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Epistemology of the European identity

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1. The legal regulation of science

Since the end of World War II, philosophy and sociology of science have progressively stressed the non-neutral character of scientific knowledge and the social connotation of the scientific community. They have also questioned the fact that, as it takes on a tangible shape in laboratories, industries and institutions, science is a special kind of knowledge.

Oddly enough, legal scholars have continued to have a more traditionally positivist vision of science. Starting with the origins of modern thought, the philosophical-political and legal disciplines saw the statute of science as having bases of neutrality and objectivity, which appeared irremediably lacking in political and legal systems. From the logical constructions of legal scholars to the political use which conceptions of a liberal matrix have made of the ideal of the 'republic of science' - the level of democracy intrinsic to the scientific community - the preferential possibility which scientific method has offered social sciences to emancipate themselves from value judgements and subjective opinions has been widely explored.

This conception has been accompanied by substantial a-historicity and abstraction in the way it looks at both science and law. In this perspective, science is considered both as the ultimate methodological referent and as a separate entity within society; hence any parallel between the scientific system and the legal system may be seen only as a remote exchange between forms of 'knowledge' with substantially incommensurable and non-communicating methodologies and goals.

However, the criticisms raised against this vision of science as a methodological paradigm for political and legal theories have failed to touch the hypothesis of the separateness of science, which, even within such perspectives, continues to appear as a self-contained form of knowledge.

By and large, this approach has also influenced the legal regulation of scientific activities and products. Since science is considered an independent social institution which uses objective criteria to determine which knowledge may be deemed valid in a given situation, the law which interacts with science to regulate it is conceived of essentially as a "technical norm" bound to acknowledge a-critically knowledge ascertained and evaluated elsewhere.

The legal translation of scientific propositions is often thought of as a value-free activity, either because it boils down to a mechanical operation -consisting, that is, of the assumption of facts supplied by science as content of norms - or because, de facto, it does not discuss the actual heterogeneousness of the two systems involved. Here, legal qualification is considered

as value-laden, but only in relation to its internal semantic, which fails to affect scientific knowledge as such.

Moreover, until quite recently -until the late Sixties to be precise, if environmental problems do involve a substantial change in relationships between science and law, the scientific content of legal norms was somewhat modest and there was no apparent reason to question the neutrality and certainty of the science which informed marginal technical sectors of legal systems.

When they adopted the hypothesis of the separation of science from law, positive-legal doctrine and legal-philosophical reflection failed to consider that such a conception is implausible when we consider the institutional procedures and social practices with which the two systems produce and actuate their respective forms of knowledge. If we analyse their concrete effectiveness, we see not only that the methods applied are different from those theorized, but also, and above all, that the boundaries between scientific and legal epistemology, and also between the 'facts' of science and the 'values' of law, become blurred.

The last few years have seen the radical subversion of the conditions which made the neutral and separate relationship between science and law tenable to be theorized. The scientific activities and products subjected to the scrutiny of law have increased exponentially, and ambits have appeared in which science has at once created risks and proved largely incapable of controlling them. The technical-scientific component has increasingly constituted the cognitive content of norms, but the number of situations is increasing in which law has to fill cognitive gaps, since scientific data prove uncertain, insufficient or susceptible to sharply diverging interpretations

On the one hand, the strong presence of scientific learning in subjects of normative competence means that it is necessary to explore relationships between science and law - over and above any reflection on technical norms - as an intersection between scientific and legal concepts and qualifications. On the other, the indeterminate or uncertain character of much scientific knowledge poses the problem of which specific normative choices have to overcome the gaps left by science.

The emergence of risks and uncertainties that result from the social implementation of science has brought to light a dual need. In the first place, it is necessary to broaden consultation with scientists, wherever divergences of opinion emerge vis-à-vis the possible occurrence of potentially harmful events. In the second place, an opportunity arises to involve citizens more in science-based decisions which affect civil society directly.

In fact, though the possibility of accessing a multiplicity of information sources has grown, most of the scientific data on which experts base their judgements are not really accessible to citizens, either because they may simply be not available or because they may be expressed in a highly specialized language. What citizens have to do, de facto, is to subscribe to a tacit fiduciary agreement with the official depositaries of scientific knowledge. After all, for civil society the directly testable side of the assertions of scientists consists not in the validity or validation of scientific affirmations, but in their social credibility. However, the reliability of

the 'voice of science', which tangibly determines the choices and evolution of society, has thus far been essentially at one with the undisputed authority of science itself.

The term *trust* (not to be confused with *confidence*) [1] has become the benchmark concept for numerous surveys of the attitude or perception of citizens vis-à-vis the scientific knowledge which informs public policies. The numerous studies devoted to the public's understanding of science have revealed that the growing unwillingness of citizens to trust experts and rely on their choices cannot simply be labelled as irrational, but stems from a multiplicity of reasonable and concrete considerations.[2]

Part of the public's lack of confidence in experts stems from the limited possibility of accessing information, of finding visibility and transparency in the experts' choice procedures, of checking the credentials and possible conflicts of interest of the experts involved, of knowing and comparing different opinions, of controlling the content and form of technical and scientific decisions.

Changes which have taken place in the relationship between science and society are leaving a profound mark on institutional arrangements and on all the rights which are linked to the social contract notion, in particular the idea of the state under the rule of law. The powers recognized to citizens in *lato sensu* liberal-democratic governments has been prevalently that of combining to determine the political orientation by voting. More recently, the need to make decision-making procedures within institutions more visible and transparent has proved a further form of (at least potential) participation in government action through what has been recognized as the citizens' 'right to know'.

The set of guarantees which is part of the definition of the state under the rule of law has yet to touch upon the specific guarantees with regard to the knowledge-power of science, which has become such an important part of legal and governmental choices. In so far as they are deemed an expression of objectivity and methodological neutrality, the appointment of

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[1] Cf. The TRUSTNET Framework, *A New Perspective on Risk Governance*, September 1999 http://www.trustnetgovernance.com/library/pdf/Eframework.PDF, in which a distinction is drawn between *confidence* and *trust* : "Confidence is the everyday relation between a person and an organisation or a system. It is the usual attitude that we adopt for instance when we take a plane or when we put a letter in the post, or when we go to a restaurant. (…) Social Trust is a relationship between individuals within an existing or emerging group. It takes place in situations where individuals depend on people they trust to achieve important projects entailing significant risks for them. When we undergo a risky operation for instance, we need to trust the medical team. Social trust entails the risk of the other person. We trust someone because we feel that he is in some way similar to us. We can trust him for many reasons: because we share common concerns or political views, because we are from the same community, because we share cultural values, religion, etc. Social trust implies a personal choice and entails a risk resulting from the freedom of the trusted" (pp.30-31).

[2] A. IRWIN, B. WYNNE (eds), *Misunderstanding science? The public reconstruction of science and technology*, Cambridge University Press, Cambridge 1996; HOUSE OF LORDS, *Science and Technology, the 3rd Report*, February 2000; P. JENSEN, *Public Trust in Scientific Information*, IPTS, 14.9.2000, http://governance.jrc.it/publicperception/ipts.pdf

experts, the setting up and working of scientific and technical committees did not raise a major concern in terms of the protection the state offers its citizens.

Today the need to introduce specific guarantees and rights and also to promote greater democratic participation by civil society concerns specifically the regulation of science, an ambit from which citizens have, to date, been virtually totally extraneous.

The complexity of the effects which result from the mixture of the social spread of science and the existing legal rules in the dynamic interplay of reciprocal production and modification (co-production) [3] is giving rise to original new forms of scientific-legal knowledge with respect to which the very notion of epistemology appears limiting. [4]

Apparently the description of this process as a contrast between positions pro and contra science by no means captures its significance and direction. The significance and direction of this process do not consist of or move in the direction of a limitation of science and the freedom of scientists – if this freedom is ethically qualified and not interpreted as a simple expression of will. It is rather a question of favouring a deeper understanding of complex links between science and society, identifying the modes and procedures most suitable for determining the scientific-technological choices that underlie social transformations.

2. The American model as science-based regulation

If the problem of the regulation of science is spreading in all countries along with processes of globalization, the answers that have been given to it so far are extremely diverse, especially in terms of the relationship between Europe and the United States.

The most discussed element of diversity seems to be the more science-based character, more rigorously and objectively informed by scientific facts and knowledge, of the legal regulation of science in the United States. The procedures and standards of US federal agencies have stood for a model of rigour and seriousness.

But if the firmly science-based US conception of the relationship between science and law is still dominant (at the governmental level and in most theoretical reflection), considered as a whole, relations between science and law in the US may be described as a much more complex phenomenon.

The two studies conducted by Sheila Jasanoff on how experts (in federal agencies, in technical-scientific commissions and in testimonies produced in trials) formulate their opinions [5] and on the role played by US courts in the regulation of science,[6] reveal how, behind the positivistic, technocratic approach whereby science 'speaks truth to the power', [7]

[3] S. JASANOFF, *Science at the Bar. Law, Science, and Technology in America*, Harvard University Press, Cambridge Mass. 1995.

[4] S. JASANOFF, *Beyond Epistemology: Relativism and Engagement in the Politics of Science*, "Social Studies of Science" 1996, Vol. 26, No. 2, pp. 393-418.

[5] S. JASANOFF, *The Fifth Branch. Science Advisers as Policymakers*, Harvard University Press, Cambridge Mass. 1990.

[6] S. JASANOFF, *Science at the Bar*, cit.

[7] S. JASANOFF, *The Fifth Branch. Science Advisers as Policymakers*, cit., p.16.

scientific knowledge, practices and products are, de facto, stabilized in social life through complex activities of mediation and negotiation. Careful analysis shows that experts' opinions, albeit declaredly neutral, are always intimately connected to the assumption of particular premises and evaluations, hence inseparable therefrom.

For their part, faced with science's claims to objectivity, judges have deliberately staked out an autonomous space of their own. Based essentially on judicial power, the American legal system tends naturally to consider all parties in trials (including experts called to testify) as stakeholders. This situation has allowed judges to deconstruct the different theses put forward by the different parties, even when they are backed up by scientific validation. This function of courts became manifest in the *Daubert v. Merrell Dow Pharmaceuticals* case in 1993,[8] when the Supreme Court decided that the consolidated criterion of the scientific community's general acceptance [9] - expressed largely through peer reviews- constituted only one of the possible elements that qualify hypotheses as scientific. The Court argued that judges are free to allow to testify as an expert anyone who, albeit without the official acknowledgment of the scientific community, demonstrates possession of scientific knowledge and methods (arguing, that is, hypotheses that are falsifiable and susceptible to testing).

The particular thesis argued in *Daubert* has been widely criticized both because it is poorly articulated, and because it continues to a-critically accept the peer review mechanism, adding to existing criteria the discretionary power of judges. Nonetheless, according to Jasanoff, the role claimed by courts is appreciable and shows how American judicial mechanisms possess potential for self-reflection and represent deliberative arenas in which all interests have the possibility to emerge.

Last but not least, another element which partly mitigates the accentuated American leaning towards science-based regulation is represented by the opening-out and visibility of regulation procedures. This approach materialises mainly through the publication of regulation projects and guidelines designed to make public comment possible. Transparency and opening-out to public comment on the one hand, and judicial deconstruction on the other - these are the methods used in the United States to seek to maintain a vital contact between science and society.

3. The governance of science in Europe: policy-related science

Over the last few years, many of the questions linked to the conception of scientific knowledge have attracted the attention of European institutions.[10] Emergencies resulting

[8] *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579 (1993).

[9] This rule was established in 1923 in *Frye v. United States* (Court of Appeals of District of Columbia 54 App. D.C. 46; 293 F. 1013; 1923 U.S.), and has since been known as the *Frye* rule. This is the principle whereby the admissibility of evidence based on scientific knowledge derives from the fact that that knowledge 'be sufficiently established to have gained general acceptance in the particular field to which it belongs'.

[10] See COMMISSION OF THE EUROPEAN COMMUNITIES, *Governance and Expertise*, 2000, http://governance.jrc.it/.

from inadequate or ineffective legal regulation (e.g. in the field of food safety) have certainly shaken European countries at their foundations.

The phenomenon which Europe is now experiencing and seeking to remedy is a crisis among citizens and institutions. This crisis has grown particularly evident in the lack of confidence in the capacity of the institutions to regulate science and the reliability of experts to provide sound knowledge.

As far as the governance of science is concerned, Europe has to overcome a crisis of trust among its citizens, who appear aware of the errors that have been committed at both national and community level - despite attempts to write off the negative attitude towards experts and science as a mere matter of ignorance. [11]

Recurring events in which experts have appeared incapable of taking control of situations of scientific uncertainty and in which errors of evaluation and interests in conflict with the safety and health of citizens have sometimes emerged have made the problem of public distrust towards science crucial, whenever science is directly involved in public policy decisions. Recent events in Europe are underpinned by the weakening of the capacity of scientists and technicians in administrative and governmental structures to be reliable and to be accountable for arguably avoidable events.

Nonetheless, the innovative character of the European reflection on the epistemology that has to inspire the governance of science is not only a pragmatic response to the political need to create sufficiently homogeneous and standardized decision-making processes in scientific and technological questions characterized by high uncertainty. Beyond this, it is possible to note the theoretical effort to elaborate an epistemological position in which it is possible to recognize science policy in Europe.

Emergencies are not the sole feature of European scientific regulatory issues. What is now taking shape is the foundational aspect which the interpretation of the relations between science and law may acquire in the construction of the European identity. True, many lacks of homogeneity in the international regulation of science need to be filled. If globalization processes impose the harmonization of standards and procedures, this does not diminish the importance of a peculiar European 'epistemological cipher' in the reflection on connections between science, law, and democracy.

Many European countries and EU institutions are elaborating an epistemology - or, more properly speaking, a model of governance of science incorporating a conception of science, institutions, society and law to regulate these relations. The decisions adopted on the transparency and publicity of the committees that assist European institutions (in particular

[11] S. FUNTOWICZ, I. SHEPHERD, D. WILKINSON, J. RAVETZ, *Science and Governance in the European Union: a contribution to the debate*, http://governance.jrc.it/jrc-docs/spp.pdf (also published in "Science and Public Policy" 2000, vol.27, 5, pp.327-336); the subsequent citations are from I. SHEPHERD (ed.), *Science and Governance in the European Union. A Contribution to the Debate*, March 9, 2000, 2000 EUR 19554 EN, http://governance.jrc.it/scandg-eur.pdf; O. DE SCHUTTER, N. LEBESSIS, J. PATERSON (eds), *Governance in the European Union*, Office for Official Publications of the European Communities, Luxemburg 2001, http://europa.eu.int/comm/cdp/cahiers/resume/gouvernance_en.pdf

the European Commission) - the so-called comitology issue [12] - the problematic nature and improvement of public perception of science, the need to make the citizen's right to know and participate in science-based decision effective are elements of this model. So what proposals are being put forward to reveal and shape the epistemological identity of Europe?

In July 2001 the European Commission published the White Paper on European Governance,[13] which addresses problems connected with the reform of governance methods in Europe in an attempt to improve democracy. The term governance alludes to a system of government which actively pursues, among other things, the concrete involvement of citizens to make up for the lack of democracy of which European institutions have been accused (though similar problems also occur in democracies at national level). As the document states, "What is needed is a reinforced culture of consultation and dialogue; a culture which is adopted by all European Institutions and which associates particularly the European Parliament in the consultative process, given its role in representing the citizen". [14]

However, the scope of the document goes beyond Europe, in the effort of contributing to global governance: "The White Paper looks beyond Europe and contributes to the debate on global governance. The Union should seek to apply the principles of good governance to its global responsibilities. It should aim to boost the effectiveness and enforcement powers of international institutions". [15] To that end, five principles are stated as the normative framework that has to inspire the reforms: openness, participation, accountability, effectiveness, coherence.

As to the governance of science, the document stresses the importance of the role which law plays for science within the EU framework. The role would appear to be a particularly important one in so far as, in comparison with national political systems, the European Union works more on the definition of a normative framework than through economic interventions.

The White Paper on Governance has instituted twelve working groups, two of which closely related to the subject under discussion here. They are: Group 1b, responsible for formulating proposals designed to democratise scientific expertise, especially in the sectors of health and

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[12] COUNCIL DECISION *1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission*, Official Journal L 184, 17.7.1999 p. 23-26.

[13] COMMISSION OF THE EUROPEAN COMMUNITIES, *European Governance. A White Paper*, Brussels, 25.7.2001, COM(2001) 428 final, http://europa.eu.int/eur-lex/en/com/cnc/2001/com2001_0428en01.pdf. A first draft was released in October 2000.

[14] COMMISSION OF THE EUROPEAN COMMUNITIES, *European Governance. A White Paper*, cit., p.16.

[15] *Ibidem*, p.5.

safety; [16]and Group 2b, responsible for initiatives connected with participation in civil society.[17] Group 1b's activities are linked to two necessities mentioned in a passage in the document. "On the one hand, it is necessary to make this knowledge more accessible, not just technically transparent. On the other, it is necessary to create a system of scientific reference parameters which have sufficient effect and authority on a European scale and can be applied in the various national contexts".[18] Group 2b is, instead, designed to study and develop the 'right to participate' of citizens, and seeks to extend to other sectors what the UN/ECE Convention, signed at Aarhus in 1998, has established in terms of public access to information, the decision-making process and environment-related judicial procedures.[19] The new epistemology that European institutions - partly thanks to the reflections of single European countries, [20] with their democratic traditions, but also under the thrust of circumstances that have highlighted the lack of democracy in decision-making mechanisms - are seeking to build and implement substantially joins the need for more democratic science and a more participatory democracy.

The theoretical and practical elements of this project may be summed up as follows. If, as I have said, it is an intellectualist exercise to seek to separate and treat as distinct enterprises science and society – especially when the aim is not to analyze the abstract methodological statute of scientific propositions, but to see how scientific knowledge is sedimented through existing institutions – it is also necessary to observe that policy-related science must be conceptually distinct and have different aims from both pure and applied science. [21] Pure

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[16] WORKING GROUP 1b, *Report "Democratising Expertise and Establishing Scientific Reference Systems"*, Pilot : R. Gerold, Rapporteur: A. Liberatore, May 2001, http://europa.eu.int/comm/governance/areas/group2/report_en.pdf. The Commission will publish from June 2002 guidelines on collection and use of expert advice in the Commission to provide for the accountability, plurality and integrity of the expertise used.

[17] WORKING GROUP 2a, *Report "Consultation and Participation of Civil Society"*, Pilot : L. Pavan-Woolfe, Rapporteur: M Kröger, June 2001, http://europa.eu.int/comm/governance/areas/group3/report_en.pdf.

[18] COMMISSION OF THE EUROPEAN COMMUNITIES, *European Governance. A White Paper*, p.7. See also: RSC HARVARD LAW SCHOOL, *Responses to the European Commission's White Paper on Governance*, http://www.jeanmonnetprogram.org/papers/01/010601.html

[19] UN/ECE, *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, Aarhus, Denmark, June 25, 1998, art.1: " In order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being, each Party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention".

[20] HOUSE OF LORDS, *Science and Technology, the 3rd Report*,cit.; *Colloque International "Science et Société"*, Intervention de Roger-Gérard Schwartzenberg, 30 novembre 2000 – Paris – La Sorbonne, http://www.recherche.gouv.fr/discours/2000/dsciesic.htm

[21] I. SHEPHERD (ed.), *Science and Governance in the European Union. A Contribution to the Debate*, cit., p.15.

science is mostly guided by the researcher's curiosity, whereas applied science is oriented by a project and looks for particular practical outcomes. Policy-related science, on the other hand, has to help define questions which, in so far as they have to be applied socially, are tied to broad evaluations and demand a political choice - even when they present themselves as scientific-technical problems.

As a recent French report stressed, policy-related science is still waiting to have an adequate epistemological statute. The definition of this statute certainly entails a hybridization between scientific knowledge and political-legal choices, which, in the words of the French report, has to give life to science that is "public, civic and legitimately governed". [22]

To a large extent, the methods of this hybridization have still to be explored. An interesting case in this respect is the principle of precaution which is the subject of constrasting opinions and an example of the distance that still exists between the United States and Europe in terms of the way in which they conceive the regulation of science. In February 2000, the European Commission produced a document [23] which seeks to clarify and make this principle operational. Having emerged as a regulatory criterion for environmental law, and having become a general principle for the health of human beings, animals, plants and the environment, the precautionary principle provides indications for the political-legal treatment of scientific uncertainty, establishing that the gaps created by scientific uncertainty be filled with measures designed to protect citizens. The need for law to intervene with measures to protect citizens, even if the possible occurrence of a damage has not been certified with full scientific certainty, is a symptom of an important change in the epistemology that underlies the legal regulation of science. This is a passage from an a-critical vision of scientific knowledge assumed as objective and certain to a position aware of the non-neutrality of scientific propositions. By and large, this is the position adopted in the US regulation of uncertainty, where 'precautionary measures' for handling situations of uncertainty consist of adopting special safety norms, which allow risky or uncertain behaviour to become under control.

Wherever the scientific community is uncertain or divided, the European Commission's proposal is not to cover up the uncertainty with the presumed certainty of technical measures devised to hide the impasse of science. On the contrary, it feels that the impasse must be brought to light and become the object of a political decision. When we acknowledge the impossibility of deciding on the basis of mere scientific knowledge, it says, the valuational context has to be extended to competences and subjects other than experts in the field.

The principle of precaution is an *in fieri* example of a policy-related way of interpreting scientific knowledge. The tangible interplay of the scientific evaluation of a problem, the weight to be attributed to uncertainty, the contribution of a multiplicity of players in both

[22] *Colloque international "Science et Société"*, cit.: "désanctuariser la science, pour rendre la science publique, repolitiser la science, pour développer une science citoyenne, détechnocratiser la science, pour avoir une science légitimement gouvernée".

[23] COMMISSION OF THE EUROPEAN COMMUNITIES, *Communication from the Commission on the precautionary principle*, Brussels 2.2.2000, COM(2000)1.

science and social evaluation, and, finally, the translation of all these elements into legal-political decisions and norms - this is the challenge but also the intellectual appeal of the construction of new epistemological-normative concepts.
As far as the determination of the meaning and scope of the scientific contribution in policy-related science is concerned, a pluralistic scientific expertise is needed. In the event of risk assessment, this extends to all experts in the field. Pluralistic expertise is necessary for a variety of reasons. As Lebessis and Paterson have noted:

"Pluralistic scientific expertise is, therefore, needed essentially for three reasons. First of all, it is required in order to make scientific decision-making more responsive. To be clear, it is not a question of holding scientific rationality hostage to irrational fears and unfounded concerns. Rather, it is a matter of reconnecting science and society as a means of coping with such fears and concerns. Secondly, such a pluralistic approach is needed in order to help transcend the boundaries of segmented scientific expertise. (…) The aim, therefore, is to improve communication between disciplines. Whether between such disciplines or between science and society, the third reason that pluralistic scientific expertise is needed is precisely to encourage the systematic exposure of unspoken or even unexamined assumptions and uncertainties underlying both expert and lay opinion. The aim is thus to render political those choices which have traditionally been regarded as a matter purely for experts, irrespective of the extent of their ramifications and the scale of their error costs". [24]

It appears advisable not only to review the concept of expert opinion, but also to rethink the notion of 'expert' itself, which once referred to a narrow conception including only insiders in scientifically defined disciplines, but now extends to a multiplicity of differentiated forms of knowledge and practices. [25] It is also necessary for experts to openly acknowledge situations of scientific uncertainty even where this may create a situation of inconclusiveness that makes decisions more difficult.
As Shepherd has observed,

"in the provision of information for the policy purposes, science must simply do its best, even if its products are inadequate, by the criteria both of its field and of its clients' needs. Policymaking cannot wait for conclusive facts, in science-related fields any more than in others; and part of the art of policy is to make do with inadequate, confused and contradictory information. (…) Instead of providing 'scientific facts', the objective of the extended peer review process is to deliver uncertainties, error-costs, and also the social and ethical dimensions. (…) By "knowledge assessment" we understand the complex processes of quality assurance, operating on the equally complex processes of the production of that knowledge. The two processes, while distinct conceptually, are inseparable in practice. This is a change from previous practice where quality assurance was principally a matter of evaluating research reports through journal refereeing, and of research proposals through peer review. Now we

[24] N. LEBESSIS, J. PATERSON, *Recent developments in institutional and administrative reform*, in O. DE SCHUTTER, N. LEBESSIS, J. PATERSON (eds), *Governance in the European Union*, cit., p.287.
[25] Cfr. S. JASANOFF, *The Fifth Branch. Science Advisers as Policymakers*, cit.

must appreciate how all the aspects of science in the policy context, technical, social and ethical, are involved in its assessment as well as in its practice". [26]

The way in which scientific knowledge, thus predisposed, has to be translated into a legal-political choice are what connect work on expertise to the need to elaborate new decision-making processes for science-based decisions. The proposals advanced in the framework of European reforms indicate a way of substantial change in the involvement and participation of the public.

Continental legal systems, primarily based on statute laws - the case of the EU - do not rely on judicial power as expression of conflicts as common law systems do, or in any case not to a comparable extent. Continental law is, by its very nature, more inspired by the pursuit of a preventive consensus. This, however, is not always achieved due to the difficulty in giving space to, and sometimes recognizing in advance, all the possible elements of conflict, especially vis-à-vis situations as new as those continuously elicited by scientific-technological development. Forms of bargained legislation in which representatives of different interests (such as NGOs or consumer protection organisations) are allowed to participate giving voice only to well-structured sectors of civil society, but fail to reach the general public in the normative process.

Hence, the next step is to find ways of reaching the public and involving it in the formation of the regulatory framework. This attempt to reach civil society in a more diffused way involves, for example, trying to go beyond the simple and now limiting identification of stakeholders as official representatives of public interests. If, in fact, the voice of holders specific interests with well defined roles in society is important for certain ends and constituted the first step towards citizen access to government, limiting the definition of the public to such players means allocating them excessive power, distorting or opacifying certain instances and preventing the expression of needs and interests not yet expressed or aware or more transversally connoted in social dynamics.

Another interesting point which is emerging is awareness that the forced pursuit of public consensus may distort the debate and the regulation process,[27] that is to say an attempt to transform the need for participation into a marketing manoeuvre designed to acquire consensus. These proposals for the legal regulation of science have been defined by some authors as a 'cognitive proceduralisation' of law'. This is "the putting in place of mechanisms which enable learning processes to be generated at collective level to manage the uncertainty linked to contexts of bounded rationality". [28]

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[26] I. SHEPHERD (ed.), *Science and Governance in the European Union. A Contribution to the Debate*, cit., p.16-17; 15.

[27] Cf. in this sense, the programmatic points of the British Food Standard Agency (FSA), set up in April 2000 in response to food safety problems: http://www.foodstandards.gov.uk/about_agency.htm

[28] J. DE MUNCK, J. LENOBLE, *Transformations in the art of governance. A genealogical and historical examination of changes in the governance of democratic societies*, in O. DE SCHUTTER, N. LEBESSIS, J. PATERSON (eds.), *Governance in the European Union*, cit., p.46.

The significance of this 'proceduralisation' of the formation of a regulatory framework should not be interpreted in formalistic or procedurally relativistic terms, but as a concrete, contextualised and reflexive process of knowledge enhanced by the interactive cognitive contribution of the multiplicity of components which contribute to its development. Likewise, if it is not to be considered a form of rationality per se, this 'proceduralisation' also escapes any claim to arrive at a stable truth only by virtue of its pluralism. This legal and cognitive process tends to open and set up an institutional discussion space in which scientific knowledge may find forms of social stabilisation that are more critically and democratically screened and always open for review. [29]

This dissemination of knowledge, no longer isolated in a single social component - the scientific community - but ascribed to many different players, and no longer univocally conceived as the sole form of knowledge but disaggregated and re-aggregated in different epistemic cultures of different importance, redistributes the needs for credibility and accountability among all the parties involved and in their reciprocal relations. [30]This means, for example, that the problem of credibility no longer concerns the experts alone, but also those - traditionally NGOs - who contest them. This means that the criteria of accountability must be specified in relation to accounted and accounters and to the specific contents of accountability.

The theoretical merging of 'philosophy of science' and 'philosophy of science policy' aimed at more democratic public policy-making shows a change not only in the contract between science and society, but also in the very bases of the 'social contract'. [31]

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[29] Cfr. P. ROQUEPLO, *Entre savoir et décision, l'expertise scientifique*, (Sciences en Question) INRA Editions, Paris 1997.

[30] Cf. H. NOWOTNY, P. SCOTT, G. MICHAEL, *Rethinking Science: Knowledge and the Public in an Age of Uncertainty*, Polity Press, London 2001. Nowotny defines as *agorà* this civic and public space where many agents of knowledge interact.

[31] I. SHEPHERD (ed.), *Science and Governance in the European Union. A Contribution to the Debate*, cit., p.24: 'This reflects changes in the "social contract" of science. Formerly it was seen as performing a service to government, providing the technical information on which policy decisions in the relevant areas could be based. Now it is coming to be seen as assisting in the processes of governance, a much more diffused activity whereby a whole society manages its affairs. Expertise is no longer exclusively possessed or controlled by official organisations. Citizens are becoming engaged in the deliberative processes of science-related governance issues. By incorporating them at the outset of any negotiation they will be more likely to accept its outcome'.