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Author

Nahid, Babak

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TOBY E. HUFF, *The Rise of Early Modern Science: Islam, China and the West*, (Cambridge: Cambridge Univ. Press: 1993) 409 pp.

Writing in the wake of works on the history and sociology of science by scholars such as Joseph Needham and I. A. Sabra, Toby Huff makes yet one more attempt at explaining a tricky and recurring problem: why a putatively more 'advanced' society begins to stagnate and decline, only to be overtaken by an emergent yet more 'primitive' civilization. Huff begins his inquiry by positing the Chinese and, in particular, the Islamic scientific "failure" as a "mystery" and a "deep puzzle" begging to be unraveled. Why exactly, he asks, did modern science arise "only in the West and not in the civilizations of Islam and China, despite the fact that medieval Islam and China were more scientifically advanced?" (i). Huff argues that science in the Islamic and Chinese civilizations cowered from going the "last mile" and "failed to continue its march toward the development of this universal institution of modernity" (61) because of cultural handicaps resulting from religious, legal, philosophical, and institutional aspects of their respective societies.

It is well known that Copernicus's revolutionary theory of heliocentrism was founded upon Islamic research and discovery, and Huff cites this fact as the most dramatic illustration of his book's thesis as well as the sign of a clearly missed opportunity by the Moslems. In the thirteenth century, the combined efforts of the Marâgha School of astronomers, especially Iranians like al-Tusi and Qutb al-din al-Shirazi, as well as Damascenes like Ibn al-Shatir, meant that Moslem scientists "arrived at a planetary model mathematically equivalent to the Copernican model of a century and a half later" (87). Yet, they "failed to achieve the philosophical and metaphysical transformation that we call the scientific revolution of the sixteenth and seventeenth centuries." The reasons, Huff argues, had to do with a lack of the kind of courage that "dared to break out of the received (religious) conception of the world's natural order," "the absence of the rationalist view of man and nature, most thoroughly exemplified in Plato's *Timaeus*," "the extremely personalistic nature of social relations in the medieval Middle Eastern world," and "real legal impediments to the formation of social structures open to and supportive of science...centered in the absence of a legal theory of corporations" (89-90).

All these points but the last are reminiscent of outmoded scholarship on Arabs and Islam and have been amply dealt with in count-

less critiques of such orientalist texts. Huff's originality, then, must lie in what he has to say about "a legal theory of corporations" and its influence in the birthing of new "religious, economic, communal, educational, professional" (135) and ultimately political institutions in the West. Huff defines incorporation as "the legal idea of treating a collective body of people as a unit, a whole body or corporation" (134). Applying the "famous Roman maxim, 'What touches all should be considered and approved by all'" to medieval institutions meant that European "canon law recognized these collectives as legitimate legal entities with the rights of assembly, ownership, and representation (both internal and external)" enabling and delineating the separation between church and state, public and private jurisdiction. Moreover, as the "principle of due process and representation was put into effect, it created a new concept of political consent, whereby rulers had to receive the approval of the governed" (147). Such 'corporate perks' as "constitutional government, consent in political decision-making, the right of political and legal representation, the powers of adjudication and jurisdiction" were unavailable in Islamic and Chinese civilizations where legally "everything is up for grabs" (215): "The emergence of corporate actors was unquestionably revolutionary in that the legal theory which made them possible created a variety of new forms and powers of association that were in fact unique to the West, since they were wholly absent in Islamic as well as Chinese law" (120).

Flying the 'corporate' banner as a Western civilizational flag, Huff thus attempts to explain how incorporation as a pivotal concept in medieval Europe, from the church, to guilds, banks, cities, universities, princes, and entire nation-states, made possible the superiority of the modern West and its democratic system of government over the rest of the world. "The Rise of Early Modern Science" thus emerges as a mere example of the global rise of the modern West. He makes his chief concerns quite explicit when he insists "not on the linkage between science and capitalism, but on the linkage between the rise of a great faith in reason and the application of this real or imagined agency to the study of the natural world and to all the other domains of cultural existence" (6). Huff wishes to persuade us that his assumptions about science in non-Western civilizations apply to contemporary global politics and power shifts: "the central issues are the same: will the developing countries of the world allow their citizens full participation in the realms of the mind—scientific, political, and literary—or will they continue to erect barriers to free-

dom of thought, expression, and action in the interests of primordial religious and ethnic identities?" (7).

In one fell swoop, Huff ignores the ways in which the institutions of modernism, capitalism, colonialism, and more recently, corporate multinationalism and New World Orderism, have functioned historically as structures of domination and instead calls on them only as evidence of rationality, progress, and as justification for Western global hegemony. Claiming to be examining differences in the religious, philosophical, and legal institutions of the three civilizations, Huff begins showing symptoms of an acute relapse into an orientalist anthropology beset, according to Edward Said, by "the binary typology of advanced and backward (or subject) races, cultures, and societies."³ Where Huff credits Islamic civilization *vis-à-vis* a coeval West for its contributions to early modern science, it is only with serious reservations. An ardent Greco-Romanophile, Huff assesses almost everything the Moslems and the Chinese discovered, invented, calculated, explored, and experimented upon as either only "protoscientific" or an act of "scissor-and-paste" plagiarism.

Bizarrely, Huff even claims there to be a gross neglect, by "sociologists and even many historians of science" (341) of the role of the West in the rise of early modern science. He rejects, for instance, the idea that the first modern institutions of higher learning evolved in Islamic society and believes that European universities, not Arab colleges or *madrasas*, should be credited here. The fact that the medieval world's greatest scholars, scientists, and philosophers (not just Moslems, but Jews, Christians, and Zoroastrians, and not only Arabs but Persians, Greeks, Indians, Chinese, Turks, Syrians, Egyptians) taught at, interacted with, and somehow benefited from the *madrasa* from the ninth to at least the fifteenth century appears moot to Huff. For him, "it was only in the West that the scientific revolution took place, and the existence of the university with its uniquely scientific and philosophical curriculum made a major contribution to that outcome" (341). From this perspective, *madrasas* are Islamic, while universities are unique to the West. The important distinction as far as Huff is concerned is more of the usual: "open, public debate" took place *solely* in the West. Moreover, Huff has no doubt that the only 'science' taught in the *madrasas* was just "enough mathematics to equip legists and *qadis* to divide up inheritances" (153). Lacking a Western "scientific ethos," and having not a clue as to the finer

³Edward W. Said, *Orientalism* (New York: Vintage Books, 1979), 206.

points of institutional learning, Islamic culture's contributions to modern science, no matter how significant, are portrayed as mere aberrations, conducted surreptitiously by heretical Moslems: "Thus, loopholes in the *madrasa* system account for the fact that Arabic science achieved great heights in medicine, optics, mathematics, and astronomy, although," Huff sadly informs us "it did not make the breakthrough to modern science" (154). Huff dismisses the corporate and semi-autonomous nature of trusts and foundations like the *wuqf* which, independently yet in ways that were compatible with Islamic legal norms, funded scientific exploration and higher education until the end of the Ottoman Empire.

Part of the problem lies in Professor Huff's sources, most of which, not surprisingly, are dredged from an orientalist tradition. Many were decisively tackled in Said's *Orientalism* over a decade and a half ago. Said demonstrates the extent to which scholars like Ignaz Goldziher, H. A. R. Gibb, Ernest Renan, G. E. Von Grunebaum, Bernard Lewis, D. S. Margoliouth, and E. G. Browne, as some of the fathers and influential practitioners of modern orientalism, engaged in the 'scholarly' production and dissemination of an essentialist image of the Arab and of Islam as someone and something eccentric, mysterious, unchanging, repressive, backward, inferior, addicted to mythology, unable to seek the truth, and ultimately fit to be overcome by the West. Many more of Huff's less antiquated sources have been taken rigorously to task in countless works since *Orientalism*. Riding pillion on the back of the long-discredited school of the orientalists (Goldziher's ideas, for instance, are over a century old), Professor Huff cannot but eventually sink into an epistemological quicksand.

Huff writes, for example, that in Islam "innovation...was equivalent to heresy" (117). Via footnote, he attributes this and many more essentialist gems to Bernard Lewis, whose work Said showed exemplified "only the latest—and in the West, the most uncriticized—of the scandals of scholarship" (*Orientalism*, 316). Not that Huff shirks from homegrown speculations of his own. Millions of Moslems, among others, may learn from Huff that according to Islamic law "murder and bodily assault are treated as private affairs" (215) in which the state does not interfere or that "one could request as many legal opinions as one desired on a question of law and morals and choose to follow the one most personally congenial" (89). Or that the Chinese made their scientific strides *in spite of* "the many weaknesses of the Chinese language as an instrument of clear and

unambiguous communication" (291) without explaining how Asian countries (including China, Korea, and Japan) continue to make such strides ("Arabic language," Huff adds, "is only slightly less ambiguous" [293]). Or that, unlike Islam and China, Europe alone inaugurated a modern science that was pure, objectively neutral, universal, value-free, and disinterested.

While Europeans "wholly committed" themselves to the notion of a rational man and a rationally ordered cosmos, Islam, because of its "fundamentalism," "particularism," "occasionalism," and "personalistic" tendencies, "sought to tightly circumscribe and eliminate human reason as a source of law" (234). Where Islam repressed and shrank from rational thinking, Christianity was, together with Greek thought, the primary cause of European intellectual fearlessness. While Moslem clerics bashed Reason to a pulp with the club of Tradition and Fideism, Christian clerics had the Bible, "according to which man has an unquenchable rational agency that enables him to make informed judgements on moral and ethical affairs" (117). Had the Moslems had *the* Bible (instead of the Quran whose very authenticity Huff questions) would they have enjoyed an "unquenchable rational agency" too? Unlikely, since the Moslems and the Chinese fail Huff *even* in terms of conscience, an ingredient Huff finds necessary in a rational scientific mind but lacking in the Arab or Chinese mind: "there is an absence of the Western concept of *conscience* or inner moral agency in Chinese philosophy" (268 n. 116), and to the Moslems "the Greek and Christian idea of conscience (*synderesis*) was unknown" (111). Huff then quotes the Bible ("And ye shall know the truth, and the truth shall make you free"! [233]) to show how individual judiciousness through the faculty of conscience was responsible for allowing *homo occidentalis* alone to wrestle with moral and ethical dilemmas, and by extension, scientific phenomena.

Huff's reductive comparisons are designed to drown crucial questions in the din of general applause for a wondrous (and thus fictional) West. Medieval Europe's "breathtaking spheres of inquiry," we are told, took place "in the unique citadels of Western learning, that is, the universities" because Christianity had provided the Europe with "a new set of rational capacities that knew no bounds" (118). Thanks to "the genius of Western institution building" (359) Europeans "were masters at institutionalizing great ideas and ideals" (134) and they alone established a "disinterested agenda" which, as opposed to the Islamic and Chinese dabblings with "proto-scientific" methodologies, "was no longer a private, personal, or idiosyncratic

preoccupation, but a shared set of texts, questions, commentaries, and in some cases centuries-old expositions of unsolved physical and metaphysical questions that set the highest standards of intellectual inquiry" (336). Huff quickly puts an end to any skepticism a reader may harbor by declaring that "aside from the [*European*] scientific revolution itself, and perhaps even the [*European*] Reformation, no other revolution [*anywhere, anytime?*] has been as pregnant with new social and political implications as the legal revolution of the European Middle Ages" (120). Huff also credits colonialism (which he sometimes romantically refers to as "presence" and on other, more straightforward, occasions as a "penetration") for bringing the institutional framework of European society and civilization to the "Arabic Islamic situation" (139).

Where Huff finds either the generosity (or well-known, incontrovertible proof against his orientalist constructions) to credit Islamic civilization with scientific progress, he merely exploits it as a comparative means to expose any 'pretensions' the Chinese might have in this regard. For what the Arabs gain, the Chinese lose. Here again, Huff makes clear that the Chinese owe anything resembling 'modern science' to the colonizing Jesuits in the seventeenth century, to the imperialist Europeans in the nineteenth century, and to "Mr. Science" of the aftermath of the 1911 Revolution. In the end, none of these 'influences' was to any avail since everything Chinese (numerical system, system of logic, language and grammar, philosophy, religion, metaphysics, educational system, bureaucracy, government, legal and political systems, even family relations) was inimical to the thriving of science in that civilization. Huff writes, for instance, that for the Chinese scientist "the classic ways of knowing were not predicated on reason and logic but on listening with a sixth sense" (361). As in the case of Islam, the Chinese failure was, for Huff, inherently cultural.

In neither civilization can Huff find "free thought and, above all, criticism of all forms of the status quo, which is at the heart of the scientific enterprise" (363). Those familiar with the history of Islam would be surprised to learn that for its civilization science was only a marginal activity. Meanwhile in China there was total absence of "a genuine dialectic of disputation and a faith in reason" and, as adherents of a "primitive but natural instinct of mankind to think of the world in pairs," they "never outgrew this correlative way of thinking...as did the West" (252). How on earth, one wonders, did the Chinese and Moslems build entire millennia-old civilizations to

which, even Huff grudgingly admits, Western scientific progress owes a debt? How could they have made significant contributions to the West's scientific, rational, intellectual 'ethos' if they had none of their own? How can a civilization arrive at the level of scientific and intellectual progress that the Chinese and Islamic worlds reached if in them science was always a minor and clandestine activity? How, if Moslems lacked Western notions of conscience, intellectual autonomy, a disinterested scientific agenda, originality, educational institutions, and rational notions of man and the cosmos, did they make revolutionary breakthroughs in the arenas of medicine, pharmacology, optics, astronomy, mathematics, and philosophy? Sooner or later, the crucial question rears its head. What lies at the heart of Huff's own enterprise? What might constitute, in short, his "disinterested agenda"?

It emerges from the first few pages that "culture" is Huff's euphemism for race. If it weren't for Western culture, there would be no "rise" in the title of Huff's book. Chinese and Islamic civilizations got as far as they did, in spite of their lazy, duplicitous, paranoid, plagiaristic, retarded, and repressive (such adjectives pepper Huff's descriptions of Islam and China) cultural configurations, only to hand over the racial baton to the only race truly equipped, 'culturally' that is, to get a rise out of science. Second, Huff is keen to express his gratitude to mercantile capitalist corporatism as the institutional mother of modern science. Conversely, socialist-oriented collectives as may be found in Islamic or Chinese societies are condemned for leading only to retardation, irrationality, fundamentalism, and dictatorial bureaucracies. Third, Huff applauds the "corporate" Christian church as an inherently progressive and logic-oriented religious institution which not only didn't scupper the scientific endeavors of European civilization (as a knowledge-phobic Islam and an implausibly 'yang-yin' Confucianism did for theirs) but in fact underwrote them.

Historical developments rude enough to interrupt Huff's accolade to the West (such as the suppression and persecution of numberless thinkers and scientists among whom St. Thomas Aquinas, Copernicus, and Galileo are only the most famous, or typically repressive and reactionary measures such as the 'fatwa' issued by the Bishop of Paris in 1277 against 219 suspect propositions and their architects at the University of Paris, or the horrific Inquisitions that were about to grip Europe) are depicted as mere 'anomalies.' Nevertheless, anomalies such as those Huff cares to mention cannot but

peeve him. He seems particularly angered by the authorities' ungentlemanly treatment of Galileo, showing textual fury fresh enough for the offense to have happened only yesterday. But in the end he rescues Western civilization by dividing the blame equally between Galileo (he was too much of a "wrangler" "who preferred frontal assaults to quiet diplomacy") and a few anomalous "malevolent individuals." Huff is ultimately explicit about his motives for finally laying Galileo-gate to rest: "It is so important because it clearly violates all of our Western notions about the freedom of the individual and his right to seek and speak the truth" (353). One wonders if Huff isn't writing in the spirit of Galileo-gate by refusing to budge Europe from the center of the universe, just as the church refused to budge the earth.

"There is no document of civilization which is not at the same time a document of barbarism" notes Walter Benjamin.⁴ Yet, Huff seems too busy counting civilizational peas and cheering to spend a few critical or intellectually candid paragraphs on the more problematic areas of the evolution of modern science. It seems disingenuous in such a book not to ask, for example, whether the mechanistic, deterministic, and capitalistic aspects of Western scientific "ethos" merit reevaluation in light of their generous contributions to the near-fatal pollution of the planet, its simultaneous, sometimes irreversible, and often violent conquering of nature and cultures, the invention, use, and proliferation of the means for modern nuclear, biological, and chemical warfare, or the recent Franco-American scandal surrounding AIDS and its treatment. Here one also recalls not only Michel Foucault's discursive analyses of specific genealogies of law, psychiatry, clinical medicine, and history of science, but his more general critique of the webwork of Western scientific and institutional discourse and domination. Most recently, scholars have contributed to the post-Foucauldian critical canon by tracing the complex circuitry between torture, modernity, and modern science. It seems, therefore, that statements such as "science is especially the natural enemy of authoritarian regimes" or "science is thus the natural enemy of all vested interests" (1), betray more than the author's Eurocentrism. They illustrate a general lack of critical methodology. Moreover, by ignoring the sticky ideological goo that seeps out of the cracks of such flippant assumptions, Huff allows himself to equate science

⁴Walter Benjamin, *Illuminations: Essays and Reflections*, ed. by Hannah Arendt, trans. by Harry Zohn (New York: Schocken Books, 1968), 256.

with the West and the West with rationality, liberty, progress, and a historical right to global political ascendancy.

Finally, in an avuncular epilogue, Huff acknowledges belatedly an "anticipation that China will emerge as an economic giant" (363) but declares that it "must undergo major social and cultural changes to remedy [its] deficits" (364). Though he concedes that this is "a tall order" for the Chinese (especially since they may have been too lazy to maintain glossaries, much less start another cultural revolution), Huff feels "far more optimistic about China (and Asia's) contribution to modern science in the twenty-first century than that of the world of Islam." Huff then cites Iran as a derogatory umbrella-term for all Islamic societies. "The fate of science and education in the Middle East as a result of Islamic revolution is dramatically revealed by Iran's plummeting position in terms of students sent to study in the United States" (364). Unable to avoid even the most glaring sophistries, Huff neglects to consider that a culture's intellectual prowess may not be affirmed by a national brain-drain to the West and that perhaps Iran, despite the heavy tolls of revolution, war, plummeting oil revenues, and a blanket international boycott of technological assistance, is developing its own need-based brand of academic institutions and setting its own trends in scientific research and higher learning. For Huff, however, it is simply a matter of record that for most Moslems "modern science is perceived as un-Islamic, and those who embrace it are thought to have taken the first (and fatal) step toward impiety" (360). Ultimately, China and the Middle East must both grapple with a "historical absence of a Western-style individualism" (363) before they merit a pat from concerned scholars such as Huff.

Orientalist-bashing, whatever its apparent joys, ought not to be one's thrust when dealing with dubious scholarship. So to say that the author of *The Rise of Early Modern Science* is racist and Eurocentric would be saying, at the same time, too much and too little. Too much, because I am not interested in determining whether or not Toby E. Huff is a racist. Too little, because the racism that one encounters in his work is taken for granted in a discourse shared by the thinktanks that produce our pedagogical and public policies. Further, to come across an explicitly orientalist text at the threshold of the twenty-first century, at a time when a global multinational community of scholars becomes increasingly alert to the intellectual dangers and embarrassments of engaging in ethnocentric diatribe and churning out cultural superiority-claims is more depressing than surprising.

Still, neither Huff's cultural and racial narcissism nor a publisher gambling on controversy rather than scholarship necessarily negates the validity of any insights that may be loitering in his work.

In closing, therefore, I recommend *The Rise of Early Modern Science* not for what it is purportedly designed to be, an undergraduate textbook, but as a means of providing a rich exercise in critical thinking and the practice of a politics of representation, and, finally, because optimistic students of orientalist writing should find it jarring *and* instructive to learn the variety of modes and configurations in which postmodern strains of both latent and manifest orientalism continue to proliferate. To the author, I suggest Said's *Orientalism*. In it, one may see charted some of the dangers of engaging in a kind of scholarship that is a result of a "culmination of orientalism as a dogma that not only degrades its subject matter but also blinds its practitioners" (273).

Babak Nahid

Department of Comparative Literature

University of California, Los Angeles⁵

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