 P.2d 1157 (S.C. of Nevada, 1983), in critical terms.

[56] *United States v. Schipani*, 289 F.Suppl. 43, 57 (E.D.N.Y., 1968).

[57] *Cage v. Lousiana*, 498 U.S. 39 (1990).

[58] *Adams v. South Carolina*, 464 U.S. 1023 (1983).

founded doubt» [59]. In such a confused situation, one scholar [60] believed he had found a solution in § 1096 of the Penal Code of California, which defines reasonable doubt and was applied in the famous O.J. Simpson trial. Beyond the usefulness of this kind of formula, the latter is a very modest sign of progress, as it echoes the above-mentioned formula of the 1850 trial.

3.1.3. The Italian legal context

The idea of PRD entered Italian law very late [61]. It was initially alien to the main procedural criminal systems of the 19th and 20th centuries because of the lack of any obligation to state the reasons of the judicial evidential decision (Code of Kingdom of Italy of 1807), the vagueness of any such obligation (Bourbon Code of 1819), the attribution of the evidential decision to a jury without receiving actual instructions on this point (from 1848 to 1913), and lastly because of the ideological refusal of the presumption of innocence (Criminal Code of Procedure of 1930 [62]). After the entry into force of the 1948 Constitution, some scholars argued that the idea of PRD had become a fundamental rule of the Italian criminal trial even though this rule was not established in the CCP until 2006. In this respect, the main argument was that this rule implemented, *inter alia*, the presumption of innocence as established in art. 27, § 2, IC [63], and recognised in many international legal documents: Universal Declaration of Human Rights of 1948 (art. 11, § 1), European Convention on Human Rights of 1950 (art. 6, § 2), International Covenant on Civil and Politic Rights of 1966 (art. 14, § 2); a special mention is due to the Statute of the International Criminal Court, which expressly provides for the rule of PRD (art. 66, § 3). All remaining doubts regarding the existence of the PRD rule in the current CCP were overcome with the 2006 reform, which reformulated art. 533, § 1, in the following terms: «The judge convicts if the defendant is proven guilty of the alleged offence beyond any reasonable doubt».

3.2. Theoretical outlines

Like that of the idea of FEE, the legal nature of the idea of PRD is still disputed. I will address this problem applying the same model followed in the theoretical review of the idea of FEE. In other words, I will focus on the Italian legal system and try to

[59] *Butler v. South Carolina*, 459 U.S. 932 (1982).
[60] Stella, G., 2003: 200-201.
[61] Incampo, A., Scalfati, A., 2017
[62] Garlati, L., 2012: 182-183.
[63] See, for example, Canzio, G., 2018: 14; Catalano, E.M., 2016*:* 43-44; Garofoli, V., 2010: 1034; Paliero, C.E., 2006: 73; Stella, F., 2003*:* 212-216; Ubertis, G., 2015*:* 175-176. On this conception, in critical terms, see Caprioli, F., 2009*:* 52, 91.

ascertain the legal nature that the idea of PRD has there, considering my findings valid for all similar legal systems.

In the abstract, this idea too could be conceived as inspiring a single rule, a regulatory trend or a principle. With regard to the Italian CCP, the first conception may be followed due to the existence of the above-mentioned art. 533, § 1, which expressly provides for the PRD standard and has been categorised as a rule of decision. As I'm going to show, this conception is correct but narrow, as is the thesis that the idea of PRD is a mere regulatory trend.

In this respect, other scholars and judgments speak of a «principle of reasonable doubt»[64] but without explaining or justifying this morphological thesis. Furthermore, it is still disputed whether this principle is of constitutional rank. The following reflections will try to shed light on these uncertainties[65].

3.2.1. The idea of PRD as source of a principle

The historical evolution and the judicial and doctrinal conceptions of the idea of PRD show that it has always been functional to the same need. Modern legal systems are aware that the criminal trial involves supreme interests (of the defendant, the administration of justice, and in some ages even the trier of fact)[66], and that trying the fact can never lead to a perfect ascertainment of truth[67]. Therefore, they have chosen the most rigorous discipline for this ascertainment, namely that of proof beyond any reasonable doubt. This conviction was shared irrespective of the type of trial system in place: the central value is the same in both common law and civil law culture. I propose to call this value «optimal certainty" of criminal proof, which presupposes the *best possible* justification of the proposition «the defendant has committed the fact» and implies that «it is proven that the defendant has committed the fact»[68]. Optimal certainty is neither the preponderant probability of the civil trial nor the absolute certainty of mathematics[69]. It is rather both the minimum to which the criminal proof has to aspire and the maximum compatible with the limits of historical knowledge.

As a *general* demand for realising a *value*, the idea of PRD underpins an *open* set of prescriptions, a set that includes rules of decision, such as art. 533, § 1, CCP, but is not limited to them (see § 3.2.2). This «*axiological exuberance*» characterises the legal principles, and is thus the reason why the idea of PRD constitutes the «principle of proof beyond any reasonable doubt" (hereafter: «principle of PRD»).

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[64] Catalano, E.M., 2016: 43-44; Conti, C., 2006: 89, 111, 115.

[65] Carlizzi, G., 2018: 79-99.

[66] Ferrajoli, L., 2000: 193-196.

[67] Ferrajoli, L., 2000: 24-36.

[68] For the (correct) thesis that «it is proven that P» means "there are enough reasons to believe that P», see Ferrer Beltrán, J., 2005: § I.3.

[69] On the standard of proof, see Choo, A. L-T., 2018: 44-52; Ferrer Beltrán, J., Tuzet, G., 2018: 455-462; Vásquez Rojas, C., 2013.

3.2.2. The Italian version of the logic of proof beyond any reasonable doubt

The axiological exuberance of the principle of PRD emerged above all in Italian law due to some judgments handed down by the *Corte di Cassazione*, which gave rise to a specific «Italian version of the logic of PRD»[70]. More specifically, it became apparent in two respects. On the one hand, in the very famous *Franzese* judgment[71], the United Sections of the Court, in addressing the problem of ascertaining the causal relationship in the criminal trial, clarified that the PRD standard is connected not only to a rule of *decision* but above all to a set of *guidelines* for the *evaluation* of evidence (arts 192 and 546 CCP).

The axiological exuberance of the principle of PRD has emerged not only in the above-described terms, namely implying a specific evidential reasoning, but also in a further respect. According to the *Dasgupta*[72] and *Patalano*[73] judgments of the United Sections of the *Corte di Cassazione*, if the Appeal Court intends to overturn an acquittal because of a different evaluation of the reliability of the defense witnesses compared to that of the prior judge, it is obliged to re-examine the witnesses, as this is the only way to prove guilt beyond any reasonable doubt. The stance of the *Corte di Cassazione* has significant implications as it confirms that the idea of PRD has not only an *epistemic* but also a *practical* application. In other words, the idea does not guide only the *knowledge* of the trier of fact, namely the methods for *ascertaining* the case, but also his *action*, prescribing a specific *behavior*, namely the re-examination of the defense witnesses. This prescription was so in line with the adversarial framework of the CCP, that it was ultimately incorporated into it (art. 603, § 3 *bis*, introduced by l. 103/2017).

In summary, in Italian law the idea of PRD is acknowledged as a principle, which can be called the *principle of PRD*. As the general demand for *optimal certainty* of criminal proof, it is not a specific rule but requires the introduction of rules that concur to realise this value, and so justifies these rules. In particular, in the wake of the *Corte di Cassazione*, it can be concluded that the idea of PRD does not underlie only the *epistemic* rule of *decision* found in art. 533, § 1, CCP, but also the *epistemic* guidelines for the evidential *evaluation* that can be inferred from arts 192 and 546 CCP, and the *practical* rule that has been introduced in art. 603, § 3 *bis*, CCP. Moreover, the principle of PRD is valid not only in the Italian criminal trial system but in every legal system that in some way demands the optimal certainty of criminal proof.

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[70] For this phrase («*versione italiana della logica BARD*»), see Carlizzi, G., 2018: 88, 104.

[71] *Corte di Cassazione*, *Sezioni Unite*, 11 September 2002, *Franzese*.

[72] *Corte di Cassazione*, *Sezioni Unite*, 6 Jul 2016, *Dasgupta*. See Lupària, L., Belluta, H., 2017: esp. 155-157.

[73] *Corte di Cassazione*, *Sezioni Unite*, 14 Apr 2017, *Patalano*. See Lupària, L., Belluta, H., 2017: esp. 158-159.

3.2.3. Methodological implications of the principle of PRD

Although they have led to these conclusions, the illustrated opinions of the *Corte di Cassazione* do not constitute a point of arrival but only a point of departure in the doctrine of PRD. In particular, these opinions leave open two fundamental issues. We must firstly illustrate the model arising from both above-mentioned epistemic rules of evaluation and decision, and secondly show whether the principle of PRD is of constitutional rank and therefore binding not only on the judge but also the legislator.

The first issue, concerning *what* the judge has *to do to prove* the case beyond any reasonable doubt, can be resolved adapting the epistemological model of eliminative induction. According to this model, thought up by Francis Bacon, developed by John Stuart Mill, and adopted by many contemporary theorists of evidence[74], « [t]he hypothesis that best resists our most concerted efforts to eliminate it, as well as any other hypotheses, is the one in which we should have increasing confidence»[75]. Therefore, I argue that the principle of PRD implies a rule of evaluation and a rule of decision that prescribes a specific *methodology of reasoning*[76]. In particular, the *rule* of *evaluation* requires the judge to:

A) deduce *all* the elements that are normally present when facts like the case occurs (the so-called «*damning evidence*»), and establish which of these elements actually emerged during the trial and how relevant the presence of each of them is;

B) deduce *all* the elements that are normally not present when facts similar to the case occur (the so-called «*rebuttal evidence*»), and establish which of these elements are lacking and how relevant the absence of each of them is;

C) reason in this dual way with regard to *all* the alternative hypotheses to the charge that have actually been formulated by the defence or can be formulated on the basis of the evidence (the so-called «*counterhypotheses*»).

For example, if the defendant Tom is accused of furiously stabbing Dick, the lover of his wife Mary, in his own home, for reasons of jealousy, the judge will have to establish whether:

a) one or more neighbours heard Tom threaten Dick at that time, Tom had discovered or at least suspected the relationship between Dick and Mary, Tom left his fingerprints on the knife that was used to kill Dick, and so on (*damning evidence*);

b) Tom had already applied for separation to marry another woman; Tom had a physical inability that stopped him moving with agility, and so on (*rebuttal evidence*);

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[74] Anderson, T., Schum, D., Twining, W., 2005: 257-261; Cohen, J.L., 1977: esp. 245-264; Roberts, P., Zuckerman, A., 2012: 258-265; Ferrer Beltrán, J., 2012: 152-156; Gascón Abellán, M., 2010: 154-167. For a more rigid model, see Ferrajoli, L., 2000: 123-132.

[75] Anderson, T., Schum, D., Twining, W., 2005: 257.

[76] On the «criminal standard as reasoning procedure", see also Roberts, P., Zuckerman, A., 2012: 258-265.

c) given that Tom's defence lawyer has countered that Dick's killer was Mary, the clothes that she was wearing when the police arrived on the crime scene were stained with Dick's blood; given that the bloodstains of another man were found on the crime scene, so that it could be supposed that he killed Mary, the neighbours provided information on the presence of a third man in Tom and Mary's home at the time of the crime, and so on (*counterhypotheses*).

The model of evidential *evaluation* described is connected with the principle of PRD because it ensures that the judge scrutinises the evidence with the most rigorous and complete care, and therefore contributes to the optimal certainty of the criminal proof. Indeed, the judge has to consider, on the one hand, *all* the elements and hypotheses relevant to ascertain the case, not only the elements that have been presented by the prosecutor; on the other hand, *all* the counterhypotheses that can be formulated on the basis of the evidence, not only the counterhypothesis proposed by the defence lawyer (who may also remain inactive).

Nevertheless, such a reasoning is not enough to reach the optimal certainty of criminal proof. It is precisely in this that the principle of PRD implies a *rule of decision* requiring a specific methodology of reasoning, as does the rule of evaluation[77]. This rule, addressed once again to the judge, may be formulated in the following terms: «convict if and only if:

A) the vast majority of the most relevant damning elements are present and the absence of all the others can be congruently explained;

B) the vast majority of the most relevant rebuttal elements are lacking and the presence of all the others can be congruently explained;

C) all the alternative hypotheses to the charge are actually lacking in supporting evidence and/or discredited by counterevidence».

Returning to the example of the murder for reasons of jealousy, conviction will be justified beyond any reasonable doubt if, *in effect*, among other things:

a) many neighbours heard Tom threaten Dick; Tom had discovered the relationship between Dick and Mary;

b) Tom had already applied for separation but only subsequent to this discover; Tom had no physical impairment;

c) Mary's clothes were not stained with Dick's blood; the third man's bloodstains were present before the time of the crime.

The definition of the concept of «PRD» arising from the above-mentioned rule of decision is highly significant. Indeed such a definition, being *methodological*[78], is *informative* and not purely *tautological*, unlike the *substantial* definition that is current

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[77] The distinction between rules of evaluation and rules of decision is current in the Italian legal scholarship: see Ferrua, P., 2017: 54-55, 100-101; Ubertis, G., 2015: 158-161, 162-167.

[78] In Italy, a similar approach to the PRD is followed by Canzio, G., 2004: 306-308; Catalano, E.M., 2016: 89-101; Conti, C., 2012: 6-7, 8, 12-13.

in Anglo-American legal culture and refers to a vague state of mind of the fact finder (see § 3.1.2, for the similar definitions of the 1850 judgment, and § 1096 of the Penal Code of California: «It is that state of the case, which, after the entire comparison and consideration of all the evidence, leaves the minds of jurors in that condition that they cannot say they feel an abiding conviction of the truth of the charge»).

3.2.4. Constitutional relevance of the principle of PRD

The issue of the *constitutional rank* of the principle of PRD remains. I propose a solution by developing an argument that is merely touched upon in the abovementioned *Winship* judgment (§ 3.1.2.A), namely the connection between the principle of PRD and the Due Process Clause[79]. In the Italian Constitution this clause is found in art. 111, § 1, whereby «Jurisdiction is implemented through due process regulated by law». The *principle of due process* can be specified in two principles, which both serve to reach a fair decision, namely a decision that is right because it takes into account all the interest involved in the process[80].

The first principle, which can be (and is) called the «*principle of fair trial*»[81], is practical and demands the implementation of all *procedural* forms necessary to reach a right decision. Art. 111, §§ 3 and 4, lists the main forms of this type applicable to the criminal trial, namely the right of the defendant to:

i) be promptly and confidentially informed of the nature and reasons for the charges brought;

ii) have adequate time and conditions to prepare a defense;

iii) cross-examine or have cross-examined the persons making accusations before a judge;

iv) summon and examine persons for the defence on the same terms as the prosecution;

v) produce all other evidence useful for the defence;

vi) be assisted by an interpreter in the event that he or she does not speak or understand the language used in the proceedings;

vii) be tried in adversarial process[82].

The second principle, which can be called the «*principle of fair reasoning*», is epistemological and demands the implementation of all *epistemic* forms necessary to

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[79] Orth, J.V., 2003.

[80] On the distinction between fairness of the trial («*giustizia del processo*») and fairness of the decision («*giustizia della decisione*»), see Ferrua, P., 2005: 67-71.

[81] On the fundamental principle of fair trial, see McDermott, Y., 2016 (International legal context); Goss, R., 2016 (European Convention on Human Rights); Bodenhamer, D.J., 1991 (USA); Clayton, R., Tomlinson, H., 2010 (English law); Ferrua, P., 2005 (Italy).

[82] On these guarantees, see Ferrua, P., 2005: 24-167.

reach a right decision. These forms are not expressly provided for in art. 111 IC, so they must be identified through its analysis. Given that the main epistemic judicial activities are to interpret the law and to prove the case, the principle of fair reasoning demands the implementation of all forms necessary for a right interpretation (*principle of fair interpretation*) and a right proof (*principle of fair proof*).

Regarding the latter demand, which is the most significant for our present goals, the right proof is the appropriate ascertainment of the truth, namely the resolution of the factual question according to a *method* and a *standard* that fulfil all the interests involved in the trial. Briefly, the principle of fair proof requires the implementation of a proportional regulation of evidential reasoning. But this is exactly what the *principle of PRD* (or of optimal certainty of the criminal proof) requires with regard to the criminal trial. It can therefore be concluded that the second principle is a specification of the first and, in the same way, is of constitutional rank.

To demonstrate that the regulation of evidential reasoning required by the principle of PRD for the criminal trial is proportional, we must examine and apply the model of the judgment of proportionality[83]. According to this model, which has been adopted by the Constitutional Courts of several countries, a legal regulation is proportional if it:

A) pursues a constitutionally significant goal (legitimacy);

B) is able to reach this goal (suitability);

C) is not, among the different regulations equally capable of satisfying the interests underlying that goal, the most detrimental to other interests involved in the same regulation (necessity);

D) brings the interests of the first order advantages at least equal to the disadvantages brought to the interests of the second (proportionality *stricto sensu*).

It is possible to apply this model to the regulation of evidential reasoning required by the principle of PRD. This regulation is proportional because it:

a) pursues a goal (the best possible ascertainment of truth) that is constitutionally significant, as it is the best form of the goal pursued by the fundamental principle of fair proof;

b) is able to reach this goal, given that it requires the highest degree of precision on the epistemological level;

c) is not, among the different regulations that are *equally* capable of satisfying the interests underlying said goal (esp. the defendant's freedom, dignity and peace of mind), the most detrimental to the other interests involved in it (the public expectation that crime be punished and prevented, as well as the efficient administration of justice). In fact, the regulation of PRD, imposing the best possible ascertainment of

[83] On this model, see Barak, A., 2012: 243-370. See also Alexy, R. 2012: 133-137; Cartabia, M., 2013: 4-8.

truth, is the *best able to* guarantee the goods of the defendant, so that, in this respect, no other regulation can be compared to it;

d) brings the interests of the first order advantages that are not simply equal but even greater than the disadvantages brought to the interests of the second order. In fact, the discipline of PRD is ambivalent. On the one hand, *minimising* the risks of unjust convictions, it safeguards the innocent defendant, but on the other hand, *maximising* the risks of unjust acquittals, it penalises the interests of the community and any victim of the crime. However, the advantages for the defendant outweigh the disadvantages for the community and any victim. Indeed, while the damages suffered by an innocent person wrongly convicted are always enormous and not erasable (variously: limitation of personal freedom, social stigma, dismissal from job, loss of familiar serenity, and so on), the same conclusion does not hold for the inconvenience arising from the erroneous acquittal, first for the community (crime generating a sense of impunity, which nevertheless appears mostly in those already inclined to commit crimes), and second for any victim of the crime (whose needs are often only partially and temporary frustrated, because they can be transferred as claims for damages to the civil trial, with a less rigorous standard of proof, namely the «preponderance of evidence"). It is probably such a logic of proportionality that underlies the famous protective slogan «It is better that ten guilty persons escape than that one innocent suffer» (so-called «Blackstone's *ratio*») [84] and analogous ones [85].

Recognising the fundamental rank of the principle of PRD has similar implications to those of the principle of FEE, namely obligations relevant not only for the judge but also for the legislator. For both subjects it is possible to distinguish two aspects of this binding effect: *epistemic* and *practical*. Regarding the former, the legislator has to provide, and the criminal judge to apply or make explicit, *methods* of *evaluation* and *standards* of *decision* that will contribute to the optimal certainty of the criminal proof. Regarding the latter, the legislator has to establish, and the criminal judge to implement or extract from the legal system, *procedural* rules for the best possible ascertainment of the truth. Failure to do so leads also in this case to the illegitimacy of either the statute or the judgment.

4. "*IUDEX PERITUS PERITORUM*": AN AMBIGUOUS PHRASE

Albeit not lacking in the past, the main problem of scientific evidence, namely that of the relationship between judges and experts, has taken on particular significance only recently, as a result of scientific and technological advances. This problem has customarily been addressed using the formula «*iudex peritus peritorum*», which is

[84] Blackstone, W., 1893: 358.

[85] Many of these slogans, which propose either a quantified (4:1, 5:1, 9:1, 100:1, 1000:1) or an undetermined («a few», «some», «several», «many», «a considerable amount», «a goodly number») ratio, are quoted and examined in Volokh, A., 1997: esp. 174-177, 182-185.

ambiguous, as it is unclear to which question it provides an answer[86]. In short, what does it mean to say that the judge is the expert of experts? That he is free to both *identify* and *apply* for himself the scientific principle necessary to resolve a specialist question of fact? Or that only he can *apply* this principle? Or that he is anyway authorised to *reject* the conclusions of the experts heard at trial? Or something else?

This bundle of questions have to do with the «paradox of expert testimony» illustrated in the introduction above. As mentioned, in order to establish whether this paradox is real or only apparent, I shall review the possible judicial approaches to the role of experts at trial[87]. This review, which will rely on some recent and significant Italian criminal judgments, rests on a fundamental premise. As the role of *peritus peritorum* assumed by the judge means having logical supremacy, namely imposing his judgement over that of the experts, this supremacy can manifest itself in two fundamental attitudes: closed or open.

4.1. Closed attitudes on the part of the judge

The judge can have three kinds of closed attitude towards experts. First of all it must be clarified that this closure is revealed as either opposition or indifference to the experts. In the case of *opposition*, the judge overrides the opinion of an expert summoned to trial with his own without developing any epistemological critique of the opinion. In the case of *indifference*, on the other hand, the judge does not feel the need for the presence of an expert at the trial and directly assumes this role himself. In both cases, the result is the same: the possible contribution of the expert is not taken into account. For this reason I will disregard the distinction below.

The judge is a *peritus peritorum* with a closed attitude when he behaves as an «apprentice judge», a «popularising judge» or a «land-surveyor judge»[88]. All three approaches are consistent with the *PFE's first requirement*, that of concreteness, since the evidential criterion is freely chosen or applied by the judge. But none of them is consistent with the *PFE's second requirement*, that of logicality, since the evidential criterion is either not at all scientific or not applied in accordance with scientific methods. Therefore, none of the three approaches is consistent with the *PRD* either, which demands the most rigorous application of scientific criteria.

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[86] Carlizzi, G., 2019: 49-79.

[87] On this role, see Vázquez Rojas, C., 2015: esp. 25-57, 149-194, 211-263. On the other hand, for a list of the ways that science works as a «bad teacher" («*cattiva maestra*») in the trial (bad science, good science applied badly, good and well-applied science improperly used), Caprioli, F., 2008: 3525-3535.

[88] Carlizzi, G., 2019: 51-60.

4.1.1. The apprentice judge

Firstly, the judge can assert the scientific validity of an evidential criterion that is only a precipitate of common sense, or even a vague stereotype. This is the image of the apprentice judge, who struggles to establish specialist evidential criteria by himself.

An example of this attitude is offered by a judgment of the Court of Appeal of Milan handed down on 9th November 2012. In a prior trial, a woman pleabargained for robbery (art. 628, § 2, CC). Later, in two further trials, where she was accused of stealing credit cards and identity cards in order to swindle a number of storekeepers, the woman was found to be a kleptomaniac by two psychiatrists. Therefore, the woman's lawyer demanded the Court of Appeal of Milan review the plea bargain judgment. The Court of Appeal of Milan rejected the demand, because it argued, at odds with the opinions of the psychiatrists, that the ability to plan shown by the woman was incompatible with the typical impulsivity of the kleptomaniac. The *Corte di Cassazione* dismissed the application presented against the judgment of the Court of Appeal, asserting that the judge as a *peritus peritorum* can disagree with the expert conclusions, provided that he states his reasons [89].

The judgment of the Court of Appeal clearly exemplifies the attitude of the apprentice judge. At the time of the trial, the most prominent reference manual on psychiatric assessment (Diagnostic and Statistical Manual on Mental Disorders-4-TR) defined kleptomania on the basis of specific symptoms, and the ability to plan was not included among these symptoms (redundancy of the theft; increasing sense of tension immediately before committing the fact; relief at the time of this committing; and so on). In short, the judgment of the Court of Appeal seems to have relied on a pseudoscientific definition that was invented by the judge starting from the stereotype of the kleptomaniac as an impulsive agent.

4.1.2. The popularising judge

Secondly, the judge can use a specialist criterion consulting official sources that, instead of establishing a nomological connection between problematic phenomena, provide either simplified versions of scientific laws or generic accounts. In both cases emerges the image of the popularising judge, who trivialises and sometimes even distorts the specialist discourse.

This trivialising approach can be found in a decision of the Court of Appeal of Bari handed down on 28th March 2014. The defendant was originally convicted for having induced an old lady to donate him some of her property, and therefore for «circumvention of an incapable» (art. 643 CC). Indeed, the expert present at trial had established, relying on extensive documentation and examining the old lady,

[89] *Corte di Cassazione*, Sect. II, 11 December 2013, *Mosca*.

that she suffered from senile dementia. The Court of Appeal, relying principally on the entry for «Dementia» in the *Dizionario di medicina Treccani*, considered the expert opinion «a result of suppositions and hypotheses but not of actual ascertainment" and therefore overturned the conviction. The *Corte di Cassazione* reversed the order of acquittal of the Court of Appeal, arguing that it arose from an erroneous conception of the judge as *iudex peritus peritorum*[90].

The *Corte di Cassazione*'s criticism captures the image of the popularizing judge well. The above-mentioned entry for «Dementia», on the one hand, having been drafted with the help of psychiatrists, does not echo mere stereotypes but, on the other hand, serving to satisfy the layman's general need for information, represents only the popular version of the real specialist definition of «Dementia».

The second form of judicial popularisation, namely the distorting approach, which consists in transforming a simple specialist account of disputed phenomena into an actual scientific law, occurred in a judgment of the Court of Appeal of Turin, handed down on 28th November 2012. The court of first instance convicted almost all the defendants, who had worked as directors of an electricity plans in the course of several years, for aggravated multiple murder (art. 589, § 2, CC). The defendants were charged with not ensuring the absence of asbestos in the workplace, and therefore with not preventing the death from pleural mesothelioma of a number of workers between 2003 and 2006. Two facts were proven: that asbestos can cause mesothelioma, and that the victims contracted this illness under the direction of one of the defendants in the early stages of their work. Therefore, the main evidential question was whether the victims' exposure to asbestos in the subsequent stages of employment, under the direction of other defendants, could be considered to have accelerated the development of the illness and thus led to early death (the so-called «question of the acceleration-effect»). The Court of Appeal of Turin, contrary to the opinions of all the experts heard during the trial, reversed the conviction of the court of first instance, establishing that if, *in abstract*, it could be argued that further exposure of an ill worker to asbestos can lead to his early death due to mesothelioma, *in concrete*, there were insufficient elements to prove this is precisely what happened in the case of the deceased workers. The *Corte di Cassazione*, in turn, objected that the Court of Appeal based the abstract hypothesis of the acceleration-effect on a document, the 2011 *Consensus conference*, which referred only to «the ratio between the illness and the dose» of asbestos[91].

The latter remark illustrates the specificity of this kind of popularisation: the judge not only simplified a complex specialist discourse like that of the *Consensus conference* but also ascribed to it a nomological guise that it did not claim to assume. In brief, here the judge trivializes the specialist discourse through a distortion.

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[90] *Corte di Cassazione*, Sect. II, 12 February 2015, *Renna*.
[91] *Corte di Cassazione*, Sect. IV, 27 February 2014, *Negroni*.

4.1.3. The land-surveyor judge

Thirdly, a judge can use criteria that are effectively shared by an expert community but are also so complex that they require special competence to apply. This approach matches the image of the land-surveyor judge, who delineates the perimeter of the specialist criteria for himself.

An example of this approach is the judgment of the Court of Appeal of Caltanissetta handed down on 21st May 2015. The defendant, who was twice submitted to an alcohol test, a couple of hours after causing a road accident, was initially found to have a blood alcohol level of 1.49 grams per litre (g/l), and shortly after 1.35 g/l. It had to be proven whether his blood alcohol level was above the threshold of 1.50 g/l at the moment of the accident, because this excess is a constitutive element in the crime of drunk driving according to art. 186, § 2, lett. c, Italian Highway Code (hereafter: HC). The Court of Appeal confirmed the conviction of the lower court, applying – without the help of an expert – a theory, the so-called «Widmark-curve», widely accepted in the scientific literature. This is the central passage of the Court's reasoning:

> it is known that the concentration of alcohol, which increases between 20 and 60 minutes after intake (the so-called «Widmark-curve»), falls after reaching the maximal absorption peak during this interval of time. Therefore, there is no doubt that the [levels resulting from the above-mentioned measurements], which marked the evolution of the defendant's alcohol level and resulted just below the threshold of 1.50 g/l, are able to prove that this threshold had been crossed while he was driving.

In brief, given that the ascertained alcohol levels were close to the threshold of 1.50 g/l, and given that this measurement was made while the level of alcohol in the blood was falling, the Court of Appeal concluded that before the measurement was taken –more specifically while driving– this threshold had been passed, albeit only slightly. The *Corte di Cassazione*, however, disagreed with this conclusion, considering it in conflict with the obligation of the judge to be a «user and not producer of scientific laws"[92].

The latter stance can certainly be shared. In the case of the Court of Appeal, judicial arbitrariness is manifest not as a «free establishing» but as a «solitary implementing» of a scientific criterion (above all in the form of an intuitive calculation). Indeed, in the toxicological literature, the theory of the Widmark-curve is widely acknowledged in explaining and quantifying the absorption of alcohol in the blood. Nevertheless, this theory implies a mathematical function that is rich in numerical and non-numerical variables (concerning, for example, the quantity of alcohol ingested, the time elapsed from the moment of ingestion, the concomitant ingestion or otherwise of alcohol and food and so on), whose quantification and co-ordination requires specialist competence.

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[92] *Corte di Cassazione*, Sect. IV, 21 April 2016, *Lo Porto*.

4.2. Open attitudes on the part of the judge

The judge can also play the role of *peritus peritorum* displaying openness towards scientists or technicians. This happens in two situations: when he behaves either as a receptor judge or as a gatekeeper judge. In both situations, which I review here separately, there is at least one expert present at trial, and the judge takes his opinion into account.

The judge is a *peritus peritorum* with an open attitude when he behaves as a «receptor judge" or a «gatekeeper judge»[93]. In the first case, the judicial approach is not consistent with the *PFE*, since the judge lets uncritically the expert impose the evidential criterion, so it is not consistent with the *PRD* either. In the second case, the judicial approach is consistent with both *PFE* and *PRD*, since the judge shares the expert opinion only after seriously scrutiny it.

4.2.1. The receptor judge

The judge can first of all refer to the conclusion of the expert and share it merely as a matter of common sense. In this case, the judge questions neither whether the criterion proposed by the expert is widely recognised, nor whether the expert has used it correctly. This approach gives rise to the image of the judge receptor, who ratifies the specialist opinions in a substantially uncritical way.

An example in this regard is the judgment of the *Corte di Assise di appello* of Naples handed down on 11th December 2012. The defendant was charged with murder (art. 575 CC) for killing a local surveyor whom he suspected had plotted against him. While the defence sustained that the defendant suffered from a psychosis implying total mental incapacity, the court of first instance shared the psychiatrist's conclusion that he was only partially incapable on account of his paranoia. The *Corte di Assise di appello* followed the opinion of the lower Court, simply highlighting «the extreme precision and completeness» of the expert report, its «full adherence to the [defendant's] anamnesis» and that it was the result of a «careful and thorough investigation» of his personality. The *Corte di Cassazione* confirmed this *modus procedendi*, specifying that the judge who states his reasons can «merely recall the evaluations and conclusions of the expert shared by [him] »[94].

This argument illustrates what it means for the judge to consider expert opinions in a receptive way. In fact, the *Corte di Cassazione* strives to enrich the requirement of «merely recalling», demanding it be based on an «ongoing observation of the [defendant] » and «correct scientific criteria». Nevertheless, this requirement is too vague and thus cannot be considered truly binding. Therefore, the judicial decision will not rely on the ascertainment of epistemological reliability but the pure reasonableness of the expert's opinion.

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[93] Carlizzi, G., 2019: 60-79.

[94] *Corte di Cassazione*, Sect. I, 14 November 2013, *Araci*.

4.2.2. The gatekeeper judge

Lastly, the judge can establish whether (and possibly which of) the opinions of the scientists and technicians present at trial are worthy of acceptance, only after ascertaining some requirements for epistemological reliability. In this case, he behaves as a gatekeeper judge who examines precisely and completely the nomological and implementing opinions of the experts during the cross-examination.

In Italy, the first to develop a model for this kind of ascertainment is a judgment of the *Corte di Cassazione*[95], which has been often compared[96] to the famous *Daubert* judgment of the U.S. Supreme Court (see § 5.2.1). The first judgment is also known as «*Cozzini*», by the name of the main defendant, an engineer who assumed the direction of a railway workshop containing asbestos dust in 1976. One of the maintenance men, who worked there between 1971 and 1982, discovered in 2003 that he was suffering from pleural mesothelioma and died the following year from this illness. In the subsequent trial, only two facts were undisputed: on the one hand, that the mesothelioma has a multistage pathogenesis, consisting in a degenerative process that essentially comprises three phases (promotion, latency, and appearance); on the other hand, that the victim had passed to the promotion stage (namely the irreversible but not yet detectable cell mutation) because of exposure to asbestos dust under the direction of a predecessor of Cozzini's. It had therefore to be proven whether, as Cozzini had constantly exposed the victim to asbestos dust, he had shortened the latency phase, thus hastening the appearance of the illness and consequent death of the victim. Essentially, the main question was whether the so-called «theory of the acceleration-effect» (see § 4.1.2) could be used as an «etiological covering law». This evidential question was resolved in the negative by the court of first instance, which acquitted the defendant pointing to the purely epidemiological rather than nomological nature of the statistics concerning the acceleration-effect. In contrast, the Court of Appeal asserted that the «acceleration-effect is a finding that is constantly and undisputedly recognised in the scientific field, as well as 'supported by illustrious and surely rigorous scientific publications'»; therefore this effect is the object of «a statistical generalisation able to prove the causal link". The *Corte di Cassazione* overturned the conviction of the higher court, arguing that its reasons in favour of the theory of the acceleration-effect were weak. According to the *Cassazione*, the judge «can [neither] assume a passive role in relation to the scientific world»", nor pretend to have sufficient «knowledge and […] competences to carry out an [autonomous] investigation [on this world] ». He has rather to interact with experts, thus behaving as «a guarantor of the scientific value of the knowledge brought to the trial» and «play an insightful […] critical role, becoming […] gatekeeper of the scientific method».

This model, which demands the judge be a gatekeeper of the reliability of expert opinions, was not followed in the decisions of first and second instance in *Cozzini*,

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[95] *Corte di Cassazione*, Sect. IV, 17 September 2010, *Cozzini*.

[96] See, for example, Tonini, P., 2011: 1341.

and this is precisely why they can both be censured. In fact, both decisions addressed the acceleration-effect theory in quite a superficial way, as they limited themselves to substantially transposing the opinion of an individual expert, without verifying any requirement for epistemological reliability. In simple terms, in both decisions the *iudex peritus peritorum* was illegitimately conceived according to the image of the receptor judge described above (§ 4.2.1).

As said above, the gatekeeper approach reflects the only appropriate conception of the *iudex peritus peritorum*, as it is wholly consistent with the principles of FEE and PRD. Aware of his limited competence and simultaneously of his role as administrator of justice, the gatekeeper judge places himself midway between epistemic activism and passivity. He seeks the support of experts but, at the same time, evaluates whether their opinions, based on the correct identification and application of specialist criteria, are reliable, namely they can worthily contribute to the decision of the case. In this way, the gatekeeper judge is able to reach logical evidential conclusions, and therefore to establish whether they constitute proof beyond any reasonable doubt.

5. FREE EVALUATION OF SCIENTIFIC EVIDENCE AND SCIENTIFIC PROOF BEYOND ANY REASONABLE DOUBT

The central problem of the evaluation of scientific evidence[97] is known as the «*paradox of expert testimony*»[98] and can be formulated in the following terms: «how can the judge assess information provided by an expert witness if he needs him precisely because of his own lack of adequate scientific knowledge? ». In the adversarial criminal trial[99], where the evidential judgment is subjected to the principles of FEE and PRD, this problem is even more complicated. It is disputed not only whether the judge is actually able to *evaluate* scientific evidence autonomously but also whether he is really capable of *deciding* that the result of this evaluation constitutes proof beyond any reasonable doubt.

In the previous section, I briefly presented the reasons why only the gatekeeper judge approach is consistent with the above-mentioned principles. In this section, I examine this approach in greater detail, focusing on how the evaluation of epistemological reliability of the expert opinion is logically structured (§ 5.1), and secondly what the requirements for this epistemological reliability are (§ 5.2). In this way, I

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[97] Canzio, G., Luparia, L., 2018; Caprioli, F., 2008; Carlizzi, G., 2019; Carlizzi, G., Tuzet, G., 2018; Choo, A. L-T., 2018: 295-333; Federal Judicial Center, National Research Council, 2011; Roberts, P., 2014; Roberts, P., Zuckerman, A., 2012: 469-509; Haack, S., 2014: 78-103, 122-293; Taruffo, M., 2005; Vázquez Rojas, C., 2015; Vázquez Rojas, C., 2013.

[98] Taruffo, M., 2005: 1109-1110 («*paradosso della perizia*»).

[99] On the adversarial jury trial, see Roberts, P., Zuckerman, A., 2012: 42-95; on the adversarial trial by judge, see Ferrua, P., 2017: 7-9.

aim to show that the judge is truly able to assess scientific evidence, and therefore that the paradox of the expert testimony is merely apparent. Moreover, this «discovery», although very important, is not the end of the matter, because the abovementioned evaluation in turn gives rise to some further problems that future legal epistemology will have to address (§ 5.3).

5.1. Resolving the paradox of expert testimony

In my opinion, the paradox of expert testimony depends essentially on a faulty understanding of the logical activities of the judge and the experts, presupposing that both *activities* are similar, if not even identical. In order to establish whether this point of view is correct, we must first of all shed light on the acts of *formulation* of a scientific criterion and *application* of this criterion to the evidence emerged at trial. Both acts are necessary to resolve any scientific question of fact, which can belong to one of the following types:

a) questions of *quantification*, which concern the measurement of a gradable quality of a living being or a thing. For example, as we said in § 4.1.3, to establish whether the blood alcohol level of a driver exceeds the threshold set in the abovementioned art. 186, § 2, lett. c, HC, one can refer to the «Widmark-curve» and use it in the form of a calculation to the relevant evidence[100];

b) questions of *classification*, which concern the positive or negative assertion that someone or something has a certain rigid (not gradable) quality. For example, if a defendant is charged with poisoning waters or foodstuffs (art. 439 CC), having introduced a certain quantity of arsenous anhydride into a water pipe, the nature of this substance can be ascertained by establishing and employing its conventional chemical definition (AS2O3)[101];

c) questions of *identification*, which concern the positive or negative assertion that a living being or thing has a certain origin. A question of this kind typically emerges in murder trials, where it is necessary to prove not only the nature of the crime-scene evidence (e.g. blood, saliva) but also from whom or what they arise (e.g. does this drop of saliva come from Tom?). In order to resolve the question, it must be tested whether there is a chemical match between the record and the sample collected from its possible source, and for this test an appropriate analysis procedure must be found and implemented[102];

d) questions of *explanation*, concerning the ascertainment of the causal link between a human conduct (action or omission) and an event. Therefore, the expla-

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[100] On «forensic metrology», see Vosk, T., Emery, A.F., 2014.

[101] Regarding biology, see Kendig, C., 2016.

[102] Nowadays, the most significant question of identification of course concerns DNA: see Gill., P., 2016.

nation is normally an answer to a specific «*why-question*»[103], although neither of the concepts are in a one-to-one relationship[104]. The ascertainment of the above-mentioned causal link[105] is a central point in trials relating to so-called «crimes of event» (e.g. murder). According to a model that is broadly accepted in contemporary legal culture[106] (the so-called «covering-law model»[107]), this ascertainment requires the formulation and application of a specific causal law[108] («If A happens, then B certainly or probably follows»).

Formulating and applying a scientific criterion produces «*nomological*» and «*applicational*» opinions respectively[109]. Although both are fundamental for addressing the above-mentioned evidential questions, the judge and the expert do not play the same role in this respect. Indeed, on the one hand, formulation and application constitute a duty of the expert, who thus gives the judge the information essential to resolve the scientific question of fact. On the other hand, the judge, relying on the results of cross-examination[110], has «only» to assess whether the nomological and applicational opinions have been reached in an epistemologically correct way[111]. Basically, while the expert's judgement is *epistemic*, concerning the validity of a scientific criterion (law, definition and so on) and its applicability to the evidence emerged at trial, the judicial judgement is *epistemological*, concerning the reliability of the former judgement from the point of view of the «legal philosophy of science»[112]. In short, while the expert's judgement regards the scientific criterion, the judicial one regards the expert's judgement.

It is exactly this «Russian nesting doll-arrangement» of the two judgements, namely this relationship «from judgement to meta-judgement», that confirms that the paradox of the expert testimony is only apparent. In fact, it is true that the judge has no competence to directly and autonomously establish whether a certain scientific criterion is really valid and applicable to the evidence. But it is also true that he,

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[103] On the «why-questions» in general, see Hempel, C.G., 1965: 334-335.

[104] Indeed, as clarified in Hempel, C.G., 1965: 334-335, 428-430, on the one hand, there are not only «explanation-seeking why-questions» but also «reason-seeking or epistemic why-questions» («Why should it be believed that *p*?» or «What reasons are there for believing that *p*?»); on the other hand, explanations can answer not only «why-questions» but also «'how-possibly' questions» («How could it possibly be the case that not-*p*?»). On these «pragmatic" matters, see also Salmon, W.C., 1990: 4.4.

[105] On causality, in the epistemological literature, see Illari, P., Russo, F., 2014.

[106] The covering-law model is widely used in the Italian legal context: see, albeit in different terms, Stella, F., 1990 (as covering law may be used only a universal natural law or a similar one), and *Corte di Cassazione*, *Sezioni Unite*, 11 September 2002, *Franzese* (as covering law may be used also a statistical natural law).

[107] This model too arises from Hempel, C.G., 1965: esp. 245-290.

[108] On the laws of nature, see Mittelstaedt, P., Weingartner, P.A., 2005.

[109] This phrases («*tesi nomologiche*» and «*tesi applicative*») can be found in Carlizzi, G., 2019: 11-18.

[110] On the fundamental role and limits of cross-examination in the field of scientific evidence, see Caprioli, F., 2008: 3526-3527; Conti, C., 2010: 1215-1217.

[111] On the logical structure of this epistemological assessment, see Carlizzi, G., 2019: 7-30.

[112] See also Caprioli, F., 2008: 3526-3527.

being an «undercover philosopher» [113], can normally verify whether the expert judgement on this criterion meets the demands of legal epistemology.

The requirements for epistemological reliability vary depending on whether the judicial evaluation concerns either the nomological or the applicational opinion of an expert. The Supreme Court and the legal scholarship of many countries have focused above all on the requirements relating to nomological opinions, although the problem of the reliability of the application is often more complex. Space does not permit a detailed investigation of both problems, so I shall review in the next section only the features required for the expert *nomological* opinions to be *epistemologically reliable*. In particular, I shall focus on and compare the models established in the USA by the Supreme Court and in Italy by the *Corte di Cassazione*, aiming once again to reach generally valid conclusions.

5.2. Requirements for epistemological reliability

The problem of evaluating the reliability of expert opinions was initially addressed in the USA during the 19th century. It arose from the need to prevent the jury, which is charged with trying the fact but not used in assessing evidence, being tricked by merely self-proclaimed experts [114]. Briefly, from the beginning, this problem was conceived as how the judge could *banish* «*junk science*» [115] (also called «bad science or pseudoscience») from courtrooms at the *beginning* of the trial.

Although the solution ultimately found by the U.S. Supreme Court has been of inspiration to other national trial systems [116], the requirements for epistemological reliability play a somewhat different role in some of these systems than they do in the USA. The remark is especially relevant for the systems, like the Italian, where the trier of fact is the judge. Indeed, in this case, the requirements under consideration essentially serve to ensure the best possible judicial *evaluation* of the scientific evidence at the *conclusion* of the trial.

5.2.1. The American legal context

In the USA, at first, the opinion of an expert present at trial was considered reliable just because he «succeeded in making a living from [his] expertise» [117] (the so-called «*commercial marketplace test*"). This criterion revealed itself inappropriate as

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[113] For this idea (judge as a «*filosofo in incognito*»), see Capograssi, G., 1959: 22.

[114] Welch, C.H., 2006: 1085; Jurs, A.W., 2012: 1334, 1415.

[115] Huber, P.W., 1993.

[116] On the international spread of *Daubert*, see Haack, S., 2014: 24 (referring to Canada, England, Wales, Italy, Mexico and Colombia).

[117] Mnookin, J.L., 2001: 32.

soon as it became clear that there were scientific questions of fact that did not have an external marketplace (e.g. the question of identifying fingerprints).

Therefore, the Courts strived to establish a more refined epistemological parameter of evaluation. A milestone in this direction was the *Frye* judgment (1923), handed down by the Court of Appeal of the District of Columbia. As the defendant's lawyer had proposed an expert testimony that relied on a systolic blood pressure deception test, the Court rejected the lawyer's request. The rejection was justified by arguing that an expert testimony could be considered reliable only if it rested on a principle or discovery *generally accepted* in a specialist community, while the proposed test had not yet gained sufficient recognition among scientists[118].

The real impact of the parameter of «general acceptance» was and is still disputed[119]. Some scholars are of the opinion that it «was applied primarily to a narrow category of forensic testimony in criminal cases»[120]. Anyway, it was considered both somewhat ambiguous (because of the vagueness of the concept of «general acceptance") and rigid (because of its inappropriacy for the pluralistic scientific disciplines)[121]. Therefore, in 1975, Federal Rule of Evidence (FRE[122]) 702, regarding Federal jurisdiction and that of a number of States[123], provided for a new and more liberal[124] scheme of admissibility of expert testimony, requiring it to be *useful*[125].

Given that FRE 702 made no mention of «general acceptance», the issue arose whether this concept was still relevant as an implicit requirement. The issue was resolved in the negative by the 1993 *Daubert* judgment (hereafter: *Daubert*) of the U.S. Supreme Court, whose conclusions were further developed in other two judgments of the same Court, *Joiner* (1997) and *Kumho Tire* (1999). The three decisions comprise the very famous «*Daubert* trilogy"[126]. The main achievements of this trilogy may be summarised as follows:

a) to admit an expert testimony, the judge has to assess not only its usefulness but also its reliability; in particular, he has to behave as a «*gatekeeper*», verifying whether the theory or technique proposed by the expert can be (and has been) tested, has been subjected to peer review and publication, has a known or potential rate of error

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[118] *Frye v. United States*, 293 F. 1013 (D.C. Cir 1923).

[119] Bernstein, D.E., 2001: 388-393; Vásquez Rojas, C., 2015: 92-96.

[120] Bernstein, D.E., Lasker, E.G., 2015: 4.

[121] Fradella, H.F., O'Neill, L., Fogarty, A., 2004: 326; Kanner, A., Casey, M.R., 2007: 287.

[122] On the origins of the FRE, see The Committee on the judiciary House of Representatives, 2008, *Historical Note*, VII-X.

[123] More specifically, for the jurisdiction of 39 States, as well as of the District of Columbia: see Morgenstern, M., 2017.

[124] Kanner, A., Casey, M.R., 2007: 287, 290; Giannelli, P.C., 2003: 1077-1079.

[125] However, the formulation of FRE 702 was changed in the following years (2000 and 2011), above all to implement and refine the results of the «*Daubert* trilogy».

[126] The literature on the «*Daubert* trilogy» is already vast: see Berger, M., 2011: 12-26; Bernstein, D.E., Jackson, J.D., 2004; Bernstein, D.E., Lasker, E.G., 2015; Fradella, H.F., O'Neill, L., Fogarty, A., 2004; Giannelli, P.C., 2003; Haack, S, 2014: 104-155; Kanner, A., Casey, M.R., 2007; Vásquez Rojas, C., 2015: 98-137.

(in the case of a particular scientific technique), and enjoys general acceptance in its respective scientific community (*Daubert*) [127];

b) the judicial evaluation of reliability must not be limited to the validity of the evidential scientific criterion but has to be extended to its full *congruence* with the elements of the case (*Joiner*) [128];

c) this evaluation has to be implemented not only for the scientific testimony but for any kind of expert testimony (*Kumho Tire*) [129].

5.2.2. The Italian legal context

In Italy, the epistemological reliability requirements of expert opinions have been established by the above illustrated *Cozzini* judgment (see § 4.2.2), which differs from the *Daubert* trilogy in two respects. On the one hand, while the *Daubert* trilogy applies in a system where the judge has to guarantee the legitimacy of the evidence presented to the jury as the trier of fact, and therefore is valid only for the *preliminary admission* of the expert testimony, *Cozzini* works in a system where the judge is also the trier of fact, and thus refers above all to the *final evaluation* of the expert information already produced during the trial. On the other hand, although it shares the *ratio* of the *Daubert* trilogy, *Cozzini* establishes its own requirements for epistemological reliability [130]. These requirements are of two kinds:

a) *subjective* requirements, which correspond to certain qualities of the person (or persons) who has (or have) carried out the research leading to the opinion of the expert at trial (obviously, both persons can coincide): identity, undisputed authority, independence, and pursued aims;

b) *objective* requirements, which correspond directly to certain qualities of the above-mentioned research: its scope, precision and objectivity, degree of empirical corroboration and explaining-capacity, as well as the intensity of the external critical discussion regarding the research.

Some scholars argued that such requirements are scarcely binding on the judge as a trier of fact [131]. This scepticism may be justified in some cases [132], and it must be recognised that the Italian Courts of first and second instance have so far given scant consideration to this list. However, the judge is normally able to verify whether the opinions of the experts at trial meet the most important of the illustrated requirements. Therefore the paradox of expert testimony is once again seen to be merely apparent.

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[127] *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).
[128] *General Electric Co. v. Joiner*, 522 U.S. 136 (1997).
[129] *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999).
[130] Carlizzi, G., 2019: 98-115.
[131] With regard to the *Daubert* judgment, see, among others, Welch, C.H., 2006: 1091-1101.
[132] On the other hand, this scepticism.

5.3. Unsolved questions concerning the requirements for epistemological reliability

The requirements listed above were essentially established to aid the *judge* in assessing whether an *expert* opinion on the validity of an evidential *scientific* criterion («*nomological opinion*») is *epistemologically reliable*. In simple terms, while the expert asserts that such a criterion (scientific law, definition and so on) is valid, the judge has to establish whether this assertion can be used as a premise for his evidential scientific reasoning. Nevertheless, judicial evaluation of specialist (and not only scientific) evidence has a broader and more complex scope than this. Hence, the described set of requirements leaves many problems unsolved[133], some of which I aim to review in this concluding section.

On the one hand, there are problems of *law of evidence*, namely how the set works within the positive discipline of evidential evaluation and decision. These problems obviously depend above all on the specific positive contents of the different legal systems. In the civil law legal systems, especially the Italian one, such problems are exemplified by the following questions. Are the requirements under consideration applicable (not only for evaluating the evidence at the end of the trial but also) for admitting the means of evidence at the beginning of the trial? Do they work in the same way both in the proceedings before the courts of first and second instance and the *Corte di Cassazione*? Can they justify a request for reviewing a final conviction being considered admissible and then granted?

On the other hand, there are problems of *legal epistemology*, which are relatively independent from the specific positive contents of the various legal systems. Considering the philosophical matrix of the present paper, I concentrate on this topic, and more specifically on four issues. Are the above-mentioned requirements really useful for every specialist (and not only scientific) evidential question? Can they be applied also when the expert opinion to evaluate belongs to a «pluralistic discipline»? Which is, and which complications are implied by, their «working logic"? How do they fit into the complex evidential discipline implied by the principle of PRD? How scrupulously can the judge, with a principally legal background and a very heavy workload, verify these requirements? In the following, I will focus only on the problems of legal epistemology.

5.3.1. Heterogeneity of the specialist evidential questions

The scientific evidence considered in *Cozzini* (and *Daubert*) belongs to the sphere of the so-called «*natural sciences*» (biology, oncology, epidemiology, and so on)[134].

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[133] For a deeper analysis of these problems, see Carlizzi, G., 2019: 115-155.

[134] On the traditional but nowadays somewhat controversial distinction between «natural sciences» («*Naturwissenschaften*») and «human sciences» («*Geisteswissenschaften*»), see above all Dilthey, W., 1927: esp. 79-88; Windelband, W., 1915: 136-160; Rickert, H., 1896: esp. 289-304.

Nevertheless, the evidence that the judge has to assess is not only natural-scientific but more broadly specialist. For example, it can be *human-scientific* (e.g. a psychiatric diagnosis to ascertain the mental capacity of the defendant), *technical* (e.g. the instrumental results of the DNA analysis to identify its source), *artistic* (e.g. an expertise on a painting to reveal whether it is fake), *semiological* (e.g. a visual inspection of a tyre to establish why it exploded, as in the above-mentioned *Kumho Tire* case) and so on[135]. Therefore, it could be disputed whether the requirements established in *Daubert* and *Cozzini* can be applied to every kind of specialist evidence.

In my opinion, the positive answer given in *Kumho Tire* is laudable. Irrespective of the differences between the legal systems where they were laid down, *Daubert* and *Cozzini* rely on the same ideas. They are the ideas of falsifiability and corroboration, according to which all general hypotheses can be taken for true only on two conditions: one must attempt to discredit it through intersubjective methods, and be certain that the attempts have failed[136]. Being universal, the ideas of falsifiability and corroboration are valid not only for natural-scientific knowledge but for any further kind of specialist knowledge.

Nevertheless, precisely due to their natural-scientific matrix, the requirements established by *Daubert* and *Cozzini* need to be refined and, if necessary, modified depending on the peculiarities of each discipline. And the main author of this "adjustment according to form of knowledge» must be the judicial body, once again under the supervision of the *Corte di Cassazione*. In fact, if the Courts of first and second instance tried to proceed autonomously, and if the legislator tried to establish a general and abstract regime, they would both be doomed to failure because of the heterogeneity of the forms of specialist knowledge.

5.3.2. Pluralistic disciplines

The *Cozzini* (and *Daubert*) requirements refer to sciences (biology, oncology, epidemiology and so on) that, in generally making use of experiment and/or measurement, very rarely obtain theoretical results that are in unsolvable conflict with each other. However, some of the disciplines that can help the judge to resolve specialist questions of fact are not so uniform, as, on the one hand, they either ignore or rarely make use of experiment and measurement, and on the other hand, are very much influenced by theoretical and ideological factors[137]. I propose to call them «pluralistic disciplines», namely any organic body of specialist knowledge that is not monopolised by a unique school of thought but shared between different doctrinal approaches,

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[135] For further examples of specialist fields of discipline, see Berger, M., 2011: 16; Haack, S., 2015: 40.

[136] Popper, K.R., 2002: 17-20 (falsifiability as a criterion of demarcation), 57-67 (failure of attempts at falsification as a source of corroboration).

[137] On the «theory-ladenness» of scientific observations, see Hanson, N.R., 1958: 4-30.

where none has been able to prevail over the others, and each relies on assumptions that are at least partially incompatible with those of the others.

These features beg the question whether the *Cozzini* (and *Daubert*) requirements can also be applied to pluralistic disciplines, such as research relating to economics or the mind. For example, a diagnosis on the mental condition of an individual can be made from at least two very different points of view. While *psychiatry* takes the descriptive and medical aspects of mental illness into greater account[138], *clinical psychology* above all focuses on explanatory and environmental aspects[139]. Moreover, this is a «squared pluralism», as each of the two approaches is shared among several competing orientations (e.g. in the field of psychiatry, the dispute between the DSM[140] and the phenomenological models[141]; in the field of clinical psychology, the opposition between the biological, psychodynamic, behavioural, cognitive, humanistic-existentialist, and sociocultural models[142]). All this implies that the same fact could be evaluated in two or more different ways. Let us assume that three scientists of the mind are summoned to trial (the first by the prosecutor, the second by the defence, the third by the judge) to establish the mental capacity of the defendant. How has the judge to behave if the experts, referring to different doctrinal orientations, conclude that the defendant is fully capable, half capable and totally incapable respectively? Can the judge refer, for example, to the *Cozzini* requirements?

The problem arises because most of these requirements seem to be of scarce utility. Given that each of the theoretical models applied by the three experts is varyingly consolidated, «valid", and disputable, it will probably result similar to the others in terms of identity, authority and independence of its author, as well as its scope, precision, and the degree of empirical corroboration of its results. The point is that, unlike in *Cozzini* (and *Daubert*), in this case we are in the presence of no competing science and pseudoscience but of approaches based on theoretical and ideological points of view that are different and to some extent even incommensurable. A way out consistent with fundamental principles of the criminal trial, starting from that of PRD, could be to favour the scientific model most beneficial to the defendant. Of course, this solution could be followed, as long as the expert in the trial has applied this model correctly and appropriately to the case.

5.3.3. Working logic of the evaluation of epistemological reliability

This problem reflects the complex relationship between the requirements established by both *Daubert* and *Cozzini*, which in turn depends on two factors. *Firstly*,

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[138] Sadock, B.J., Sadock, V.A., Ruiz P., 2017: VII.

[139] Comer, R.J., 2015: IV.

[140] American Psychiatric Association, 2013. For a criticism of the DSM approach, because of its Neopositivist hallmark, see Aragona, M., 2013.

[141] Jaspers, K., 1996.

[142] Comer, R.J., 2015: III.

this relationship differs from any of the relationships between the features required for a quality to be subsistent. In fact, for the epistemological reliability of an expert opinion to be subsistent:

a) none of the above-mentioned requirements is essential as such (not a singly necessary condition);

b) none of them is enough as such (not a sufficient condition);

c) it is not indispensable that they all be met (not jointly necessary conditions);

d) it may not be enough that they all be met (not jointly sufficient conditions).

Therefore, the quality of epistemological reliability seems to be «typologically determined"[143]. By «typologically determined quality» I mean a quality conceived as protean, namely capable of being realised in infinite ways due to its gradability. Conceiving a quality as protean is an ideal choice, which aims to reflect this phenomenological infinity, and therefore to avoid the limits resulting from a definition in terms of a set of necessary and sufficient conditions.

In particular, conceiving epistemological reliability as a typologically determined quality[144] has two very important corollaries. On the one hand, it can be neither ascribed nor denied categorically, but only to a certain extent, depending on the concrete features of the expert opinion to be evaluated. On the other hand, one cannot predetermine these features once and for all but only establish the most important on the basis of their paradigmatic value; for example, even general acceptance of the expert opinion by the specialist community is neither necessary nor sufficient, as this community could be a gang of quacks. This conception of epistemological reliability underpins *Cozzini* (and *Daubert*), which more or less explicitly assert that the requirements they established are neither exhaustive nor exclusive.

The *second* reason why the working logic of the requirements for epistemological reliability is quite problematic is that here emerges a «squared complexity». In fact, what is typologically determined, and therefore gradable, is not only epistemological reliability but also each of the features on which it depends. For example, the extension and precision of a research are never subsistent in categorical terms but always to some degree.

Both these factors mean that the evaluation of epistemological reliability is flexible and demanding. The judge has to ascertain:

A) what the features of the expert opinion are, and to what extent;

B) for each one of these features, whether it is relevant in the abstract for an expert opinion to be deemed true;

C) what epistemological reliability arises from the set of features that emerge.

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[143] On this concept, see Carlizzi, G., 2016: 97-100.

[144] From a similar standpoint («*Reliability as Non-Binary*»), see Nance, D.A., 2003: 198-201.

The latter step is the most complicated, as the judge cannot calculate the degree of each emerged feature and add it to the degrees of the others. He has rather to «think synthetically", establishing whether the emerged features support each other, as every one of them, being either paradigmatic or intense, amplifies the virtues and resizes the defects of the others. For example, although an opinion has been proposed by an expert who is *not wholly* independent, it may be thought *highly* epistemologically reliable by the judge, as it relies on *broad* experimental research and is shared by the *majority of* scholars in the field [145]. In short, in carrying out this evaluation, the judge cannot count on *protocols* established *beforehand* but only on the *arguments* emerging *during*.

5.3.4. Specialist proof beyond any reasonable doubt

As seen in § 3.2, the principle of PRD demands the judge apply not only a specific rule of *decision* but first of all a methodology of evidential *evaluation*. Given that both the *Cozzini* (and *Daubert*) requirements guide the judge in his *assessment* of the expert opinions, which are necessary to *ascertain* the specialist aspects of the case, one can finally ask how these requirements fit into the positive discipline of evidence. This issue must be broken up in two questions. What role do the above-mentioned requirements play within the methodology of evidential *evaluation*? To what extent must they be met to *prove* the charge beyond any reasonable doubt?

Concerning the *former* question, we must first of all recall and specify the methodological principles of evidential evaluation (see above, introduction and § 3.2.3). The judge has to assess the *probative value* of the evidence emerging at trial, namely *whether* (reliability) and, in the affirmative, *how much* (cogency) it can contribute to ascertaining the charge. The models of both assessments are similar, relying as they do on the idea of testing a hypothesis against the counterhypotheses (eliminative induction). In the first instance, the hypothesis to be tested is that the expert has told the truth, and the judge has to verify the features normally recurring when evidence of the kind under consideration is reliable. In the second instance, the hypothesis to be tested is that the charge is true, and the judge has to establish whether the facts the evidence refers to match the facts normally recurring when cases similar to the charge actually occurred. On the other hand, each expert opinion, as information, is evidence, so that it has to be treated in the described manner. In particular, the evaluation of reliability of an expert opinion is regulated by the *Cozzini* (and *Daubert*) requirements, which do no more than indicate the features normally recurring when this kind of information is reliable. Given that epistemological

[145] A conflict between the requirements of epistemological reliability illustrated here could emerge in the field of HIV. Indeed, while almost all scientists assert that this virus causes AIDS, a *renowned* professor, who teaches Molecular and Cell Biology at the *prominent* University of California, Berkeley, has criticized this assertion in *specialist journals*, relying on some principles of *scientific methodology* (the postulates of Koch and Henle, as well as six cardinal rules of virology): Duesberg, P., 1988.

reliability is a *gradable* quality (see § 5.3.3), only if the judge considers the expert opinion epistemologically reliable *enough* can he take it as true and thus proceed to the assessment of its probative *cogency* as well as the probative *sufficiency* of all the (specialist and common) evidence.

This remark introduces the *second* question, concerning the extent to which the *Cozzini* (and *Daubert*) requirements must be met to *prove* the charge beyond any reasonable doubt. The issue arises because the BARD standard regulates the probative sufficiency of *all the collected* evidence and not a *single* item such as each expert opinion. Nevertheless, the principle that underpins this standard, namely the principle of PRD, *in general terms*, demands optimal certainty of the criminal proof. Therefore, the *BARD standard* has to influence *every* stage of the evidential judgement, including the evaluation of epistemological reliability. This means that the judge may consider an expert opinion true only if it is *fully reliable*. According to the above-illustrated conception of PRD (see once again 3.2.3), this full reliability has to be understood not in psychological but *methodological* terms. The judge may consider an expert opinion as fully reliable if he, on the one hand, *verifies* to a high degree the most important features that information of this type has when it is true, and on the other hand, he *has good reason* to believe that the possible weakness of these features and lack of additional ones have a *neutral* significance. The latter test is surely the most difficult. Let us assume that a chemist proposed as an expert by the defendant's lawyer in a trial for murder by poisoning is *relatively well known* in his specialist community, gives an opinion relying on *strong experimental* findings, and appears to be *not wholly independent* because he works for a company whose CEO is the defendant. The expert opinion could be considered as fully reliable from the second point of view but not the first and the third (not to mention the *lack* of further possible requirements), unless there are reasons to believe that these *weaknesses* do not signify the falseness of the expert opinion. Thus, the defence could point out to the judge that the expert:

i) *is not* very well known because of his age (40 years old) but *is expected to become* very famous, considering the growing recognition he is earning in his specialist community;

ii) *appears* to be not wholly independent but *in reality* this is not the case, given that his employment contract is expiring in a week's time;

iii) has reached, with regard to the case, experimental findings that are *not only* strong *but also* undisputed among his colleagues.

In this case, like in any other, the judge has obviously to assess at the same time the opinions of possible other experts present at trial, as the reliability of each expert opinion depends, to some extent, on that of the others. In conclusion, according to the rule on the burden of proof arising from the principle of PRD, the judicial decision of a specialist question of fact can result in one of the following outcomes:

A) if *none of the parties* introduces an expert opinion that is *fully* epistemologically *reliable*, the specialist aspect of the case is not proven at all, and the defendant must be acquitted;

B) if *only the defence* introduces such an opinion, the specialist aspect is totally disproved, and the defendant must be acquitted;

C) if *both parties* introduce such opinions (this can happen especially in the field of pluralistic disciplines), the specialist aspect is not proven beyond any reasonable doubt, and the defendant must be acquitted;

D) if *only the prosecutor* introduces such an opinion, the specialist aspect is proven beyond any reasonable doubt, and the defendant must be convicted (while it would be irrelevant for the defendant's expert to present a modestly or even scarcely reliable opinion).

5.3.5. Judicial practicability

The question of whether the judge can really check the epistemological reliability of an expert opinion was first raised in *Cozzini*, where the Corte di Cassazione remarks that it is «aware of entrusting the trial judge with a very demanding task» but optimistically adds that such a judge will have «already shown himself capable of managing complex and cyclopic cases».

One might object that a trial judge cannot actually verify the requirements established by *Cozzini* (and *Daubert*), since this verification presupposes critical skills that he, on the one hand, usually lacks due to his principally legal background, and on the other hand, can hardly achieve due to his very heavy workload.

Both objections deserve to serious consideration. Concerning the first, given that the critical skills that a judge needs are epistemological and not scientific, the question can be reformulated as: is the training received before and after becoming a judge enough to acquire *epistemological competence*? Of course, the answer varies depending on the national system considered. In Italy, this training is traditionally of a dogmatic stamp: aspiring and working judges have above all to know how statutes, doctrine, and case law define concepts such as «source of law», «sale contract», «administrative act», «murder» and so on. This state of affairs has been changing over the last few decades, as subjects like the «theory of legal argumentation», «legal logic», and similar have become a central part of university and professional training. The change is significant, because, as seen above (§ 5.1), in order to become a gatekeeper of scientific knowledge, it is not necessary to be a good scientist but a good critic of scientific assumptions. Nevertheless this is not, in itself, sufficient[146], as these methodological studies are: a) of short duration or even sporadic, so they lead to the acquisition of

[146] For critical remarks and reform proposals about the legal background in Italy, see the articles collected in Pasciuta, B., Loschiavo L., 2018.

only the rudiments of legal reasoning and not a strongly critical attitude; b) usually geared towards normative rather than evidential reasoning, so epistemological competence is not a central point; c) not mandatory for aspiring and professional judges, so the above-mentioned rudiments are anyway destined to fade into oblivion. Under these circumstances, it will be necessary to set up further initiatives. Thus, subjects such as «legal epistemology» and «specialist evidence» should be taught more intensively at undergraduate and graduate level on courses for future judge and working judges. More specifically, while «*legal epistemology*» should address the theoretical concepts (e.g.: assessment, evidential criteria, statistical likelihood, corroboration of the charge, and the standard of proof) and models of reasoning (e.g.: abduction, deduction, induction, analogy, Bayes' Theorem) underpinning the evidential judgement, «*specialist evidence*» needs to address the main issues concerning both the collection and assessment of scientific and technical information (e.g.: observance of chain of custody in DNA evidence, and the reliability of expert opinion). Neither of these subjects should be taught in the abstract but with constant reference to case law. On the other hand, working judges should be provided with textbooks on the sciences and techniques more frequently involved in deciding legal cases; these volumes would serve as a guide to the most commonly held theories in each field of discipline. A good model in this regard is the well-known *Reference Manual on Scientific Evidence*, which was promoted for the first time in 1994 in the USA and reached its third edition in 2011[147]. It consists of fifteen Chapters, related, among other subjects, to «Forensic Identification Expertise», «DNA Identification Evidence», «Estimation of Economic Damages», «Epidemiology», «Toxicology», «Medical Testimony», «Neuroscience», «Mental Health Evidence», and «Engineering».

Of course, improving this kind of competence should be promoted also through organisational measures. This remark recalls the second aforementioned objection, concerning whether the check of epistemological reliability of expert opinion can actually be carried out by judges (like the Italian ones) with a very hard workload. In this regard too, the measures to adopt are numerous. In particular, on the one hand, the judicial workload should be «sustainable»[148] so as to allow judges to review all the evidence collected and study the epistemological (as well as normative) issues it raises. On the other hand, the organisation of judicial offices should be basically shaped also on the basis of the heterogeneous nature of specialist evidential questions. So, as every Court is divided into several Sections, and every Section is in turn divided into several Panels, each Section might be entrusted with cases involving certain kinds of crime (e.g.: negligence), and each Panel with certain kinds of specialist evidential questions concerning this kind of crime (e.g.: medical responsibility, traffic accidents and so on).

[147] Federal Judicial Center, National Research Council of the National Academies, 2011.

[148] On this topic, Castelli, C., 2015.

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