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## **The Power of Reason – Views of Knowledge**

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The question of rationality and modernity has played a key role in defining the West’s understanding of itself in relation to “the other.” Much of this self-defining was done in a way that privileged a western model of rationality, which itself was not always carefully defined or delineated, to the detriment of all others. The period after World War II saw a change in the manner in which these claims of superiority had previously been made. Ethnic and racial delineations gave way to more nuanced cultural ones, and questions of context, relativism, essentialism, and so on came to play a larger role in the ensuing debates. Is there one standard for rationality? Or do different cultures have their own standard of rationality that is incommensurable with others? This more or less academic debate came to have serious policy implications as economic globalization came to dominate our lives in the last quarter century. The subsequent discourse about civilizational difference, which became acute in the last decade, makes it imperative to revisit this question of rationality and its implications. In the following, I approach the problem through four questions: **1) What are some of the ways in which human intellectual diversity has been understood and analyzed? 2) What are the difficulties (p. 68) with such views? What might be some alternatives? 3) What occurs when different cultural traditions come into contact? 4) What are the political implications of these views?**

It is my hope that by acknowledging the multicultural origins of modern science, we can understand that rationality is itself multifaceted, and that rather than trying to westernize or globalize, whether gently or otherwise, we need to allow that past diversity to guide our future intercultural and international relationships.

### **1) What are some of the ways in which human intellectual diversity has been understood and analyzed?**

Every society (however determined) has produced an ideology of difference that differentiates itself from non-members of that group. This may involve things as mundane as cooking or how words are pronounced, or as grandiose as religion, cosmology, values and theoretical self-definition. Sometimes the mundane and the grandiose come together: for incomprehensibility of language, or *barbarismos* to use the Greek term, was often held to mark the essence of cultural difference. And translation could well make things worse, not better. So it should not surprise us that cultures (or civilizations to coin a phrase) might be held to have conflicting (or clashing) worldviews that not only are different (p. 69) but even incomprehensible and incommensurable.

In modern times, the anthropological analysis of difference was famously defined by Lucien Lévy Bruhl in the early twentieth century. Focusing on what he termed “mentalities”, he differentiated a prelogical from a logical or scientific one. A characteristic of the former was the ability to assign what a scientific mentality would call contradictory aspects to the same object. Well-known examples were the Nuer claiming that human twins were birds or the Dorze statement that the leopard is a Christian animal. An apologist for the Nuer and Dorze might say that these statements are meant metaphorically. But the problem is that the notion of literal and metaphorical, at least as they have come to be used in a western context, are the product of Aristotle, who was reacting to a particular intellectual context. And the Nuer and Dorze, when asked by anthropologists, seem to hold fast to the literal interpretation of their words.<sup>1</sup>

Lévy Bruhl’s ideas elicited a fair amount of discussion and criticism, and even he modified the strong version of his ideas in his later writings.<sup>2</sup> But despite the fact that a notion of primitive mentality seems, in the post-WWII ethos that we inhabit, somehow abhorrent, a reconstituted notion of mentality has (p. 70) continued to have currency, though in somewhat

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<sup>1</sup> For an informed discussion of Lévy-Bruhl’s position and a valuable critique, see G.E.R. Lloyd, *Demystifying Mentalities* (Cambridge: Cambridge University Press, 1990), esp. chapter 1.

<sup>2</sup> It is interesting to note that Lévy-Bruhl was already sharply criticized by his contemporary O. Leroy in the 1920s; see René van der Veer, “Primitive Mentality Reconsidered,” *Culture & Psychology* 9 (2003): 179-184.

less stark and more nuanced terms. Here ideas of cultural or religious, or more generally civilizational, difference move to some degree away from a “mentality” (that might imply some kind of genetic predisposition) to a nexus of ideas, beliefs, and behaviors that differentiate one people from another. What drives these attempts, I believe, is the notion that there is a “great divide” that separates the modern view of science and rationality from a “premodern” one.

A variety of strategies have been used to define this divide.<sup>3</sup> Robin Horton, an anthropologist writing in the 1970s, sought to shift the debate away from mentalities to one of “closed” versus “open” societies.<sup>4</sup> Thus Horton argued that there was no qualitative difference in kind between a myth of a primitive tribe and the scientific theories of our own time. Both were based upon assumptions of untested and untestable entities (spirits on the one hand, forces on the other). (p. 71) Drawing upon the French anthropologist Claude Lévi-Strauss and his rather vague notions of hot and cold societies, and upon the philosopher Karl Popper’s strong defense of an “open” society, Horton held that the difference between the primitive and the modern was attributable to the possibility of criticism and change. Primitive myth was unassailable whereas scientific theories, here following Thomas Kuhn, were always subject to change and even revolution.<sup>5</sup>

There was another related track that this debate has taken. In this case, it was not so much the “primitive” tribes of Africa or the Pacific that were the focus but rather some of the great pre-modern civilizations. The defining question here was not so much whether there was logic, for one could hardly deny that the pre-modern Chinese had often acted more logically than Europeans in their social and political organization, but rather the question of “why not”: given the promising start of the Chinese in technology, and the Islamic world in science, why hadn’t

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<sup>3</sup> In his highly influential *We Have Never Been Modern* (Cambridge, Mass.: Harvard University Press, 1993), Bruno Latour proposes dispensing with this dichotomy altogether by questioning the very foundations upon which we define ourselves as modern. But this and similar attempts to transcend the “great divide” do so from a mostly Eurocentric, academic perspective. If nothing else, the events and subsequent commentary of the past decade have shown that the discourse on mentalities, cultural divides and civilizational difference is not only a part of our intellectual landscape but is a lived part of the experience of vast numbers of people with serious implications for their survival and well-being.

<sup>4</sup> Robin Horton, “African Traditional Thought and Western Science,” *Africa* 37 (1967): 50-71, 155-187; abridged version in B. R. Wilson, *Rationality* (Oxford, 1970).

<sup>5</sup> Among the works cited by Horton are: Claude Lévi-Strauss, *La pensée sauvage* (Paris, 1962); Karl Popper, *The Open Society and Its Enemies* (London, 1945); and Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago, 1962).

they made the leap from “proto-science” to modern science. Here a whole host of factors have been put forth: the inhibiting factor of Confucian classification (p. 72) according to Joseph Needham, the lack of legal, institutional and democratic structures according to Benjamin Nelson and Toby Huff, and so forth and so on.<sup>6</sup> The question here was as straightforward as it was simple: given the success of Europe, what made everyone else a failure? For Islam, the inhibiting force was viewed first and foremost as the religion of Islam. This notion—that Islam itself was the problem—marked a reversal from the Europe of the sixteenth and seventeenth centuries, when the Ottomans, still expanding into Southeastern and Eastern Europe, were viewed as an equal or superior adversary; some thinkers even saw the Islamic religion as liberal, progressive and rational (at least in relation to Christianity).<sup>7</sup> (p. 73) A marked shift is manifest in the writings of Ernest Renan (1823-1892), who made the claim, often repeated since, that a nascent rationalist and scientific tradition in Islam was eradicated by religious fanaticism.<sup>8</sup> In the writings of Pierre Duhem (1861–1916) and others, this came to be bolstered by anti-Semitic claims, e.g. that Semitic languages, of which Arabic was one, were not suited for rational thinking and that Semitic peoples were too tied to the concrete to be philosophers and scientists.<sup>9</sup> Stripped of the blatant anti-Semitism, these 19<sup>th</sup>-century attitudes have had a remarkable longevity. Instead of

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<sup>6</sup> There is quite a large body of literature devoted to the “why not” question. Among the most influential works, though not necessarily the most insightful, have been: Joseph Needham, “Mathematics and Science in China and the West,” in his *Science and Civilization in China* (Cambridge: Cambridge Univ. Press, 1954-), vol. III (1959), pp. 150-168; Nathan Sivin, “Why the Scientific Revolution Did Not Take Place in China—or Didn't It?”, *Chinese Science* 5 (June 1982): 45-66; and Toby Huff, *The Rise of Early Modern Science: Islam, China, and the West* (Cambridge: Cambridge University Press, 2003). An overview of these debates is provided by H. Floris Cohen, *The Scientific Revolution: A Historiographical Inquiry* (Chicago: University of Chicago Press, 1994). The debate may be reignited with two very recent books: H. Floris Cohen, *How Modern Science Came into the World: Four Civilizations, One 17th-Century Breakthrough* (Amsterdam: Amsterdam University Press, 2010) and Toby Huff, *Intellectual Curiosity and the Scientific Revolution: A Global Perspective* (Cambridge: Cambridge University Press, 2011). One wonders, though, whether with the eastward shift in global economic, technological and scientific power the “why not” question may soon be rendered moot.

<sup>7</sup> See Nabil Matar, *Islam in Britain, 1558-1685* (Cambridge: Cambridge University Press, 1998), esp. ch. 3. The complex and often contradictory European views of Islam before the modern period are dealt with in David R. Blanks and Michael Frassetto (eds.), *Western Views of Islam in Medieval and Early Modern Europe: Perception of Other* (New York: St. Martin's Press, 1999) and in Nancy Bisaha, *Creating East and West: Renaissance Humanists and the Ottoman Turks* (Philadelphia: University of Pennsylvania Press, 2004).

<sup>8</sup> Ernest Renan, *L'islamisme et la science: conférence faite à la Sorbonne le 29 Mars 1883* (Paris: C. Lévy, 1883). English translation by S. Ragep :

[http://www.mcgill.ca/islamicstudies/sites/mcgill.ca/islamicstudies/files/renan\\_islamism\\_cversion.pdf](http://www.mcgill.ca/islamicstudies/sites/mcgill.ca/islamicstudies/files/renan_islamism_cversion.pdf)

<sup>9</sup> F. Jamil Ragep, “Duhem, the Arabs, and the History of Cosmology,” *Synthese* 83 (1990): 201-214.

racism, one has seen such ideas morph into notions about civilizational and religious difference that have found their way into mainstream writings.<sup>10</sup> (p. 74)

## **2) What are the difficulties with such views? What might be some alternatives?**

The attempts to use mentalities, civilizational difference, religious intolerance, or, more generally, inhibiting factors to explain differences in scientific accomplishment have met with considerable opposition and counter-arguments. In his book *Demystifying Mentalities*, the eminent historian of ancient science G.E.R. Lloyd made a strong philosophical and historical case against the use of mentalities. While acknowledging difference between intellectual traditions, he noted that the notion of mentalities hindered rather than helped explain such differences. Among the points he raised are the following: a) if one highlights a particular aspect of a society (its insistence, say, that twins are birds), one has the problem of explaining how most people in that society generally go about their business in perfectly rational ways. Thus one is faced with explaining “multiple mentalities” rather than a monolithic characterization with which to differentiate it from another group; b) if one were to accept an essential mentality, how could it change? As anthropologists have learned more about various so-called primitive societies, they have understood that even small, stable groups change over time, though perhaps not as quickly as more complex societies; c) positing a single mentality fails to take into account the diversity of views (sometimes even in the same individual) that occurs within a given society or culture; (p. 75) and d) so-called changes of mentality did not result in the eradication of more “primitive” thinking. Belief in religion and magic still exist in “scientific” societies; indeed scientists are known to engage in both religion and magic.

In rejecting mentalities (and most other essentialist and reductionist explanations for societal difference), Lloyd opted instead for contingent social and political explanations for difference. The advantage here is that one can thus imagine ways in which differences might be

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<sup>10</sup> A striking example of this is provided by the transplanted Austrian orientalist Gustav von Grunbaum (1909–1972), who believed he could summarize a 1000-year tradition, based on a priori assumptions and without qualification, with the declaration that for Muslims the natural “sciences (and their technological application) had no root in the fundamental needs and aspirations of their civilization” (“Muslim World View and Muslim Science,” in idem., *Islam: Essays in the Nature and Growth of a Cultural Tradition*, 2nd ed. [London: Routledge & Kegan Paul, 1961], pp. 111-126 at p.114.)

bridged or at least mitigated. By allowing for differences within cultures, one opens up the possibility of communicating with someone from another culture whose views more closely mirror one's own. And even people from different cultures who do not share the same viewpoints could, again conceivably, understand one's interlocutor based upon comparable, divergent viewpoints in one's own society.

A counter-argument against Lloyd might be that whether these differences are contingent or not, or universal within a culture or not, one can still speak of a dominant "mentality" at any given point in time that determines a culture's (or civilization's) actions. This evidently is the manner by which the late Samuel Huntington sought to justify his claim that we had entered a period of a "clash of civilizations" that defined the post-Cold War world.<sup>11</sup> (p. 76) Huntington, a Harvard professor whose assessments were taken quite seriously in both the academic and policy arenas, was in part responding to Francis Fukuyama, who had written a work just after the demise of Soviet Communism that made the audacious claim that we were at the "end of history," by which he meant the end of the age of ideological struggle and the triumph of western liberal democracy, which he saw as soon becoming universal.<sup>12</sup> Although neither Huntington nor Fukuyama quite put it in these terms, we can reframe the debate as one in which Huntington argued that cultural difference (or "mentality" as distinct from ideology) was far from being outmoded. Those living in the seven or eight non-western "civilizations" he identified were not going to give up their religious, cultural and other civilizational affiliations for western liberal democracy, even if that democracy was connected, whether inherently or through coercion, with the promised fruits of capitalism and globalization.

This is not the place to enter into a discussion regarding the merits of either view, or whether both views missed the larger issues of global poverty and economic disparity, environmental degradation, and continuing racism, (p. 77) points made by Edward Said toward

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<sup>11</sup> Samuel P. Huntington, *The Clash of Civilizations and the Remaking of World Order* (New York: Simon & Schuster, 1996). This book arose out of an article by Huntington that originally appeared in *Foreign Affairs* in 1993, which, the outspoken Harvard professor notes, "stirred up more debate...than anything else I have written." The phraseology most immediately came from the orientalist Bernard Lewis, who a few years before had spoken of "a clash of civilizations—the perhaps irrational but surely historic reaction of an ancient rival against our Judeo-Christian heritage, our secular present, and the worldwide expansion of both" ("The Roots of Muslim Rage," *Atlantic Monthly* [Sept. 1990]: 60).

<sup>12</sup> Francis Fukuyama, *The End of History and the Last Man* (New York: Free Press, 1992).

Huntington and Jacques Derrida toward Fukuyama.<sup>13</sup> What concerns us here is that this debate, between those advocating universalism versus those insisting on the intractability of cultural difference, has unfortunately framed the terms of discussion, especially in the post-9/11 world. By making these seem the only options, both the public and academic discourse has been narrowly defined between those who see the choices as inevitable westernization, implying a benevolent evolution, versus a continued adherence by non-western civilizations to barbaric medievalism, implying the need for more coercive measures. But historically human societies (or civilizations if one insists) have often interacted to the benefit of both without such stark choices, a point we will need to elaborate on in the next section. (p. 78)

### **3) What occurs when different cultural traditions come into contact?**

One way to test civilizational difference is to see what actually happened historically when different scientific traditions came in contact: do these differences or mentalities inhibit interaction? One of the most interesting cases occurred in the ancient world, both before and after the conquests of Alexander the Great. Martin Bernal drew attention to what he called the “Ancient Model” of such encounters, when he noted that the Greeks themselves hardly spoke of their own “Greek miracle” but rather often, perhaps exaggeratingly so, attributed many of their advances to their Near Eastern neighbors.<sup>14</sup> Thus Aristotle tells us, rather surprisingly when viewed from a modern perspective, that it was the Egyptians who invented geometry, because their priests were provided the necessary leisure.<sup>15</sup> The Greeks of course insisted that they improved what they received but there is hardly a claim that they invented science and rationality, as has been, until quite recently, the usual extravagant contention. While still acknowledging the importance of the Greek contribution to our scientific heritage, recent specialist research has considerably modified the claims of a Greek miracle by showing that the

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<sup>13</sup> Edward W. Said, “The Clash of Ignorance,” *The Nation*, vol. 273, issue 12 (October 22, 2001), pp. 11-13; Jacques Derrida, *Specters of Marx: The State of the Debt, the Work of Mourning, and the New International* (New York: Routledge, 1994). Shireen Hunter also provided a sustained argument against Huntington in her *The Future of Islam and the West: Clash of Civilizations or Peaceful Coexistence?* (Westport, CT: Praeger, 1998).

<sup>14</sup> Martin Bernal, *Black Athena: The Afro-Asiatic Roots of Classical Civilization*. (London: Free Association Books, 1987).

<sup>15</sup> Aristotle, *Metaphysics*, bk. 1, pt. 1.

Near Eastern, especially Babylonian, contribution was not inconsiderable and perhaps was the (p. 79) source of the notion of an exact mathematical science. What is interesting here is that far from civilizational divides, we have the fascinating example of one scientific/philosophical tradition—the Greek—modifying its rather idealistic claims to truth in the face of serious observational and computational work of the Babylonians.<sup>16</sup>

These types of fruitful encounters of premodern scientific traditions are not rare. One of the best known cases, of course, is the translation, appropriation and adaptation of Greek science and philosophy into an Islamic milieu. The reasons for this are complex and have given rise to much controversy among historians.<sup>17</sup> But what cannot be denied is that this transmission of knowledge resulted in the transformation of an entire civilization. For as the great German-American Orientalist Franz Rosenthal noted: “The indisputable fact remains, though, (p. 80) that Islamic civilization as we know it would simply not have existed without the Greek heritage.”<sup>18</sup> This had broad implications in many fields of inquiry, including religion and law. Again, we see that intercultural encounters can be transformational but without implying by this that Islamic civilization itself became somehow “Greek” or “Hellenized” in the process, any more than Greek civilization became “Oriental” due to its encounter with its Near Eastern neighbors.

Less known, but still of considerable importance, are scientific encounters that occurred solely within Asia. Indian science was transmitted to Islam even before Greek science; indeed, some of that Indian science contained Greek elements that had been transmitted to India during

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<sup>16</sup> Asger Aaboe, “Scientific Astronomy in Antiquity,” *Philos. Trans. Royal Soc. of London*, Ser. A 276 (1974), pp. 21-42. See also John M. Steele, *A Brief Introduction to Astronomy in the Middle East* (London: Saqi, 2008) and Alexander Jones, “On Babylonian Astronomy and its Greek Metamorphoses,” in F. Jamil Ragep and Sally P. Ragep (eds.), *Tradition, Transmission, Transformation: Proceedings of Two Conferences on Premodern Science Held at the University of Oklahoma* (Leiden: E.J. Brill, 1996), pp. 139-155.

<sup>17</sup> Among the most important recent attempts to deal with the transmission of Greek science and philosophy to Islam have been: A. I. Sabra, “The Appropriation and Subsequent Naturalization of Greek Science in Medieval Islam: A Preliminary Statement,” *History of Science* 25 (1987), pp. 223-43, reprinted in A. I. Sabra, *Optics, Astronomy and Logic: Studies in Arabic Science and Philosophy*, no. 1 (Aldershot: Variorum, 1994), and in Ragep and Ragep, *Tradition, Transmission, Transformation*, pp. 3-27; Dimitri Gutas, *Greek Thought, Arabic Culture: The Graeco-Arabic Translation Movement in Baghdad and Early ‘Abbāsīd Society (2nd-4th/8th-10th centuries)* (London: Routledge, 1998); and George Saliba, *Islamic Science and the Making of the European Renaissance* (Cambridge, MA: The MIT Press, 2007).

<sup>18</sup> Franz Rosenthal, *The Classical Heritage in Islam* (Berkeley: University of California Press, 1975), p. 14.

Hellenistic times.<sup>19</sup> The reverse also occurred, with Islamic science being brought to India during the early modern period.<sup>20</sup> The Mongols played an important role in facilitating exchanges between East Asia and Islam; an Islamic astronomical bureau was in place in Beijing in the thirteenth century and lasted for centuries, this long before Jesuits brought European science to China in the seventeenth century.<sup>21</sup>

In the other direction, one knows of the transmission of Greek and Islamic science and philosophy to European centers during the eleventh, twelfth and thirteenth centuries. (p. 81) Although the importance of the Islam-Europe exchange has been challenged recently in France, almost all experts who have studied the matter have insisted upon the importance of this event, sometimes referred to as the twelfth-century Renaissance.<sup>22</sup> The transmission of science here should not be conceived simply in terms of concrete products —models, instruments, remedies, etc. There is increasing evidence that the very terms in which Europe was to develop its own intellectual career was in some ways presaged by this Islamic background. Institutions such as the college, the rationalization of religion, the scholastic and humanist approaches to teaching—all these have Islamic precedents that may well have been imported into Europe.<sup>23</sup> And there are considerable indications that the idea of a prioritization of a mathematical approach to natural phenomena—mathematical humanism if you will—may well have reached Europe in the fifteenth century via Byzantine scholars who were influenced by events in far-away central Asia. (p. 82) It has been known for some time that Copernicus and other Renaissance astronomers used models in their astronomy that had originally been developed in Islamic lands. Recently it has been argued that in addition to these strictly mathematical devices, notions of the rotation of the

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<sup>19</sup> David E. Pingree, “The Greek Influence on Early Islamic Mathematical Astronomy,” *Journal of the American Oriental Society* 93 (1973): 32-43.

<sup>20</sup> Kim Plofker, *Mathematics in India* (Princeton: Princeton University Press, 2009), ch. 8.

<sup>21</sup> Benno van Dalen, “Zhamaluding,” in Thomas Hockey et al. (eds.). *The Biographical Encyclopedia of Astronomers* (New York: Springer, 2007), pp. 1262-1263.

<sup>22</sup> The term twelfth-century renaissance was coined by the Harvard historian Charles Homer Haskins (1870-1937). The challenge to the standard view has come from Sylvain Gouguenheim, who insisted that Christian Europe owed little to Islam in his *Aristote au Mont-Saint-Michel: Les Racines grecques de l'Europe chrétienne* (Paris: Seuil, 2008). This provoked a rancorous debate in France and a number of rebuttals, e.g., Philippe Büttgen et al.(eds.), *Les Grecs, les Arabes et nous : Enquête sur l'islamophobie savante* (Paris: Fayard, 2009). A sober and critical review of Gouguenheim's book by the American historian of medieval science, Steven J. Livesey, can be found in *Isis* 100, 3 (2009): 648-650.

<sup>23</sup> See George Makdisi, *The Rise of Colleges: Institutions of Learning in Islam and the West* (Edinburgh: Edinburgh University Press, 1981) and idem, *The Rise of Humanism in Classical Islam and the Christian West: With Special Reference to Scholasticism* (Edinburgh: Edinburgh University Press, 1990).

Earth and perhaps even the foundations for the heliocentric system itself may well have come to Europe from Islamic sources.<sup>24</sup>

One of the criticisms often brought to bear on those who advocate the transmission of knowledge in premodern times is that concrete evidence of such transmission is often lacking, and that parallel and independent development is a more plausible alternative. This has been brought up in the debate about whether or not Copernicus may have been influenced (or even adopted without attribution) large parts of Islamic astronomy.<sup>25</sup> It may be useful here to provide an example of intercultural exchange, one related to the Copernican question, that indicates the difficulty of transmission (p. 83) while showing its possibility through the tenacity of the actors involved.

In 1295, a scholar named George Chioniades from Constantinople traveled to the kingdom of Trebizond, and from there to the Azerbaijani city of Tabrīz, which was the capital of the Mongol Īlkhānid ruler Ghāzān Khan, who had recently converted to Islam. George was keen to learn astronomy since he knew that the Muslims had excelled in that subject, but, as we learn from a later Byzantine source, the Persians were happy to teach him any subject, but not astronomy. For an ancient legend had foretold that the Persians would be overthrown by the Romans if the Roman king were to learn their astronomy. But Chioniades persisted and eventually Ghāzān relented and he was assigned a teacher known in Greek sources as Shams Bukharos. Tabrīz as an intellectual and scientific center was the successor to the nearby Marāgha observatory, which, under the directorship of Naṣīr al-Dīn al-Ṭūsī (d. 1274), had attracted some of the greatest scientists in the Islamic world. Chioniades eventually translated several astronomical works, mostly from Persian, into Greek. Among these works was a treatise dealing with theoretical astronomy that included what has come to be known as the Ṭūsī couple, a device invented by Naṣīr al-Dīn to rectify a number of problems in Ptolemaic astronomy; as we now

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<sup>24</sup> For a summary of these arguments, see F. Jamil Ragep, “Copernicus and His Islamic Predecessors: Some Historical Remarks,” *History of Science* 45 (2007): 65–81.

<sup>25</sup> Mario Di Bono disputes the influence of Islamic astronomy in his “Copernicus, Amico, Fracastoro and Ṭūsī’s Device: Observations on the Use and Transmission of a Model,” *Journal for the History of Astronomy* 26 (1995): 133–54. Compare this to the position of Noel Swerdlow, one of the foremost experts on Copernican astronomy: “How Copernicus learned of the models of his [Arabic] predecessors is not known — a transmission through Italy is the most likely path — but the relation between the models is so close that independent invention by Copernicus is all but impossible” (N. Swerdlow, “Copernicus, Nicolaus (1473–1543)”, in *Encyclopedia of the Scientific Revolution from Copernicus to Newton*, ed. by W. Applebaum (New York and London, 2000), p. 165).

know, it was one of several mathematical devices and models developed by Islamic scientists and used by Copernicus in his astronomical works. (p. 84) This then represents the first instance of the transmission of these new astronomical models westward; indeed, one of the manuscripts with diagrams of the Tūsī couple and his lunar model eventually made its way to the Vatican library.

After returning to Constantinople, Chioniades felt compelled to write a confession of faith in which he denounced the Islamic religion, apparently to indicate that he had not been tainted by living among the Persians. This seemed to work since he was later appointed Bishop of Tabrīz in 1305.<sup>26</sup> Another example from this same time involves a complex mathematical problem (an attempt to prove Euclid’s parallels postulate) that was also developed in Azerbaijan in the 1290s; somehow this found its way in a matter of just 25 years to the Jewish scholar Levi ben Gerson in Orange in France.<sup>27</sup>

These examples (which could be considerably expanded) point to an important fact: even complex philosophical and scientific ideas were able to cross boundaries, despite the obstacles of distance, language, religion and cultural difference. And we can go further and assert that scientific and philosophical ideas travelled widely in premodern times, and it is no exaggeration to think of the *oikoumene* as having hosted something we should not hesitate to call global science. (p. 85) And there was a consciousness about this among the actors themselves. As one of the major figures in the Tabrīz circle of scholars, Quṭb al-Dīn al-Shīrāzī, noted about astronomy: “it is not a science that changes with a change of religions, or varies over time and place.”<sup>28</sup>

In recent centuries, this process of transmission of knowledge has accelerated considerably. But as the example of Fukuyama vs. Huntington indicates, the manner in which transmission is conceived has markedly changed. Rather than a process by which there is

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<sup>26</sup> A good summary of Chioniades and his astronomical work can be found in Joseph G. Leichter, “The Zīj as-Sanjaī of Gregory Chioniades: Text, Translation and Greek to Arabic Glossary,” Brown University Ph.D. dissertation, 2004, pp. 2-17. An extended discussion of the transmission of the Tūsī couple via Chioniades and of the Tabrīz circle of which he was a part is in F. Jamil Ragep, “New Light on Shams: The Islamic Side of Σάμψ Πουχάρης,” in *Politics, Patronage and the Transmission of Knowledge in 13th - 15th Century Tabriz*, edited by Judith Pfeiffer (Leiden: E. J. Brill, forthcoming), pp. 166-180.

<sup>27</sup> Tony Lévy, “Gersonide, commentateur d’Euclide: traduction annotée de ses gloses sur les *Éléments*,” in *Studies on Gersonides: A Fourteenth-Century Jewish Philosopher-Scientist*, edited by G. Freudenthal (Leiden: E. J. Brill, 1992), pp. 83-147.

<sup>28</sup> Quṭb al-Dīn al-Shīrāzī, *Nihāyat al-idrāk fī dirāyat al-aflāk*, Berlin, Staatsbibliothek, Petermann I MS 674, f. 1a.

intercultural *exchange*, the choice now is between the obliteration of other cultural traditions through the triumph of a superior West, or the toleration of other cultures that will be “contained” by that superior West.

#### **4) What are the political (and other) implications of these views?**

When I embarked many years ago upon a comparative study of knowledge systems, in part to expand my teaching, I thought that there were political implications and relevance to the subject but that I would have a difficult time convincing anyone of that. For most of my career I was proven correct; but in the last few years the political implications of some of the views I have been describing have become, not altogether happily, all too apparent. (p. 86)

The notion that modern science is somehow tied to western values of freedom, liberty, and openness has begun to be challenged, not only by western analysts of scientific history and practice, but also by non-western thinkers and governments, who insist that impressive scientific results are possible in different cultural contexts. The case of China is instructive. As we have seen, many of the views regarding the growth of knowledge in the West have emphasized the “open” nature of that science. In other words, science grew when scientists were allowed to explore freely, without social, religious or political constraints. This was in some ways challenged by Kuhn (at least as some have interpreted him), who spoke of the social constraints of scientists working within a paradigm. One might thus argue that given the fact that scientists are social beings, even qua scientists, then social constraints, as determined to be in the best interests of the society, are not necessarily a bad thing. Here the traditional values of Chinese society, in particular Confucian values, could be seen as providing a way to regulate science for the public good and even make it more efficient.<sup>29</sup> (p. 87)

The idea that science needs constraints can also be found in Islamic circles. The Iranian exile S.H. Nasr, who has degrees from M.I.T. and Harvard and currently teaches in the United States, has railed against western science, pointing to its secular and unrestrained nature as

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<sup>29</sup> Although not specifically dealing with science, Tianjian Shi discusses the revival of Confucianism in China in the last decade and its implications for “modeling an alternative to Western-style democracy”; see his “Traditional Values in a Modern Chinese Context” (Beijing, June 22, 2009): <http://www.carnegieendowment.org/2009/06/22/traditional-values-in-modern-chinese-context/3ez> (accessed 11 July 2011).

having led to such destructive excesses as weapons of mass destruction, the environmental crisis, and so forth. He and others have called for an Islamization of knowledge that would take us back to a supposed golden age when science and religious values were in harmony.<sup>30</sup> Whether these views have had an influence on science policy in Islamic countries is an open question. There are a number of prominent persons in Iran and elsewhere in the Islamic world who have sympathy for such views, which include a disdain for Darwinism, but it is questionable whether making science and technology pass a litmus test of religious harmony will hold much sway in countries trying desperately to modernize and compete in a global economy.

Views about the nature and history of knowledge have found their way into policy discussions and political decisions over the past several years. To quote Henry Kissinger: “The West is deeply committed to the notion that the real world is external to the observer, that knowledge consists of recording and classifying data—the more accurately the better. Cultures which escaped the early impact of Newtonian thinking (p. 88) have retained the essentially pre-Newtonian view that the real world is completely *internal* to the observer” (emphasis in original).<sup>31</sup> To see how such ideas have played out in policy, consider the following statement of November 8, 1997 by Richard Butler, the former executive chairman of the United Nations Special Commission to disarm Iraq: he was, he told an interviewer, fascinated by “the wide variation there can be between cultures on what constitutes telling the truth.” Mr. Butler also said that he came “from a Western intellectual and literary tradition that says truth is something rather objective,” and he suspects that “truth in some other cultures is kind of what you can get away with saying, and what you can get the crowd to believe.”<sup>32</sup> (I don’t think we need to belabor the objectivity of Butler and the Bush administration regarding the Iraqi weapons of mass destruction.)

On another level, we can see other political implications of the need to divide the world into starkly black and white terms, one of the hallmarks, according to Lévi-Strauss, of the “savage mind”. It is quite fashionable in both conservative and liberal circles to see the Islamic world as antagonistic, if not a threat, to the hard-won freedoms and liberties of western, liberal

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<sup>30</sup> Seyyed Hossein Nasr and Muzaffar Iqbāl, *Islam, Science, Muslims and Technology* (Sherwood Park, AB: Al-Qalam Pub., 2007).

<sup>31</sup> Henry Kissinger, *American Foreign Policy*, 3d ed. (New York: Norton, 1977), p. 48.

<sup>32</sup> Barbara Crossette “Unlikely Envoy: U.N. Point Man on Iraq,” *New York Times*, November 8, 1997.

democracy. One can debate this point but unfortunately the way in which this view is usually invoked often leads inextricably to the conclusion that there is a clash of civilizations that can only be avoided if Islam changes. (p. 89) Given the past several years, I don't think that anyone would deny that all societies worldwide are in need of change. But the view advocated by many is that Islam is in need of not just internal reform but of external, forced change based upon a certain reading of its intellectual history. According to this view, Islam long ago turned its back on rationality. But in fact, whether these views come from academics, scientists, politicians, or the Pope, they are based upon a complete distortion of the historical record.<sup>33</sup> Why is this important? Because if the Islamic world consisted of multifaceted societies that maintained scientific traditions well into the modern period, and these traditions were disrupted by transformations brought about by the European colonial enterprise, then this would seem to dictate a far different prescription for change than a view that sees Islam as being fundamentally and essentially opposed to rational thought. One of the great ironies of the current situation is that the knowledge needed to understand the past, and provide possible insights into solutions to current dilemmas, are often precluded by an unhealthy, if unintended, alliance between western intellectuals bent on seeing Islam in monolithic, anti-modernist terms, and Islamic radicals intent on opposing the West in all its manifestations. (p. 90)

As we become more and more a global society, the resistance to globalization increases. Multiculturalism is attacked from all sides; we seem at times to be reverting to the worst aspects of a nationalist, xenophobic and insular provincialism that many of us had thought and hoped were far behind us. Perhaps what is most shocking is that in the past decade it has become acceptable once again, in both scholarly and political discourse, to speak in terms of civilizational difference, to use essentialist terms, and to characterize hundreds of millions of people with stock phrases. Ideas have consequences; and distorting the historical record to legitimize violence or denigrate ethnic groups, religions or cultures has led to horrific consequences, both in the past and, unfortunately, in the present. This is why this debate matters. And why the power of reason is critical if we are to confront the enormous problems of our present and future. History is a demanding teacher, and the answers it provides are not always

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<sup>33</sup> F. Jamil Ragep, "When did Islamic science die (and who cares)?" *Newsletter of the British Society for the History of Science* 85 (Feb. 2008): 1-3.

manifest. But one lesson I believe we can and must recognize is that human societies have been most vibrant, productive and creative when they were willing to accommodate a diversity of ideas and a variety of people. And the cross-cultural transmission of ideas in the premodern period can teach us that our present is the product of many cultures and that our future must be as well.