

SETTLEMENT OF SCIENCE-BASED TRADE DISPUTES IN THE WTO: A CRITICAL REVIEW OF THE DEVELOPING CASE LAW IN THE FACE OF SCIENTIFIC UNCERTAINTY

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INTRODUCTION

Regulatory authorities and courts are facing an increasing number of scientific issues with the rise in the use of biotechnology in our society. These scientific issues are not new. What is new, however, is that for the first time the World Trade Organization (WTO) has been given the binding authority to adjudicate science-based international trade disputes. Whether it is wise to vest such far-reaching power in the WTO and its dispute settlement system in this politically sensitive and problematic area is questionable. It now appears from the developing case law that this sweeping transfer of jurisdiction to the WTO dispute settlement authorities was accomplished with little planning or reflection. In an area of law where procedural rules matter as much as substantive rules, the relevant WTO provisions are not only rudimentary and unclear, but they lack essential procedural safeguards. There is, therefore, the risk that gaps in the provisions of the WTO will be filled by dispute resolution panels and by the Appellate Body, despite the rule that the WTO dispute settlement system cannot add to or diminish the rights and obligations of its members. The upshot of the decisions made in the WTO dispute settlement system may very well be a serious threat to

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the democratic system of government of the WTO Members in the areas of health and environmental protection.

This Article will focus on the procedural rules of the WTO regarding issues of science and scientific uncertainty in the area of health-related trade measures. It will begin with a discussion of the history of the existing provisions and their interpretation thus far by panels and the Appellate Body. It will then highlight procedural and substantive issues within the developing case law. Finally, it will offer some suggestions as to what may be required to sustain acceptability of the WTO rules in this area by its members. It is important to bear in mind, however, the obvious difficulties of expressing in the short space of an article on a subject of this nature more than the bare outlines of a broader and more dense intellectual discussion.

I

A BRIEF HISTORY OF GATT AND WTO RULES APPLICABLE TO SCIENTIFIC TRADE DISPUTES¹

A. GATT 47

Under the 1947 General Agreement on Tariffs and Trade (GATT 47),² the relevant substantive provisions were Article XX(b) of the GATT 47 and Article 2.2 of the Agreement on Technical Barriers to Trade of the Tokyo Round (Tokyo TBT Agreement).³ Surprisingly, the record under GATT 47 shows that the above provisions generated practically no disputes where the scientific underpinnings of a trade measure were judged by a panel.⁴ The history of disputes involving scientific questions

¹ Disputes involving scientific questions may arise in several factual contexts, but this analysis focuses exclusively on trade measures established to protect human health, animal or plant-life or health, or the environment. Such a dispute would usually involve attempts by the respondent member to justify a trade measure on the ground that it protects health or the environment.

² General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, T.I.A.S. 1700, 55 U.N.T.S. 194 [hereinafter GATT].

³ GATT Secretariat, *The Texts of the Tokyo Round Agreements 1* (1986) [hereinafter Tokyo TBT Agreement].

⁴ One exception is the marginal treatment of the issue in the case of *Thailand—Restrictions on Importation of and Internal Taxes on Cigarettes*, Nov. 7, 1990, GATT B.I.S.D. (37th Supp.) at 200 (1991) [hereinafter Thai Cigarettes]. In that case, the quantitative restrictions imposed by Thailand on the importation of cigarettes were found to be contrary to Article XI.1 of GATT, and not justified by Article XX(b) of GATT 47. The scientific basis of the Thai mea-

under GATT 47 does not, however, include only the cases that have led to the formal establishment of a panel. It also covers legal claims resolved outside of the then-applicable rules on dispute settlement.

The case frequently cited to illustrate the collapse of the old GATT dispute settlement system with respect to science-based issues is the 1988 legislation of the European Communities (EC) restricting imports of meat treated with hormones.⁵ This legislation led to the acrimonious and celebrated dispute between the EC and the United States, in which the United States applied unilateral trade sanctions against the EC until July 15, 1996, despite the fact that no dispute resolution panel had the opportunity to determine whether the EC legislation conformed with the then-applicable GATT provisions.⁶ The record shows that the United States and the EC could not agree on the legal qualification of the facts and the legal provisions that should be applied to resolve the dispute.⁷ Both parties exercised their right to veto the establishment of a panel under the terms and conditions proposed by the other party. Thus, the case never went to a panel for resolution.⁸ The unofficial record of the dispute reflected a lack of confidence by both parties, particularly the United States, in the capacity of a GATT 47 panel to resolve a scientific dispute of this nature in the context of Article XX(b) and the provisions

ures was not in dispute, however, because the record shows that the parties to the dispute and the expert from the World Health Organization (WHO), who was heard by the panel, agreed that "smoking constituted a serious risk to human health and that consequently measures designed to reduce the consumption of cigarettes fell within the scope of Article XX(b)." Thai Cigarettes para. 73. Although the panel report indicates that an expert from the WHO provided information and documentation to the panel, the published report does not explain the manner and procedures regarding the selection and the consultation of the WHO expert. The precedential value of this case is therefore very small. There are a number of other disputes dealing with the protection of animal health or the protection of the environment, but again in these cases the panel did not review the scientific basis of the disputed measures nor were scientific experts heard by the established panels.

⁵ See Council Directive 88/146/EEC, 1988 O.J. (L 70) 16 (prohibiting the use in livestock farming of certain substances having a hormonal action).

⁶ See Werner P. Meng, *The Hormone Conflict Between the EEC and the United States Within the Context of GATT*, 11 MICH. J. INT'L L. 819 (1990).

⁷ See *id.*; Adrián Rafael Halpern, *The U.S.—EC Hormone Beef Controversy and the Standards Code: Implications for the Application of Health Regulations to Agricultural Trade*, 14 N.C. J. INT'L L. & COM. REG. 135 (1989).

⁸ See ROBERT E. HUDEC, *ENFORCING INTERNATIONAL TRADE LAW: THE EVOLUTION OF THE MODERN GATT LEGAL SYSTEM* 545, 574-75 (1993).

of the Tokyo TBT Agreement. The old GATT system in this area, therefore, will go into history as a system incapable of resolving trade disputes involving scientific questions related to human health. This inability of the old GATT system to properly address the hormone-treated meat dispute explains the serious attempts made in the Uruguay Round to clarify and improve the provisions of Article XX(b) of GATT 47.

B. *World Trade Organization*

Because Article XX(b) of GATT could not be amended on substance in the Uruguay Round, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement)⁹ was adopted on April 15, 1994. The SPS Agreement's purpose was to elaborate rules "for the application of the provisions of GATT 1994 which relate to the use of sanitary or phytosanitary measures, in particular the provisions of Article XX(b)."¹⁰ Indeed, the SPS Agreement contains a number of substantive provisions. However, it is very much a compromise text in the classical GATT tradition—that is, it lacks clarity and vision on several key questions, such as what constitutes a risk assessment and how to conduct such an assessment; when a measure is "based on a risk assessment, as appropriate to the circumstances . . .;" and when a measure is maintained "without sufficient scientific evidence."¹¹ The Tokyo TBT Agreement was also amended and improved in the Uruguay Round resulting in the April 15, 1994 Agreement on Technical Barriers to Trade,¹² but its changes are also not free of ambiguity. For example, in order to insure that international trade is not impeded, it requires members to institute procedures for assessing conformity, defined as "includ[ing], *inter alia*, procedures for sampling, testing, and inspection; evaluation, verification and assurance of conformity; registration, accreditation and approval as well as their

⁹ Agreement on the Application of Sanitary and Phytosanitary Measures, Apr. 15, 1994, WTO Agreement, Annex 1A, RESULTS OF THE URUGUAY ROUND OF MULTILATERAL TRADE NEGOTIATIONS: THE LEGAL TEXTS, at 69; 1994 WL 761483 [hereinafter SPS Agreement].

¹⁰ SPS Agreement preamble.

¹¹ SPS Agreement art. 5.

¹² Agreement on Technical Barriers to Trade, Apr. 15, 1994, WTO Agreement, Annex 1A, RESULTS OF THE URUGUAY ROUND OF MULTILATERAL TRADE NEGOTIATIONS: THE LEGAL TEXTS, at 138; 1994 WL 761483 [hereinafter TBT Agreement].

combination.”¹³ However, the agreement does not give guidance as to what the appropriate standard of conformity actually is, or how a member can assess whether its procedures are meeting that standard.

Since the members' efforts concentrated on improving the substantive rules regarding the relationship of trade with the protection of health or the environment, the need to lay down clear procedural rules to adjudicate science-based disputes received only limited attention. Lack of experience in adjudicating scientific trade disputes under GATT might also have influenced the rather passive approach of the members to establishing more detailed procedural rules. In addition, most countries, including the United States, thought that the elimination of the right to veto the establishment of a panel and the quasi-automatic nature of obtaining authority to suspend concessions (retaliatory sanctions) would likely deter members from adopting trade barriers in the form of unjustified sanitary or phytosanitary measures. The members' complex multiple negotiations have ultimately resulted in the few rudimentary procedural provisions contained in the SPS and TBT Agreements and the April 15, 1994 Understanding on Rules and Procedures Governing the Settlement of Disputes (DSU),¹⁴ which governs the collection and presentation of scientific evidence, the selection and consultation of scientific experts, the standards of review, and the distribution of the burden of proof. As demonstrated below, the new WTO rules have, above all, failed to explain completely the role and scope of a panel's authority when adjudicating trade disputes based on scientific questions.

II

ANALYSIS OF RELEVANT WTO PROVISIONS

A. *Admissibility of Evidence*

In disputes involving scientific questions, the primary parties or third parties to the dispute may submit an impressive amount of scientific evidence and technical information to the panel. The WTO rules contain no provision requiring the parties to submit

¹³ TBT Agreement annex 1.3.

¹⁴ Understanding on Rules and Procedures Governing the Settlement of Disputes, Apr. 15, 1994, WTO Agreement, Annex 2, RESULTS OF THE URUGUAY ROUND OF MULTILATERAL TRADE NEGOTIATIONS: THE LEGAL TEXTS, at 404; 1994 WL 761484 [hereinafter DSU].

all factual and scientific evidence in their possession with the first written submission, to submit a limited number of pages, or to limit the nature or the sources of the scientific information in their possession.¹⁵ In short, any type of scientific information and evidence is admissible to the panel at any point in time during the process. Furthermore, the time limits are very constraining, and the panel, frequently comprised of two trade diplomats and a lawyer, generally lacks scientific expertise. Naturally, these factors raise the question of how a panel is to deal with this type and amount of evidence. Indeed, this question has been raised in all four cases involving scientific questions decided in the WTO thus far.¹⁶

B. *Selection and Use of Scientific Experts*

The DSU grants panels broad authority to seek any information relevant to the resolution of a pending dispute, including technical and scientific information, from any appropriate source.¹⁷ The SPS and TBT Agreements contain similar provi-

¹⁵ See, e.g., DSU arts. 12-13, app. 3; SPS Agreement, arts. 5(8), 11.

¹⁶ At the time of publication, two more disputes are pending in which the panels have decided to seek advice from scientific experts in their individual capacity. The first is a complaint by Canada against the European Communities for the French Decree of 1996 prohibiting the production, import, export, and marketing of any kind of asbestos. See Request for the Establishment of a Panel by Canada on European Communities—Measures Affecting Asbestos and Products Containing Asbestos, Oct. 9, 1998, WT/DS135/3. The second is a complaint by Canada under Article 21.5 of the DSU against Australia for failing to comply correctly with the previous panel and Appellate Body reports in the salmon case. See Request by Canada for Determination of Consistency of Implementation Measures on Australia—Measures Affecting Importation of Salmon, Aug. 3, 1999, WT/DS18/14.

¹⁷ Article 13.1 of the DSU provides in relevant part that “[e]ach panel shall have the right to seek information and technical advice from any individual or body which it deems appropriate.” DSU art. 13.1. Article 13.2 of the DSU further provides that:

[p]anels may seek information from any relevant source and may consult experts to obtain their opinion on certain aspects of the matter. With respect to a factual issue concerning a scientific or other technical matter raised by a party to a dispute, a panel may request an advisory report in writing from an expert review group. Rules for the establishment of such a group and its procedures are set forth in Appendix 4.

DSU art. 13.2. Appendix 4 of the DSU sets forth the rules applicable to expert review groups. The preparatory history seems to indicate that the distinction between “technical” and “scientific” information in the DSU and in other WTO agreements is not accidental. From a procedural point of view, the “evidence” that a party to a dispute may submit can contain “technical” information, “sci-

sions relating to the right of panels to seek information and consult experts.¹⁸

Most of the provisions that govern evidence and experts are not new. Almost identical provisions existed in the system of GATT 47. The 1966 Conciliation—Procedures Under Article XXIII,¹⁹ as subsequently amended and codified in the 1979 Understanding Regarding Notification, Consultation, Dispute Settlement and Surveillance,²⁰ contained virtually the same provisions as those of Article 13.1 and the first sentence of paragraph 2 of Article 13 of the DSU.²¹ With minor differences, Article 13.2 of the DSU follows the example of Articles 14.9 and 14.10, in conjunction with Article 14.17, of the Tokyo TBT Agreement regarding a panel's right to seek information from an expert review group concerning scientific and technical issues of fact.²²

Under the Tokyo TBT Agreement, a dispute involving technical (including scientific) questions could have been resolved either by the Committee on Technical Barriers to Trade or by a panel.²³ In either case, information about scientific questions had to be sought only from an expert review group.²⁴ It is un-

entific" information, or both, in addition to simple factual information on which any dispute is normally based.

¹⁸ For instance, Article 11.2 of the SPS Agreement provides that:

[i]n a dispute under this Agreement involving scientific or technical issues, a panel should seek advice from experts chosen by the panel in consultation with the parties to the dispute. To this end, the panel may, when it deems it appropriate, establish an advisory technical experts group, or consult the relevant international organizations, at the request of either party to the dispute or on its own initiative.

SPS art. 11.2. In addition, Articles 14.2 and 14.3 of the TBT Agreement provide that "[a]t the request of a party to a dispute, or at its own initiative, a panel may establish a technical expert group to assist in questions of a technical nature, requiring detailed consideration by experts. Technical expert groups shall be governed by the procedures of Annex 2." SPS arts. 14.2-14.3. The text of Annex 2 of the TBT Agreement is almost identical to that of Appendix 4, cited in the last sentence of Article 13.2 of the DSU.

¹⁹ Decisions and Conclusions of the Contracting Parties, Apr. 5, 1966, GATT B.I.S.D. (14th Supp.) at 18 (1966).

²⁰ Decisions of the Contracting Parties, Nov. 28, 1979, GATT B.I.S.D. (26th Supp.) at 10 (1980) [hereinafter 1979 Understanding].

²¹ Compare the 1979 Understanding, para. 15 & point 6(iv), *supra* note 20, with DSU arts. 13.1-13.2.

²² See DSU art. 13.2; Tokyo TBT Agreement arts. 14.9-14.10, 14.17.

²³ See Tokyo TBT Agreement art. 14.9.

²⁴ See Tokyo TBT Agreement arts. 14.9, 14.17 (stating that panels "shall" use the report of any established technical expert group).

clear whether parties are limited to seeking information on scientific questions from expert review groups under the new SPS and TBT Agreements as they were under the Tokyo TBT Agreement, or whether they may consult any individual or scientific body they deem appropriate. The provisions of the DSU, SPS, and TBT Agreements mentioned above do not unequivocally resolve this issue. However, the answer to this question is important, since the choice between establishing an expert review group or seeking advice from any relevant source may have a substantial effect on the outcome of the case.

III THE CASE LAW

Whether a panel chooses to establish an expert review group or consult experts in their individual capacities indicates an important difference in the way panels view the relationship of science to law, the role that panels should play in resolving scientific trade disputes, and the importance of utilizing procedures that guarantee fundamental fairness.

The dispute arising from EC Measures Concerning Meat and Meat Products (Hormones)²⁵ in the WTO, launched by the United States, was the first to address these expert-consultation issues. The EC proposed that the panel seek advice from scientific experts in the form of an expert review group, in accordance with Appendix 4 of the DSU.²⁶ The United States thought that consultation of experts was unnecessary, but it agreed with the EC that, should the panel consult experts, it should follow the rules and procedures laid down in Appendix 4 of the DSU.²⁷ Surprisingly, the panel decided to seek scientific advice from individual experts, contrary to the common position of the parties. Since there were, and still are, no rules in any WTO Agreement about the selection and use of scientific experts acting individu-

²⁵ WTO Dispute Panel Report on EC Measures Concerning Meat and Meat Products (Hormones), Aug. 18, 1997, WT/DS26/R/USA [hereinafter *Hormones*].

²⁶ *See id.* at para. 6.2.

²⁷ *See id.* at para. 6.1. *See also* WTO Dispute Panel Report on United States—Import Prohibition of Certain Shrimp and Shrimp Products, May 15, 1998, WT/DS58/R, para. 5.2 [hereinafter *Shrimps*] (in which the complaining parties asked the panel to conform as much as possible with the provisions of Appendix 4 of the DSU and, in particular, Paragraph 3 thereof).

ally, the panel's choice immediately raised several procedural and substantive questions.

One of the fundamental issues involved in the choice of scientific experts was from which sources the panel should derive a list of possible experts. At the specific request of the EC, the panel decided to seek the assistance of the Secretariat of the Codex Alimentarius Commission in identifying suitable experts in the subject-matter under consideration.²⁸ After receiving the comments of the parties, the panel decided to select two of the experts proposed by Codex. The panel also sought candidates from the International Agency for Research on Cancer (IARC), and selected one expert from the list of names proposed by IARC. Finally, each party was allowed to propose three experts who could be citizens of the parties to the dispute. The panel selected two experts, one from each list of experts proposed by the parties. In total, the panel selected five scientific experts.

Despite the objections of the EC, the panel turned to Codex Alimentarius for assistance in selecting the experts because Codex is mentioned in the SPS Agreement as one of the international organizations which establishes standards, guidelines, or recommendations in the area of food safety.²⁹ But the mere fact that Codex or any organization is mentioned in the SPS Agreement does not mean that the names of possible scientific experts should come from those organizations. Indeed, scientists coming from those organizations may be unfairly biased in favor of maintaining their organization's standards and recommendations.³⁰

²⁸ In addition, the Codex Alimentarius Secretariat was asked to appoint a technical expert to provide the panel with technical information about Codex's rules and procedures as well as clarifications regarding the nature and scope of its standards. See *Hormones*, *supra* note 25, at paras. 6.7-6.8.

²⁹ See SPS Agreement, Annex A.

³⁰ For instance, in the *Hormones* case, three of the five scientists chosen were regular participants in Codex scientific committees and one was even the rapporteur in the risk assessment of the hormones in question conducted by the expert committee in Codex. The EC objected to the panel's method of choosing the experts as a serious procedural error. The statement in the Appellate Body report that the selection procedures adopted by the panel in the *Hormones* case had been "previously agreed" to by the parties is a factual mistake. WTO Appellate Body Report on EC Measures Concerning Meat and Meat Products (*Hormones*), Jan. 16, 1998, WT/DS26/AB/R, para. 148 [hereinafter *Hormones Appellate Body Report*]. Both the EC and the United States expressed their opposition on a number of issues in the selection procedure proposed by the panel. "Consultation" of the parties by the panel does not mean "agreement" of the parties to the procedure finally adopted by it. Thus on appeal, the EC referred the Appellate Body to the decision of the European

In addition, experts from international organizations may be biased against the challenged WTO member which has departed from the international standards set by those organizations.

Following identification of potential experts, brief curricula vitae were solicited from all experts who responded to the request and indicated that they were willing to assist the panel. The parties to the dispute were provided with the opportunity to comment on these experts based on the information contained in their curricula vitae, and in particular, to state any compelling objections they might have with regard to any individual.

In parallel to the procedure for the selection of experts, the panel and its secretary (who is a member of the WTO Secretariat, frequently from the division responsible for the subject-matter of the dispute) prepared a list of written questions that were submitted to the parties for comment. After the parties had the opportunity to make their comments, the panel established the final list of questions and submitted it to each expert individually. The panel requested that the experts provide their responses in writing to those questions they felt qualified to address. The written submissions of the parties to the panel, including the written versions of their oral statements, and all the scientific evidence submitted were sent to each of the selected experts for their responses. The experts were given approximately one month to submit written replies. The responses were sent directly to the panel secretary, who then provided copies to the parties. Within a week, the parties were given the opportunity to comment in writing on the experts' responses.

Two weeks after receiving comments from the parties, the panel held a joint meeting with the experts and the parties to discuss the experts' written responses and to provide further in-

Court of Human Rights of May 6, 1985 in the case of *Bönisch v. Austria* in which the court held that the appointment of the same person who drafted a report being used in evidence against the accused as an expert to advise a criminal court was a violation of the accused's right to a fair hearing under Article 6, § 1 of the European Convention of Human Rights. See *Bönisch v. Austria*, 92 Eur. Ct. H.R. (ser. A) at 14-16 (1985). The court considered the right to a fair hearing to be a general principle of law that should be taken into account in the interpretation of an "objective assessment of the matter" under Article 11 of the DSU. See *id.* The EC also believed that the appointment of that person as an expert to advise the Panel was inconsistent with the obligation to make a fair assessment of the matter. The *Hormones* Appellate Body Report does not discuss in detail this ground of appeal, but it appears to have implicitly rejected it. See *Hormones* Appellate Body Report, *supra*, at para. 148.

formation. The hearing took a day and a half and involved questions from the members of the panel and the parties to the experts, requesting clarification of their written responses and replies to new questions. No list of questions was provided in advance. The inquiry did not involve a direct dialogue between the lawyers of the parties and the experts, as the questions were asked by the chairman of the panel. The short time available for the hearing forced the parties to ask only a limited number of questions. The hearing was conducted in accordance with the civil court tradition, in which the court plays the pivotal role by asking questions and essentially directing the entire discussion. The character of the expert question-answer session used by panels is a far cry from the cross-examination of a witness by lawyers, as practiced in common law jurisdictions.³¹ There is a risk, therefore, that the methods utilized by panels to seek advice from scientific experts does not respect the fundamental principles of fairness or the rights of defense and due process in the same way that they are accounted for in the common law tradition of examining scientific experts.

The WTO Dispute Panel Reports in the cases of *United States—Import Prohibition of Certain Shrimp and Shrimp Products*,³² *Australia—Measures Affecting Importation of Salmon*,³³ and *Japan—Measures Affecting Agricultural Products*³⁴ adopted the *Hormones* approach for selecting scientific experts. In these three cases—as in *Hormones*—the parties to the dispute were given the opportunity to suggest names of possible scientific experts. However, in the *Shrimps* case, only the parties provided names of possible experts, since there were no international organizations that dealt with the specific subject matter and upon which the parties and the panel could agree.

The latest case raising scientific questions, *Japanese Measures*, indicates a clear attempt by the WTO Secretariat to stand-

³¹ It is also different from the practice of international courts, like the Hamburg-based International Tribunal for the Law of the Sea (UNCLOS) which, in August 1999 in the *Southern Bluefin Tuna* cases on provisional measures, allowed the counsel of the parties to cross-examine scientific experts on substantive scientific issues and even allowed a voir dire examination of an expert by the counsel of the defending party. See Verbatim Record, Southern Bluefin Tuna Cases (Requests for Provisional Measures) (visited June 5, 2000) <http://www.un.org/Depts/los/ITLOS/PV99_20_E.htm>.

³² See *Shrimps*, *supra* note 27.

³³ Oct. 20, 1998, WT/DS18/RW [hereinafter *Australian Salmon*].

³⁴ Oct. 27, 1998, WT/DS76/R [hereinafter *Japanese Measures*].

ardize and streamline the procedures followed in the previous cases. Since the procedures decided by the panel in this case are almost certain to provide the basic procedural matrix for selecting and consulting scientific and other types of experts in the future, they merit reproducing. The panel established the following guidelines:

Nature of advice

(a) On the basis of the first submissions from both parties, the Panel will determine the areas in which it intends to seek expert advice.

Selection of experts and questions to experts

(a) The Panel will seek expert advice from individual experts.

(b) The number of experts the Panel will select will be determined in light of the number of issues on which advice will be sought, as well as by how many of the different issues each expert can provide expertise on.

(c) The Panel will solicit suggestions of possible experts from the Secretariat of the International Plant Protection Convention (IPPC), and, subsequently, from the parties. The parties should not contact the individuals suggested.

(d) The Panel does not intend to appoint experts who are nationals of any of the parties involved in the dispute unless the parties agree with such appointment or in the event the Panel considers that otherwise the need for specialized scientific expertise cannot be fulfilled. Parties are, however, free to include in their delegations scientific experts of their own nationality and may, of course, submit scientific evidence produced by their own nationals.

(e) The Secretariat will seek brief CVs from the individuals suggested. To the extent possible, these will be provided to the parties.

(f) The Panel will prepare specific questions for the experts. These will be provided to the parties.

(g) The parties will have the opportunity to comment on and to make known any compelling objections to any particular expert under consideration. At the same time, the parties will have the opportunity to comment on the proposed questions, or suggest additional ones, before the questions are sent to the experts.

(h) The Panel will inform the parties of the experts it has selected, and submit the questions to the experts.

(i) The experts will be provided with all relevant parts of the parties' submissions on a confidential basis.

(j) The experts will be requested to provide responses in writing; copies of these responses will be provided to the parties. The parties will have the opportunity to comment in writing on the responses from the experts.

Meeting with Experts

(a) Should the Panel decide it opportune, or should a party so request, a meeting with experts, immediately prior to the second substantive meeting, may be held. Prior to such a meeting, the Panel would ensure that: (i) the parties' comments on the experts' responses would be provided to the experts; (ii) the experts would individually be provided with their colleagues' (the other experts) responses to the Panel's questions.³⁵

On average, the above-mentioned procedural steps are not likely to take more than three to five months, from the moment the panel decides to hear scientific experts until the panel holds a joint meeting with the experts and the parties to the dispute. As discussed previously, these procedures will be applied by all panels hearing disputes involving scientific questions, save in special circumstances that could duly justify a departure.³⁶ If the panel feels it needs scientific advice, it will have recourse to scientific experts even if none of the parties to the dispute requests it or if a party objects to it.³⁷ The quantity, qualifications, and nationalities of the selected persons are decided by the panel alone after consultation with the parties.³⁸ Likewise, the number and nature of the written questions put to the experts are decided by the panel. Issues of conflict of interest are also decided by the panel.³⁹

³⁵ *Id.* at para. 6.2.

³⁶ *See supra*, Part II.B.

³⁷ In the other three cases decided so far (*Shrimps*, *Australian Salmon*, and *Japanese Measures*), the decision to consult scientific experts was made by the panel alone, since none of the parties to the disputes had requested expert advice.

³⁸ The panel selected five experts in the *Shrimps* case, two of whom were citizens of the parties to the dispute. The panel selected four in the *Australian Salmon* case and three in the *Japanese Measures* case, none of whom were citizens of the parties to the disputes.

³⁹ The experts are asked to complete the declaration form appended to the WTO Rules of Conduct for the Understanding on Rules and Procedures Governing the Settlement of Disputes, Dec. 11, 1996, WT/DSB/RC/1.

IV
COMMENTS AND SUGGESTIONS FOR IMPROVING THE
WTO SYSTEM FOR SELECTING AND USING
SCIENTIFIC EXPERTS

Through case law, the WTO system has rapidly begun to develop procedural rules governing expert participation for disputes in which issues of science and law intersect. This development poses the question whether the WTO dispute settlement system can create a body of case law that satisfies its members' expectations of fairness and justice, while recognizing that issues of science transcend borders, cultures, and traditions, affecting citizens' fundamental rights to life and health. The distinction between applying the law and making the law, which underlies the DSU (e.g. Articles 3.2 and 19.2), does not address the roles that the panels and Appellate Body have assumed beyond the explicit scope of their authority in disputes of this nature.

A. *Scientific Truth Versus Plausible Scientific Alternatives*

Because the WTO panels are composed of laypersons who do not have specific scientific knowledge, they are not qualified to judge the plausibility of the competing parties' scientific views. The panels should not act as political decision-makers, basing policy choices on available scientific knowledge, because this would result in dispute settlement by "choice" rather than by "reason."⁴⁰ Panels have no policy role to play in the legislative choices of WTO members. In addition, the panels should not use the scientific advice obtained pursuant to Article 11.2 of the SPS and Article 13 of the DSU to impose on WTO members their own views of the scientific basis of contested measures. Instead, the proper role of panels under the DSU rules is to make an "objective assessment" of the matter.⁴¹ The DSU requires panels to draw conclusions on the basis of objective factors which are amenable to judicial review by the Appellate Body. Therefore, the most that can properly be done by panels under Article 11.2 of the SPS and Article 13 of the DSU is to examine whether the evidence upon which the parties rely is based on scientific principles and methods and whether it possesses the minimum attrib-

⁴⁰ See DSU art. 12.7. See also the EC's written submission on appeal in the *Hormones* case, Oct. 6, 1997, para. 82 (on file with the author).

⁴¹ See DSU art. 11.

utes of scientific inquiry, as set out in Article 2.2 of the SPS. They are limited to an examination of whether the scientific basis of a contested measure is a *scientifically plausible alternative* to the scientific theory advocated by the complaining party, and whether the measure has a *rational relationship* to the performed risk assessment.⁴² The task of the panel is to decide whether a contested measure is *based on* a risk assessment,⁴³ not whether the scientific theory upon which the conclusions of the risk assessment are based is scientifically correct and acceptable. In doing so, the panel will not deny judgment or avoid resolving the dispute but will provide “a positive solution to the dispute” in the sense of Article 3.7 of the DSU.⁴⁴

The EC claimed in *Hormones* and subsequent cases that an expert review process in science-based trade disputes is likely to achieve scientifically sound outcomes while affirming the integrity of the dispute settlement process and encouraging public confidence in the outcome of the disputes.⁴⁵ It argued that the legitimacy of the WTO dispute settlement system depends on the existence of “right” answers, objectivity, and transparency.⁴⁶ The validity of the ultimate dispute resolution depends on the validity of the process, and the absence of objectively decidable facts may lead to decisions based on choice rather than reason. Ultimately, the method for resolving scientific disputes must prove satisfac-

⁴² For a developed theory of the proper role of WTO panels in trade disputes, see Vern R. Walker, *Keeping the WTO from Becoming the “World Trans-science Organization”: Scientific Uncertainty, Science Policy, and Factfinding in the Growth Hormones Dispute*, 31 CORNELL INT’L L.J. 251 (1998).

⁴³ The term “based on” in Article 5.1 of the SPS Agreement was interpreted by the Appellate Body in the *Hormones* case to require “that the results of the risk assessment must sufficiently warrant—that is to say, reasonably support—the SPS measure at stake.” *Hormones Appellate Body Report*, *supra* note 30, at para. 193.

⁴⁴ The phrase “positive solution” does not mean that the panel has to judge the scientific merits of each of the possible scientific views presented to it in order to discover where the scientific truth lies. The principal tool of panels for arriving at a positive solution of legal disputes is the proper application of the rules governing burden of proof and the appropriate standard of review of health regulatory measures of members based on a risk assessment. *See, e.g.*, Order Prescribing Provisional Measures, Southern Bluefish Tuna Cases (Requests for Provisional Measures) (visited June 5, 2000) <<http://www.un.org/Depts/los/ITLOS/Order-tuna34.htm>>, at para. 80 (admitting that “[the panel] cannot conclusively assess the scientific evidence presented by the parties,” yet this did not prevent it from positively resolving the dispute).

⁴⁵ *See id.* at para. 6.2.

⁴⁶ *See id.*

tory to the parties and the results must engender public credibility.

B. *Individual Experts Versus Expert Review Groups*

The ordinary meaning of the terms used in Article 13.2 of the DSU and Article 11.2 of the SPS Agreement clearly demonstrates that the authors of these agreements preferred the use of expert review groups for solving scientific questions. Article 13.2 of the DSU states that for factual issues concerning scientific or other technical matters, the panel “may” request an advisory report in writing from an expert review group.⁴⁷ Similarly, Article 11.2 of the SPS Agreement distinguishes between *scientific* and *technical* issues and provides that in order to resolve disputes of this nature, the panel “may,” when it deems it appropriate, establish an advisory technical experts group.⁴⁸ The permissive nature of the verb “may” denotes here the choice panels have regarding whether to request scientific advice, rather than referring to the format in which such advice is to be sought once the decision to request it is made. Similarly, Article 14.2 of the TBT Agreement contemplates that only technical expert review groups will assist the panel on technical issues.⁴⁹

That the WTO Agreements set forth organizational rules and procedures solely for expert review groups is further compelling evidence that expert review groups were preferred. It would seem highly paradoxical if the drafters of the WTO Agreements had favored the consultation of experts in their individual capacity to resolve scientific questions but established detailed rules only for expert review groups. Unfortunately, the Appellate Body approved of the panels, and the WTO Secretariat’s, unwarranted practice of favoring the consultation of experts in their individual capacity by taking out of context and relying too much on the permissive (“may”) in conjunction with the general provision granting panels the right to seek advice from any source they deem appropriate.⁵⁰ The developing practice of panels seeking advice only from experts individually, if applied systematically, would render the provisions of the DSU and the SPS and TBT Agreements on expert review groups useless and obsolete.

⁴⁷ See DSU art. 13.2.

⁴⁸ See SPS Agreement art. 11.2.

⁴⁹ See TBT Agreement art. 14.2.

⁵⁰ See DSU art. 13.1; SPS Agreement art. 11.2.

The differences between reliance on individual experts and consultation of expert review groups are both procedural and substantive. When a scientist is consulted in her individual capacity, she works independently to answer the questions received from the panel, provides a separate response, and defends her individual views before the panel and the parties. It is thus possible that a panel that has selected five scientific experts may receive five different (and possibly conflicting) responses to all written questions. One must remember that WTO panelists receive no training on how to judge cases, do not enjoy the usual constitutional guarantees found in most national legal systems, and operate under extremely tight schedules and pressures unknown in almost any national or international legal system.⁵¹ How, then, can untrained and inexperienced panelists “be sufficiently epistemically competent to assess competing putatively scientific claims” by possibly competing scientific experts?⁵²

Panelists can avoid the need to face the troubling issues raised by this question by using expert review groups instead of consulting individual experts. Expert review groups work collectively on the panel’s questions. Unlike scientific experts consulted individually, the members of an expert review group are required to meet and discuss the issues together and prepare one report with one set of replies to all the questions. Their report to the panel is only advisory, but it is the result of intellectual dialogue and a confrontational process, very similar to the type of risk assessment employed by several members of the WTO to check and approve the authorization of drugs, chemical substances, and pesticides.⁵³

The report of the expert review group cannot, of course, constitute a risk assessment or an evaluation of the risk assessment conducted by the defending party in the sense, for example, of Article 5 of the SPS Agreement.⁵⁴ While an Article 5 assessment is all-encompassing, the review group’s purpose is to pro-

⁵¹ On the issue of time-limits, see DSU app. 3.

⁵² Scott Brewer, *Scientific Expert Testimony and Intellectual Due Process*, 107 YALE L.J. 1535, 1552 (1998).

⁵³ See DSU app. 4. See also Walker, *supra* note 42, at 256-76.

⁵⁴ The role of experts has always been conceived as one of assisting tribunals in ferreting out facts, not usurping their judicial function or fulfilling the role and duties of the disputing members. For a general discussion on the role of experts before international tribunals, see GILLIAN M. WHITE, *THE USE OF EXPERTS BY INTERNATIONAL TRIBUNALS* 163-82 (1961).

vide information in response to the specific questions posed by the panel regarding the scientific issues in dispute and to provide an opinion on the latest relevant developments in scientific research. There is no need for the members of an expert review group to express themselves by unanimity, but a collective decision-making process is more likely to result in common ground because it avoids polarizing approaches to scientific assumptions and the presentation of the available scientific evidence. The report of an expert review group is therefore more likely to converge on a substantial number of questions, and the role of the panel in addressing and deciding on scientific questions is likely to be reduced accordingly. As a result, the panelists will not have to evaluate widely diverging scientific views and it is likely that the scientific basis of their decisions may be closer to scientific consensus.⁵⁵ Leading scholars have concluded that non-expert judges cannot verify and judge the scientific bases of competing expert views because they do not understand the cognitive aims and methods of science.⁵⁶ To avoid making arbitrary decisions about which of the competing views should be relied upon, non-expert judges rely instead on other indicia of expertise, such as the credentials, reputation, demeanor, and experience of the experts.⁵⁷ They also employ “boundary-work” criteria.⁵⁸

Scientific advice from an expert review group is likely to be more objective and clear, less confrontational, and hence, more helpful in resolving a trade dispute than the advice obtained from individual experts. In addition, because there are no rules in the

⁵⁵ Non-expert panelists should resolve scientific disputes only when there is “authentic” scientific consensus among the experts they have chosen. Otherwise, they risk making epistemically arbitrary judgments not justified from a legal point of view. For example, Judge Learned Hand, in an article published in 1901, concluded that the jury will do no better with the so-called testimony of experts than without, except where the testimony is unanimous on the disputed issue. See Learned Hand, *Historical and Practical Considerations Regarding Expert Testimony*, 15 HARV. L. REV. 40, 54-56 (1901).

⁵⁶ See, e.g., Brewer, *supra*, note 52; SHEILA JASANOFF, *SCIENCE AT THE BAR: LAW, SCIENCE, AND TECHNOLOGY IN AMERICA* 42-68 (1995).

⁵⁷ See Brewer, *supra* note 52, at 1538.

⁵⁸ See Brewer, *supra* note 52, at 1539. Boundary-work criteria are akin to what some international law scholars called the “proceduralization” of international law. See, e.g., MARTTI KOSKENNIEMI, *FROM APOLOGY TO UTOPIA: THE STRUCTURE OF INTERNATIONAL LEGAL ARGUMENT* 117 *et seq.* (1989). On “boundary-work” criteria in such circumstances, see Sheila Jasanoff, *What Judges Should Know About the Sociology of Science*, 32 JURIMETRICS J. 345, 349 (1992).

DSU on relevance, admissibility, weight, and sufficiency of scientific evidence,⁵⁹ and the case law on burden of proof as it stands today is also unsatisfactory,⁶⁰ recourse to an expert review group

⁵⁹ This comment should not be taken to imply a preference for the introduction of rules on relevance, admissibility, and weight of evidence in the DSU. Experience shows that such evidentiary rules are even more likely to force panelists to become amateur scientists in order to perform their duties. *See, e.g., Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993) (holding that the federal rules of evidence and federal rules of civil procedure oblige judges to ensure that the proffered scientific evidence is both “relevant and reliable,” thus annulling the *Frye* rule which had established the “general acceptance” test for the admissibility of novel scientific evidence). It should also be noted that, contrary to the developing practice in the WTO, recourse to the methods that WTO members use to resolve questions of science and law (*e.g. Daubert*) is likely to be more useful and instructive than looking for guidance from international law courts, like the ICJ, frequently referred to in the case law of panels and the Appellate Body (*e.g. on burden of proof*). Such international law courts have not yet decided, and are unlikely to decide in the future, scientific questions (such as the carcinogenic effect of hormones) in the strict sense in which the terms “science” and “scientific uncertainty” are discussed in the SPS Agreement and in this Article. For a very rare situation in which authority is given to the ICJ to decide “scientific” questions, see 1969 International Health Regulations, art. 93 (adopted by the World Health Assembly in 1951 and entered into force in 1971).

⁶⁰ Panels and the Appellate Body appear to confuse the concepts of burden of producing evidence and burden of persuasion. *See, e.g., Hormones Appellate Body Report, supra note 30, paras. 108-109* (concluding that the panel should have required a prima facie showing of evidence and legal sufficiency by the United States and Canada before the burden could be shifted to the EC to produce contrary evidence); *Japanese Measures, supra note 34, paras. 5.18-5.28*. Both parties to a dispute share the burden of producing evidence to establish their respective claims. However, the burden of persuasion always rests with the complaining member, which must suffer the adverse finding if it fails to produce clear proof that a contested measure is maintained without sufficient scientific evidence. The issue of the burden of proof is covered by the rules on substantive adjudication of a dispute. In any national or international dispute settlement system, the complaining member is required to provide complete proof, not only prima facie evidence, demonstrating the alleged violation. Several panel and Appellate Body reports reference the fact that the initial burden lies with the complaining party, which must establish a prima facie case of inconsistency with a particular provision. *See, e.g., WTO Appellate Body Report on Japan—Measures Affecting Agricultural Products, Feb. 22, 1999, WT/DS76/AB/R, para. 136* [hereinafter *Japanese Measures Appellate Body Report*]. Therefore, this reference must be understood to mean that the complaining party “must assert and prove its claim” completely, not solely to provide allegations or to raise a presumption, as the Appellate Body appears to have accepted in several cases, most notably in the *Japanese Measures Appellate Body Report. See id.* at para. 137. The burden of proof standard actually applied by panels and the Appellate Body is far less strict than the “preponderance of the evidence” standard applied in U.S. civil cases. *See, e.g., Addington v. Texas*, 441 U.S. 418 (1979); *Grogan v. Garner*, 498 U.S. 279 (1991). For a very good discussion of the appropriate standard on the burden of proof in scientific disputes,

is likely to provide an intellectually systematic, coherent, and non-polarizing approach to address and resolve the scientific issues involved.⁶¹ It is not the best possible way of solving complex scientific questions, but it appears to be superior to consulting scientific experts individually.

The practice of panels consulting scientific experts in their individual capacity, rather than expert review groups, may even be contrary to one of the corollaries of the general rules of interpretation in the 1969 Vienna Convention on the Law of Treaties: that the interpretation must give meaning and effect to all the terms of a treaty.⁶² As the Appellate Body held in the case of *United States—Standards for Reformulated and Conventional Gasoline*, “[a]n interpreter is not free to adopt a reading that would result in reducing whole clauses or paragraphs of a treaty to redundancy or inutility.”⁶³ Since all the panels established to examine scientific issues thus far have refrained from providing explicit substantive reasons explaining their preference for consulting experts in their individual capacity, rather than establishing expert review groups, there is a serious risk that the provisions of the WTO Agreements on expert review groups will progressively fall into desuetude, if they have not already.

C. *Fact-finding, Discovery, and Burden of Proof in Science-Based Disputes*

The obscure DSU rules on fact-finding and the practice of panels on discovery and collection of evidence are conflicting.⁶⁴

see Lee Loevinger, *Standards of Proof in Science and Law*, 32 JURIMETRICS J. 323 (1992).

⁶¹ D.H. Kaye suggests that science involves empirical investigations and phenomena that are independent of the feelings and judgments of human beings, while the law involves conscious choices that intentionally affect human beings. In science, one seeks a model of the natural order. In law, one does not search for a natural model, but rather purposefully constructs a model that reconciles cases and other legal materials. See D.H. Kaye, *Proof in Law and Science*, 32 JURIMETRICS J. 313, 321-22 (1992).

⁶² See 1 OPPENHEIM'S INTERNATIONAL LAW 1280-81 (Robert Jennings & Arthur Watts eds., 9th ed. 1992).

⁶³ WTO Appellate Body Report on *United States—Standards for Reformulated and Conventional Gasoline*, 35 I.L.M. 603, 627 (1996).

⁶⁴ Compare WTO Appellate Body Report on *India—Patent Protection for Pharmaceutical and Agricultural Chemical Products*, Dec. 19, 1997, WT/DS50/AB/R (holding that there are no discovery rules in the DSU), with WTO Appellate Body Report on *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, 38 I.L.M. 118, 148 (1999) (holding that the panels have

Panels rely almost exclusively on the parties to engage in fact-finding and provide all relevant factual materials. This is in the tradition of the common law practice in which the parties do most of the fact-finding in an adversarial or counsel-led system.⁶⁵ But in all the disputes involving scientific questions, the panels have decided to appoint scientific experts under their authority to inform them of the scientific issue involved, an approach which is closer to the civil law tradition of an inquisitorial or court-led system.⁶⁶ It is unclear in the cases in which panels have decided to consult scientific experts whether they had an absolute need to consult such experts. There is at least one case (*Shrimps*) in which the scientific advice the panel received is mentioned almost nowhere in the legal reasoning of the report.

The tendency of panels to seek scientific advice, even when the evidence is clear and none of the parties to the dispute has requested it, may imply that panels resort to scientific advice in order to solidify the legitimacy of their findings rather than out of a real need to solve the scientific issues underlying the legal dispute. It would also appear that panels, with the unfortunate endorsement of the Appellate Body, are allowed to pick and choose from the different views they receive from scientists who are consulted in their individual capacities. In theory, this approach is akin to applying the principle of free evaluation of evidence (based on the “intimate conviction of the judge” principle) used in criminal proceedings in civil law jurisdictions.⁶⁷ But in

the authority to “shape the process of fact finding”). Also see subsequent cases giving wide power of fact-finding to panels, such as WTO Dispute Panel Report on Brazil—Export Financing Programme for Aircraft, May 9, 2000, WT/DS46/RW.

⁶⁵ See HENRY J. ABRAHAM, *THE JUDICIAL PROCESS: AN INTRODUCTORY ANALYSIS OF THE COURTS OF THE UNITED STATES, ENGLAND, AND FRANCE* 141-42 (4th ed. 1980).

⁶⁶ See WHITE, *supra* note 54, at 10. See also John H. Langbein, *The German Advantage in Civil Procedure*, 52 U. CHI. L. REV. 823 (1985). Common law judges also have the authority to seek help from court-appointed experts, but this power appears in practice to be very rarely used. See JASANOFF, *supra* note 56, at 66.

⁶⁷ For a brief, but excellent, account of the differences between civil and common law jurisdictions on fact-finding and evaluation of evidence (including scientific expert advice), see Jean-Marc Baïssus, *Common v. Continental: A Reaction to Mr. Evan Whitton’s 1998 Murdoch Law School Address*, 5 E LAW—MURDOCH U. ELECTRONIC J. L. 1, paras. 65-66 (Dec. 1998) <<http://www.murdoch.edu.au/elaw/issues/v5n4/baïssus54nf.html>>. See also Joseph C. Hutcheson, *The Judgment Intuitive: The Function of the “Hunch” in Judicial Decisions*, 14 CORNELL L. Q. 274 (1929).

reality, it probably comports better with the practice in Anglo-American courts, which typically make definitive findings of fact and treat them as certain even though they are established only by a preponderance of the evidence.⁶⁸ In addition, this free choice of scientific views provides a feeling of efficiency and rapidity in the DSU dispute settlement system which, some think, the newly established WTO system badly needs.

The clearest statement made so far regarding how a panel should treat divergent or conflicting scientific advice can be found in the *Japanese Measures* panel report, which states:

In our view, the prima facie case to be established in a WTO dispute settlement proceeding relates to the substantive issue of what a party invoking a fact or claim needs to prove for that fact or claim to be accepted by a panel; that is, evidence (1) which is *sufficient to raise a presumption* that the alleged fact or claim is correct and (2) that has not been *sufficiently rebutted* by the opposing party. In deciding whether a fact or claim can thus be accepted, we consider that we are called upon to examine and weigh all the evidence validly submitted to us, including the opinions we received from the experts advising the Panel in accordance with Article 13 of the DSU.⁶⁹

It is clear then that panels (and the WTO Secretariat) take the view that the DSU requires them to examine and weigh all the evidence validly submitted to them, including the opinions received from the experts advising a panel, in accordance with Article 13 of the DSU. The phrase “weigh . . . the opinions received from the experts” indicates that panels consider themselves capable of verifying the basis of the scientific views and taking a position on the substance of the evidence presented.⁷⁰ If the evidence is divergent or conflicting, panels claim that they

⁶⁸ See ABRAHAM, *supra* note 65, at 141-42. Conversely, civil law judges are more willing to recognize the limits of fact-finding, using presumptions when necessary to bridge gaps or disposing of cases on the ground of failure to discharge the burden of proof. A civil law judge must indicate which fact was satisfactorily proven; he cannot simply enumerate the elements that have convinced him, but rather must also discuss the probative value of each. By contrast, a common law jury does not give reasons for its verdict, and the judge usually does not write out reasons for his decision, even if he states them before sentencing. See Baïssus, *supra* note 67, at para. 68.

⁶⁹ *Japanese Measures*, *supra* note 34, at para. 7.10 (emphasis added).

⁷⁰ This attitude of the panels has been upheld by the Appellate Body, most clearly in its *Japanese Measures* Appellate Body Report. See *Japanese Measures* Appellate Body Report, *supra* note 60, at para. 127.

may assess, weigh and accept one or the other scientific view as they see fit.⁷¹

The burden of proof standard applied by WTO panels and the Appellate Body requires a very low degree of confidence, because it is sufficient for the complaining member to raise only a presumption that its products are “safe” or pose no risk.⁷² The defending member then must meet a much higher burden in order to eliminate the likelihood of an erroneous judgment on the scientific aspects of the case.⁷³ This standard is unsatisfactory. One would expect that in the area of food safety and health protection, the burden of proof for parties challenging trade barriers would be higher than for the defending WTO member. A wrongful finding could have potentially disastrous effects on the lives of millions of people. As such, justice requires the application of the highest burden of proof—the more serious the consequences and the higher the cost of errors, the higher the level of certainty that should be required.⁷⁴ The function of a standard of proof is to instruct the panel about the degree of confidence that the fact-finder should have as to the correctness of the factual conclusions for a particular type of adjudication. The standard thus serves to allocate the risk of error between the disputing members and to indicate the relative importance that is attached to the ultimate decision.

Not surprisingly, claims have been raised in nearly all the cases decided so far in this area of the WTO alleging that the panels have not properly interpreted, evaluated, or taken into ac-

⁷¹ As already mentioned, this approach to the evaluation of evidence is similar to the civil law principle of the “free evaluation of evidence” in criminal proceedings, as a corollary for the search of material truth. In deciding on the merits, the judge only relies on his “intimate conviction” or “intuitive hunch.” Baïssus, *supra* note 67, at para. 65.

⁷² See, e.g., Japanese Measures Appellate Body Report, *supra* note 60, at para. 137.

⁷³ See Japanese Measures Appellate Body Report, *supra* note 60, at paras. 121-24.

⁷⁴ It is submitted that in the area of food safety and human health protection only a standard equivalent to the “proof beyond a reasonable doubt” standard, as applied in the U.S. legal system, would be appropriate. See Loevinger, *supra* note 60, at 333-36. Such a standard is also applied in the European Community legal system in similar cases. See, e.g., Case C-157/96, *The Queen v. Ministry of Agriculture*, 1998 E.C.R. I-2211 [1998]; and Case C-180/96 R, *United Kingdom v. Commission*, 1996 E.C.R. I-3903 [1996].

count the scientific evidence provided by the experts.⁷⁵ For instance, the EC argued on appeal in *Hormones* that the panel did not make an objective assessment of the facts (including the scientific evidence made available to it), because it made material and manifest errors in evaluating and assessing the different scientific views presented by the scientists who were chosen by the panel, and because it failed to give the necessary weight to the evidence presented by the EC experts.⁷⁶ The ruling of the Appellate Body on this point was as follows:

In the present appeal, the European Communities repeatedly claims that the Panel disregarded or distorted or misrepresented the evidence submitted by the European Communities and even the opinions expressed by the Panel's own expert advisors. The duty to make an objective assessment of the facts is, among other things, an obligation to consider the evidence presented to a panel and to make factual findings on the basis of that evidence. The deliberate disregard of, or refusal to consider, the evidence submitted to a panel is incompatible with a panel's duty to make an objective assessment of the facts. The wilful [sic] distortion or misrepresentation of the evidence put before a panel is similarly inconsistent with an objective assessment of the facts. "Disregard" and "distortion" and "misrepresentation" of the evidence, in their ordinary signification in judicial and quasi-judicial processes, imply not simply an error of judgment in the appreciation of evidence but rather an egregious error that calls into question the good faith of a panel. A claim that a panel disregarded or distorted the evidence submitted to it is, in effect, a claim that the panel, to a greater or lesser degree, denied the party submitting the evidence fundamental fairness, or what in many jurisdictions is known as due process of law or natural justice.⁷⁷

The test established here by the Appellate Body is highly unsatisfactory. Panels may make serious mistakes in evaluating and weighing scientific evidence, whether in good faith or as a result of an egregious error or willful distortion. The willful dis-

⁷⁵ See, e.g., WTO Appellate Body Report on Australia—Measures Affecting Importation of Salmon, Oct. 20, 1998, WT/DS18/AB/R, § VI(B) [hereinafter Australian Salmon Appellate Body Report]; Japanese Measures Appellate Body Report, *supra* note 60, at para. 140.

⁷⁶ See *Hormones* Appellate Body Report, *supra* note 30, at paras. 110-19, 131-45.

⁷⁷ *Hormones* Appellate Body Report, *supra* note 30, at para. 133 (footnotes omitted).

tortion test is impossible to establish in practice.⁷⁸ Yet, serious mistakes in the evaluation of scientific evidence by panels should be reviewed, especially in the area of human health and food safety, regardless of the panelists' intention or state of mind.⁷⁹ Thus, the Appellate Body's test sets the threshold for appeals too high and, consequently, leaves too much discretion to non-expert, non-specialized panelists to judge issues of tremendous scientific complexity, including those raised by the use of genetically modified organisms in foodstuffs.

⁷⁸ Compare for instance the test applied by the Court of Justice of the European Communities by which "[t]he Court of First Instance . . . has exclusive jurisdiction to find the facts except where the substantive inaccuracy of its findings is apparent from the documents submitted to it . . . The Court of First Instance also has exclusive jurisdiction to assess those facts." Case C-136/92 P, *Commission v. Brazzelli Lualdi*, 1994-6 E.C.R. I-1981, [1994] para. 49. Thus, in EC law, no search into the motives or intention of the lower judge is required. The same applies in U.S. law, where a clearly erroneous finding by a lower court can be reviewed on appeal. See *Anderson v. City of Bessemer City*, 470 U.S. 564, 573 (1985). U.S. courts generally review action by agencies to determine whether it is "arbitrary, capricious, an abuse of discretion or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A) (1994). However, where an agency determination is required to be made on the basis of an administrative record compiled at a hearing, the "substantial evidence" test is applied. Sometimes individual statutes will specify a particular standard. For example, courts are to review orders issued by the U.S. Environmental Protection Agency to determine if they are supported by substantial evidence. See 7 U.S.C. § 136n(b). "Arbitrary and capricious" has been described as a catch-all label for attacks on the agency's rationale, its departure from previous decisions, its lack of explanation for its action, or the lack of evidence in the record to support the agency's action. See Patricia M. Wald, *Judicial Review in Midpassage: The Uneasy Partnership Between Courts and Agencies Plays On*, 32 TULSA L.J. 221, 233 (1996). There appears to be general consensus that reviewing agency action under the "arbitrary and capricious" standard is equivalent to reviewing it under the "substantial evidence" standard, which does not require showing "willfulness" or "deliberate" action.

⁷⁹ Indeed, in the Hormones Appellate Body Report, the Appellate Body found that the panel had "wrongly interpreted" the views of the scientists on several occasions, that it "excluded evidence" presented by some scientists, and that it "did not . . . represent the opinions of its experts accurately," Hormones Appellate Body Report, *supra* note 30, at paras. 138-39, 143-44. In virtually any national system of law, such mistakes would have led to the annulment of the report and its remand to the lower court for retrial of the evidence. Yet, the Appellate Body was able, by applying the so-called deliberate disregard or willful distortion test, to uphold the findings of the panel. The absence of the possibility to remand may have played a role here but, if true, this was a quite unfortunate role in view of the health issues at stake. See also Maurits Lugard, *Scope of Appellate Review: Objective Assessment of the Facts and Issues of Law*, 1 J. INT'L ECON. L. 323 (1998).

Not surprisingly, since the unfortunate and counter-productive decision of the Appellate Body, panels have consistently consulted scientific experts in their individual capacities only.⁸⁰ As explained above, this use of individual experts does little to avoid serious mistakes in the evaluation of possibly diverging scientific views. Claims alleging erroneous interpretation of the scientific evidence by panels have been made to the Appellate Body in all the cases decided thus far, but none has succeeded.⁸¹

CONCLUSION

This Article challenges the entrenched practice of WTO panels, with the approval of the Appellate Body, to seek scientific advice by consulting scientific experts only in their individual capacity. This practice appears to disregard the preferred option of the founders of the WTO Agreements to resolve scientific is-

⁸⁰ This test is counter-productive because it may implicitly incite parties to look into the personal conduct of the panelists acting as individuals, thus doing little to protect the panel as a WTO dispute settlement institution. The author is grateful to his colleague Lucio Gussetti for this observation.

⁸¹ See Australia's claims in the Australian Salmon Appellate Body Report, *supra* note 75, at § VI(B)(1)-(2). The Appellate Body's reasoning is not more than half a line: "We believe the panel has done so in this case [made an objective assessment of the matter before it]." *Id.* at § VI(B)(6). In the *Japanese Measures* case, the panel took substantial liberty in evaluating the diverging evidence from the scientists in order to examine whether there existed an actual causal link between the measure and the scientific evidence. This comment is drawn from the panel's apparent endorsement of the statements of one of the experts, Dr. Heather, cited in footnote 274 of paragraph 8.40 of the report, where too much importance was placed on the phrases "firm conclusion," "does not provide an assurance," "lies predominantly," and "there is no certainty" to justify the panel's ruling on the substance of the scientific argument. *Japanese Measures*, *supra* note 34, at para. 8.40 n. 274. At the end, the panel justified its decision on the evidence presented as follows:

Moreover, even though Japan may have some data—taken from several individual studies—possibly hinting at relevant varietal differences, no evidence before this Panel makes the actual causal link between the differences in the test results and the presence of varietal differences. On these grounds and after having carefully weighed the evidence and opinions of the experts advising the Panel submitted to us, we thus consider that the United States has raised a presumption that Japan's varietal testing requirement is maintained without sufficient scientific evidence and that this presumption has not been sufficiently rebutted by Japan.

Id. at para. 8.42. In the same case, the Appellate Body confirmed once again that "a panel's consideration and weighing of the evidence before it relates to its assessment of the facts and, therefore, falls outside the scope of appellate review under Article 17.6 of the DSU." *Japanese Measures Appellate Body Report*, *supra* note 60, at para. 98.

sues underpinning trade disputes with the assistance of expert review groups. It is also contrary to the widely held view by scholars that non-experts cannot judge complex scientific information because they lack the required scientific expertise. This applies *par excellence* to WTO panelists in the area of food safety regulation, especially when there exist complex and competing scientific views, and panel members risk making decisions that are epistemologically unfounded or arbitrary. In the long run, allowing panel members who do not have scientific expertise to make choices as to the “correct” scientific approach is likely to harm the WTO system by reducing the legitimacy and social acceptability of its dispute settlement rulings.

A more promising alternative is for panels to establish expert review groups and seek to identify whether the scientific views presented to it by the parties and the consulted experts constitute plausible scientific alternatives. Under this approach, panels would refrain from taking a position on the merits of the different scientific views. Instead, a panel’s inquiry would be limited to determining whether the contested measure is based on scientific principles and sufficient scientific evidence and is therefore in conformity with the relevant provisions of the SPS Agreement. In the absence of such a scientifically sound and legally correct approach by the panels, the need to modify the text of the SPS and other WTO Agreements is bound to arise in the near future.