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ORIGINAL RESEARCH

A Critique of Darwin's *The Descent of Man* by a Muslim Scholar in 1912: Muḥammad-Riḍā Iṣfahānī's Examination of the Anatomical and Embryological Similarities Between Human and Other Animals

Amir-Mohammad Gamini[1]

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Abstract
The cliché of the clergymen or the religious scholars battling against modern science oversimplifies the history of the encounter between modern science and religion, especially in the case of non-Western societies. Many religious scholars, Muslim and Christian, not only did not oppose modern science but used it instrumentally to propagate their religions. Marwa Elshakry, in her brilliant study of Darwin's opinions among the Arab World, concentrates more on Arab Christians and Sunni Muslims rather than on Shiite Muslims. Muḥammad-Riḍā Iṣfahānī, a Shiite clergyman educated in Islamic theology in Najaf, composed *A Critique of Darwin's Philosophy* in 1912 as a review of the theory of evolution. However, even before the publication of this book, controversy concerning this topic had been raging in the Arab World for decades. Under the influence of Muslim scholars (Sunni and Shiite) to reconcile modern science with Islam, Iṣfahānī did his best to gather knowledge of modern biology. He applied his self-taught knowledge of modern biology to find new solutions to the difficulties of establishing a dialogue between Islam and modern science. Thanks to the rationalism of his premodern scientific education, Iṣfahānī was more sympathetic towards science than many of his Arab counterparts and able to deeply engage in these debates. Iṣfahānī believed that the theory of evolution in nonhumans did not contradict Islamic discourse nor experimental and rational facts. Nevertheless, he denied the theory of human evolution as a nonscientific hypothesis. He justified his opinion through a detailed refutation of Darwin's heuristic evidence for human evolution in the first chapter of *Descent of Man*, such as the similarities between anatomy, embryology, and vestigial organs in humans and other animals. He also referred to other Western evolutionists of his time, such as Alfred Russel Wallace and Rudolf Virchow, who also rejected human evolution, and added some other scientific refutations of his own. Undoubtedly, Iṣfahānī's final aim was to demonstrate the possibility of reconciliation between religion in general, and Islam in particular, with modern science. This article provides a detailed consideration of Iṣfahānī's opinions, identifying his Arabic sources and comparing them

Extended author information available on the last page of the article

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to the original non-Arabic sources. I also examine the scientific details of Iṣfahānī's achievements and the roots of his misunderstandings.

Keywords Muhammad-Riḍā al-Najafī al-Iṣfahānī Masjidshāhī · *The Descent of Man* · The theory of human evolution · Haeckel · Islam and science · Darwin and the Arab World · Iranian Shiism and modern science

Introduction

In contrast to the general science textbooks in Saudi Arabia, which include creationism and Quranic verses about God's creation as well as a rejection of evolution theory (Determann 2015, p. 2; Burton 2010, p. 26), the official Iranian high school textbooks of biology contain a detailed description of the theory of evolution and the process speciation. However, they do not venture beyond nonhuman organisms. Although there is no mention of creationism or Quranic verses in these textbooks and eight pages are dedicated to the theory of the "primordial soup" (Keramoddini et al. 2015, p. 50), the human species is missing even from the cladograms and the embryological comparison (Fig. 1).

This omission is not limited to biological textbooks. Many books on the theory of evolution published with the permission of the Iranian Ministry of Islamic Guidance have suffered the same fate, while books with "human evolution" in their titles also have difficulties being published in Iran. Although there are different approaches to the theory of evolution among the Shiite *ulama* (Muslim religious scholars), their official approach is not to oppose the theory of evolution in the case of nonhuman organisms. Burton believes that the different approaches of Saudian and Iranian textbooks to Darwin theory can be explained by the fact that Saudi Arabia lacked any real tradition of secular education. By contrast, Western-style secular education had emerged in Iran in the mid-nineteenth century. She also mentions the difference between Shiite clergymen in Iran, with their emphasis on interpretation of holy texts, as opposed to the Wahhabi Saudi clergymen's Quranic literalism (Burton 2010, p. 28).

Here I shall study one of the key historical figures among Shiite clergymen, Muḥammad-Riḍā Iṣfahānī, and his role in understanding and criticizing the theory of evolution in Iran. This article examines how Iṣfahānī, one of the representatives of the traditional Shiite school of thought in the early twentieth century, approached modern science, especially the theory of human evolution. Educated in theology and other traditional branches of knowledge in Najaf, one of the holiest cities of Shiite Islam (after Mecca and Medina) where the greatest Shiite schools of those times were situated, Iṣfahānī became one of the most well-known Shiite scholars. In 1912, he published a review of the theory of evolution, which was particularly notable, given that the debate and resulting controversy over evolution had been raging in the Arab world for decades.

Marwa Elshakry, in her study of Darwin among the Arab world (Elshakry 2013), concentrated on the Arab Christians and Sunnis, with little attention paid to the

Shiite Muslims. Here I explore this important Islamic sect's encounter with modern science, especially evolution theory. I will examine the extent to which Shiite scholars followed in the footsteps of their Arab counterparts and in what aspects they introduced new approaches.

Nineteenth-Century Debates over Evolution in the Middle East

The work of Muḥammad-Riḍā Iṣfahānī, and the reception of Darwin's theory of evolution in Middle Eastern societies, must be placed in the broader context of the modernization movement that swept the Islamic world in the nineteenth century. A central aspect of the modernization movement within parts of Arab lands was focused on educational reform movement of the earlier part of the nineteenth century that aimed to introduce Western education to the regions of the Ottoman Empire. This included inviting Christian missionaries to found universities to offer Western teachings in Arabic through journals and other forms of teaching. Among others, Arabic Christian journals of popular science, especially *al-Muqtaṭaf*, played a significant role. As a monthly periodical, *al-Muqtaṭaf*, based initially in the Syrian Protestant College (chartered in 1866; today the American University) in Beirut, the center of intellectual life in greater Syria, had been published by Yaʿqūb Ṣarrūf and Fāris Nimr since its founding in May 1876. Ṣarrūf and Nimr were both among the few native science instructors employed at the Syrian Protestant College. For American missionaries in Beirut, modern science was considered to be an instrument to illustrate the Protestant church's rational superiority over Catholicism. Most of the articles in *al-Muqtaṭaf* were translations or summaries from English popular-science journals such as *Scientific American*, and *Popular Science Monthly*.

The theory of evolution was a frequent subject in this journal. *Al-Muqtaṭaf* followed the debates, and from the beginning human origins became the most controversial issue (Elshakry 2013, pp. 28, 33, and 51). The editors were cautious when approaching human evolution, since they were not certain about the accuracy of the evidence supporting the evolution of the human species (al-Muqtaṭaf 1879, p. 89). But gradually, they took a less conservative position. In 1882, the journal published the graduation address presented by Edwin Lewis, a Harvard-educated professor of geology and chemistry at the college. On the occasion, Lewis, in line with the views of his former teacher Asa Gray, paid homage to the recently deceased Darwin, praising his patient scientific inquiry and his illustration of "how God worked through evolution in the natural world" (Livingstone 2014, p. 24). The publication of Lewis's speech provoked church administrators and senior faculty of the Syrian Protestant College to object to promoting as "yet unproven theories" (Elshakry 2013, p. 67; see also Livingstone 2014, pp. 23–24; Ziadeh 1991, pp. 69–83). Eventually, the college terminated not only Lewis but also Ṣarrūf and Nimr's appointments, claiming that the religious aims of the college had been subordinated to science (Elshakry 2013, p. 71). This move prompted Ṣarrūf and Nimr to leave Beirut for Cairo, where they could continue the publication of their journal in a more open-minded venue. Ultimately, however, "the Lewis incident served to further the dissemination of evolutionary theory in the Arab-speaking world" (Livingstone 2014, p. 24).

شده است به دست آورده‌اند. این گونه طرح‌ها که **درخت‌های تبارزایشی** نیز نام دارند، چگونگی ارتباط تحولی جانداران را نشان می‌دهند. درخت‌های تبارزایشی شواهدی برای تغییر گونه‌ها فراهم می‌آورند.

شکل ۸ــ۳ ــ درخت تبارزایشی که برای زنان همرنگرین ترسیم شده است.

کالبدشناسی (آناتومی) و مراحل تکوین جانداران، احتمال وجود نیاکان مشترک را تقویت می‌کنند.

مقایسهٔ ساختارهای بدن جانداران مختلف اغلب شباهت‌هایی اساسی نشان می‌دهد، حتی اگر این ساختارها وظایف متفاوتی داشته باشند. مثلاً، گاه ساختاری استخوانی در یک جاندار وجود دارد و وظیفه‌ای انجام می‌دهد، اما همین ساختار در جانداری دیگر به نسبت کوچک‌تر شده، فاقد نقش شناخته‌شده‌ای است، یا نقش بسیار جزیی برعهده دارد. چنین ساختارهایی که نشان‌دهندهٔ تغییرات جاندار در گذشته هستند، **اندام وستیجیال**[1] نامیده می‌شوند (شکل ۹ــ۳).

استخوان‌های مهره‌داران مختلف، متفاوتند. با این حال شباهت اساسی در ساختار استخوان‌های آنها دیده می‌شود. این شباهت اساسی می‌تواند حاکی از آن باشد که مهره‌داران یک نیای مشترک داشته‌اند. همان‌طور که در شکل ۱۰ــ۳ ملاحظه می‌کنید، اندام‌های جلویی مهره‌داران، از استخوان‌های

۱ــ vestigial واژهٔ لاتینی vestigium به معنی رد یا گرفته شده است.

تاریخ تغییر جانداران را در طول نمو رویان نیز می‌توان دید. نمو رویان مرغ را با نمو رویان سایر مهره‌داران که در شکل ۱۱ــ۳ نشان داده شده است، مقایسه کنید. هر رویان یک دم، چهار جوانه که منشأ اندام‌های حرکتی هستند و یک حفرهٔ گلویی (حاوی آبیشش‌های ماهی و دوزیستان) ایجاد می‌کند. دم اکثر مهره‌داران در بلوغ نیز باقی می‌ماند. اگرچه این ساختارها در گروه‌های مختلف مهره‌داران با سرعت‌های مختلفی نمو پیدا می‌کنند، با این حال هم‌ولوگ هستند. تنها ماهی‌های بالغ و دوزیستان نابالغ حفره‌های گلویی خود را حفظ می‌کنند.

شکل ۱۱ــ۳ ــ رویان‌های چند جانور مهره‌دار. رویان‌های مهره‌داران در مراحل اولیهٔ نمو دارای صفت‌های مشترکی هستند. با ادامهٔ نمو، ساختارهای مختلف تغییر می‌کنند و شکل نهایی آنها ایجاد می‌شود.

Fig. 1 Two pages from a contemporary Iranian official high school textbook of biology (Keramoddini et al. 2015, pp. 81, 83). There is no mention of humans, either in the cladogram or in the embryological comparison

In Cairo, Ṣarrūf and Nimr did not recant their theistic framework. In 1898, they even attempted to reconcile new geological ideas with divine creation (Elshakry 2013, p. 35). They believed that the experimental sciences were not enough to explain the nature of the physical universe (Ziadat 1986, p. 54). Nonetheless, their critics among religious authorities did not ignore them. Father Louis Cheikho (1859–1927), a Jesuit clergyman educated in France, founded a journal, *al-Mashriq*, to cover the latest news of modern science and technology, probably with a similar motivation as the Syrian Protestant College. On several occasions, he accused *al-Muqtaṭaf* of blasphemy. Cheikho himself penned many papers on the relation between science and religion, some of which were devoted to rejecting Darwin's theory of evolution based on religious doctrines (Ziadat 1986, pp. 64–82).

Al-Muqtaṭaf never abandoned its modest liberal stance and finally found its preferred philosophical grounding in Herbert Spencer's metaphysics, as a way to negotiate between materialism and theism (Elshakry 2013, pp. 67, 71, and 82). This tendency led the journal to misrepresent the theory of evolution by attributing notions of progress and direction to nature and even to society (Elshakry 2013, p. 82). Nevertheless, some articles espousing materialism did appear in their journal, such as several writings by the Christian intellectual Shiblī Shumayyil (1882–1917), who was the first to introduce the theory of evolution into the Arab World (see Ziadeh 1991).

Christian Secularism Versus Islamic Scholars

Like Shiblī Shumayyil, secular intellectuals strongly defended the theory of evolution against religion, declaring that there is a wide gap between this area of scientific research and religion. Shumayyil, not satisfied with Darwin's failure to uncover the ultimate origin of life, advanced "materialist science and philosophy" as the solution. Since Shumayyil's materialistic account of life and evolution, largely based on Ludwig Büchner's views, contrasted with *al-Muqtaṭaf*'s opinions, Shumayyil acknowledged in 1910 the tolerance of the editors (Elshakry 2013, pp. 107, 108, 114). Some parts of his translation of Büchner's *Sechs Vorlesungen über die Darwin'sche Theorie* (Büchner 1868),[1] a book in which Darwin's theory had been presented in a materialistic context, appeared in *al-Muqtaṭaf* (Ziadat 1986, p. 31). However, the editors did not hesitate to publish criticisms of Shumayyil's materialism or even characterize his book as nothing but "sheer unbelief" (Elshakry 2013, pp. 114, 116).

By the publication of Shumayyil's translation, a period of controversy arose in Arab world. As a response to his most tenacious critic, Ibrāhīm al-Ḥūrānī (d. 1915), Shumayyil published *The Book of the Truth* (Kitāb al-Ḥaqīqa) (Shumayyil 1885). Ḥūrānī, an Evangelical theologian in the American mission in Beirut, had in 1884 published *Philosopher's Procedures to Reject the [Theory] of Emergence and Progress* (Manāhij al-Ḥukama fī Nafy al-Nushūʾ wa-l-Irtiqā), which not only argued against Shumayyil's materialism, but also accused Darwin of lacking any absolute proof for his theory. This theory, Ḥūrānī argued, cannot explain the absence of "intermediary forms" and the links between species. Shumayyi, in turn, responded by mentioning the evidence of vestigial organs and the discovery of a fossil form that connected birds to lizards (Elshakry 2013, pp. 117–118). Ḥūrānī countered Shumayyil's *Book of the Truth* in yet another work, *The Truth and the Certainty about the Rejection of the Darwin's Nullity* (Al-Ḥaqq wa-l-Yaqīn fī Radd ʿalā Buṭl Darwīn) (1886). So, too, did Jirjīs Faraj Mārūnī Khūrī enter the fray, publishing *On the Descent of Man and the Cosmos: A Refutation of the Theory of Evolution and a Rejection of Dr. Shiblī Shumayyil* (Fī Aṣl al-Insān wa-l-Kāʾīnāt: Daḥḍan li-Madhhab al-Taḥawwul wa-Raddan ʿalā al-Duktūr Shiblī Shumayyil) in 1890 (Rahmati 2004, p. 17). Shumayyil combined *The Book of the Truth* and his translation of Büchner's *Sechs Vorlesungen* into one volume, entitled *A Philosophy of Emergence and Progress* (Falsafat al-Nushūʾ wa-l-Irtiqā), published in 1910 (Sadgrove 1997, p. 501). This flurry of point/counterpoint well indicates the intellectual turmoil aroused in both Evangelical and Arabic religious circles occasioned by the incendiary combination of Darwin's theory of evolution and Büchner's views of materialistic secularism. The Muslim Arab scholars did not join the controversy very late.

Only 3 years after Shumayyil's translation of Büchner, Ḥusayn al-Jisr (1845–1909), a Muslim reformer from Lebanon, published a refutation of evolutionary materialism. According to al-Jisr, God had created each species independent of others and there is no concrete evidence for even a nonmaterialistic account of

[1] Shumayyil probably translated the book from the French translation (Büchner 1869).

evolution. Nevertheless, he declared himself ready to accept the theory if it could attain enough support in the future. In al-Jisr's opinion, however, Islam could never accept human evolution (Elshakry 2013, pp. 151–152).

The Debate Among Shiites

As an elite non-Arab Islamic intellectual, Jamāl al-Dīn Afghānī (1838–1897) (Fig. 2), despite his primary association with the field of politics, contributed to the discussion of Darwin's views. In his *Naturalism* (Niychiriyya -1881), published in Persian,[2] Afghānī strictly refuted Darwin's theory of evolution as a materialistic philosophy. Basing his refutation on the nominal support of empirical evidence, he declared: "Is this wretch [Darwin] deaf to the fact that the Arabs and Jews for several thousand years have practiced circumcision, and despite this, until now, not one of them has been born circumcised?" (cited in Keddie 1968, p. 136). Although this objection would have been more appropriate against a Lamarckian view rather than Darwin's theory of natural selection, it was a criticism of Darwinism as well, since the Lamarckian mechanism is not absent from late editions of Darwin's *Origin of the Species* (Larson 2009, p. 15).[3] Afghānī's primary targets were, as he put it, "naturalists" such as Sayyid Aḥmad Khān (1817–1898), an Indian Muslim reformer who sought to reconcile natural science with Islam (Elshakry 2013, p. 120).

Muḥammad 'Abduh (1849–1905), Afghānī's pupil and the translator of *Niychirīyya* into Arabic, became one of the most influential advocates of the reconciliation of science and Islam. 'Abduh not only followed in the footsteps of the editors of *al-Muqtaṭaf* in admiring Spencer and his scientific theories, but he also accepted the potential compatibility of the Quran with evolutionary ideas. 'Abduh was even prepared to advance an interpretation of the Quran that was compatible with the theory of human evolution (Elshakry 2013, p. 175). His Quranic exegesis, *Tafsīr al-Manār* (continued after his death by Rashid Rida [1865–1935]), and 'Abduh's idea of the "scientific miracles" of the Quran became the source of inspiration for a new genre of the scientific exegesis of the Quran in the Islamic world.

'Abduh's interpretation of human origins, by contrast, found almost no supporters (Elshakry 2013, p. 218). Later, this genre faced opposition in the Muslim world in the writings of Muḥammad Shaltūt (1893–1963) and Sayyid Quṭb (1906–1966),

[2] It has often been said that the theory of evolution appeared in Persian for the first time in Taqī-Khān Kāshānī's *Zoology* (Jāniwarnāma) (1870), as, for example, was claimed by Adamiat (1977, pp. 24–26). However, Khosravi has recently shown that there is no trace of the theory of evolution in this book. He claims that historians like Adamiat mistook the Linnaean hierarchy of life that was mentioned in *Jāniwarnāma* as referring to the theory of evolution (Khosravi 2014).

[3] Bezirgan anachronistically judges Afghānī's empirical support as "absurd utterances about Darwinism" (Bezirgan 1988, p. 384), while Wilhelm His (1831–1904), a German experimental biologist and an opponent of the inheritance of acquired characters, similarly asserted, as had Afghānī, that thousands of years of circumcision had not altered bodily form (Montgomery 1988, p. 102). Bezirgan tried to justify Afghani's "deliberate attempt to caricature Darwin" on the ground of his passionate opposition towards Westernization. Nevertheless, Bezirgan rightly shows that Afghānī later changed his mind about Darwinism and became an advocate for evolution as a theory, one that, he believed, had previously been proposed by classical Islamic philosophers.

among others. In Quṭb's opinion, for example, the Quran should not be regarded as a book of astronomy, chemistry, or medicine (Elshakry 2013, pp. 315–316). Much earlier than Quṭb, however, a similar attitude was expressed by Shiite ulama, or interpreters of religious doctrine.

The Treatment of Science Among Shiite Scholars

Muḥammad-Ḥusayn Shahristānī (1839–1897), a Shiite Persian clergyman, was a prolific author, writing on many topics of concern. In his *Evidential Signs* (Āyāt Bayyināt) (1882), he addressed the relationship of science to religion. As he wrote: "Neither the Quran nor Imams mention anything literally about the configuration of the heavens … the objective of the religion is not to state such affairs … but to guide to religious teachings (pp. 90–91). Although, in this passage, Shahristānī saw neither any contradiction nor conciliation between modern astronomy and Quranic verses, it is not surprising that he objected to heliocentrism in favor of Ptolemaic cosmology. The origin of his objection was not his religious doctrines or his reading of the Quran but rather his Aristotelian and Ptolemaic knowledge.

Neither Shahristānī nor other Shiite ulama ever issued a *fatwa* (Islamic legal opinion) against modern astronomy. Contrary to Arjomand, who claimed that the Shiite ulama opposed modern astronomy in the nineteenth century (1997, p. 10), there is scant evidence for their literal or explicit objection to modern astronomy inspired by Islamic doctrines (see Gamini 2019).[4] Bezirgan claimed that a similar clamor against the theory of the rotation of the Earth was asserted by Sunnī ulama and, more generally, that Muslim clergy "attempted to vilify the theory of evolution and its author," but without citing any credible evidence or mentioning particular individuals (Bezirgan 1988, pp. 376, 379).

Among nineteenth-century Shiite ulama, only Muḥammad-Ḥusayn Shahristānī (Fig. 3), despite his above-mentioned comments on astronomy, appears to have been the only one to criticize the theory of evolution. In his *Evidential Signs*, he referred to the "accidental" creation of organisms (Shahristānī 2017, p. 43). Without any familiarity with an exact definition of evolution and natural selection, Shahristānī, like Afghānī, did not distinguish between evolution theory and a materialistic reading of this theory (Arjomand 1998, p. 11; 2020, p. 76).

A few decades later, a clergyman from Baghdad, Hibat al-Dīn Shahristānī (1883–1967) (Fig. 3), in *Islam and Astronomy* (*Al-Islām wa-l-Hayʾa*) (1910), developed the thesis of "scientific miracles" further than ʿAbduh, and probably independently since ʿAbduh did not deal with Shiite holy texts. Hibat al-Dīn, based on his own interpretation, claimed that there were many cases of the reconciliation of modern astronomical findings with Shiite Imams' sayings (known as *hadiths*) as well as Quranic verses (Gamini 2019, p. 73). His *Islam and Astronomy* led to the emergence of several scientific exegeses of the Quran and hadith among Shiites. These include the Quranic exegesis of Abu-l-Qāsīm Khuʾī (1900–1993), *al-Bayān fī*

[4] Arjomand's evidence only covers the Shaykhist leaders, who were considered as heretics by the mainstream of Uṣūlī Shiite ulama.

Fig. 2 Jamāl al-Dīn Afghānī [Asad Ābādī] (irdc.ir). *Source* Jamāl al-Dīn Afghānī: www.irdc.ir/files/fa/news/1395/11/23/2294_294.jpg

Tafsīr al-Qurʾān (Khuʾī 1974) in Arabic (first publication: 1956), and that of Nāsir Makārim-Shīrāzī (Fig. 4), *Tafsīr Nimūnah* (1980–1987) published in Persian (Gamini 2019, pp. 74–75). Although Hibat al-Dīn did not consider evolution, his acceptance of modern astronomy was influential among Shiite ulama.

Coming only 2 years after Hibat al-Dīn's *Islam and Astronomy*, Muḥammad-Riḍā al-Najafī al-Iṣfahānī's discussion of the theory of evolution, in *A Criticism of Darwin's Philosophy* (1912), was much more outstanding, not only in comparison to Muḥammad-Ḥusayn Shahristānī and Afghānī but also to his Christian counterparts, such as Cheikho and Ḥūrānī. Iṣfahānī defined his characteristic attitude toward the theory of evolution in the historical and cultural context shaped by all the debates prompted by the 1882 Lewis lecture and the responses it generated.

Muhammad-Riḍā al-Najafī al-Iṣfahānī Masjidshāhī

Muḥammad-Riḍā Iṣfahānī (1870–1943) was a clergyman of Persian descent born in Najaf (Iraq). He studied Islamic theology and law in the Shiite seminary of Najaf, one of the holiest cities of Shia Islam (after Mecca and Medina) and its spiritual and political capital. Not only was he educated in ordinary courses of Islamic jurisprudence, but he also passed traditional philosophy and mathematics. Iṣfahānī soon became recognized as one of the most well-known contemporary Shiite scholars. In 1912, living in Karbala (Iraq), he published a review of the theory of evolution, *A Criticism of Darwin's Philosophy* (Naqd Falsafa Dārwin), in Arabic in two volumes in Baghdad (Fig. 5).[5] Two years later, after the outbreak of the First World War, he immigrated to Isfahan, in central Iran, where he spent the remainder of his life up to his death in 1943 (Nājī al-Iṣfahānī 2010, pp. 63–83), which was particularly notable

[5] It seems that Iṣfahānī was not happy with the quality of publication of his book in Baghdad. In a letter to Muḥammad-Husayn Kāshif al-Ghiṭaʾ (1877–1953), one of the leading ulama of Iraq, he blamed the Iraqi publisher for misprints. Sending six volumes of his book to Kāshif al-Ghiṭaʾ, he asked for his help to publish it in Cairo (Naji al-Iṣfahānī 2010, p. 83).

Fig. 3 From left to right: Muḥammad-Ḥusayn Shahristānī (1839–1897), Hibat al-Dīn Shahristānī (1883–1967), and Muḥammad-Riḍā Iṣfahānī (1870–1943) (irdc.ir and varesoon.ir). *Source* Muḥammad-Ḥusayn Shahristānī: www.varesoon.ir/pictures-of-shiite-clerics/image.raw?view=image&type=orig&id=20679. Hibat al-Dīn Shahristānī: www.irdc.ir/files/fa/news/1395/11/23/2294_294.jpg. Muḥammad-Riḍā Iṣfahānī: www.varesoon.ir/pictures-of-shiite-clerics-sp-19361/image.raw?view=image&type=orig&id=11983

given that the debate and resulting controversy over evolution had been raging in the Arab world for three decades.

In his somewhat polemical work, Iṣfahānī devoted the first volume of *A Criticism of Darwin's Philosophy* to a critical survey of the theory of evolution. In the second volume, he presented a proof of God's existence and a refutation of materialism. To put forth an analysis of the theory of evolution, Iṣfahānī drew on the knowledge he had gained from studying Arabic translations of European scientific periodicals as well as the writings of classical Islamic scholars, including scientists, philosophers, and theologians.

The first volume can be divided into five main parts: (1) a history of skepticism concerning Islamic doctrines, from the early Islamic period and the later era of the Arabic translations of Greek philosophical texts until modern times (pp. 3–16); (2) a list of some evolutionist figures, such as J.-B. Lamarck, A. R. Wallace, T. H. Huxley, H. Spencer, and Darwin, labeled as faithful theists (pp. 16–31);[6] (3) an examination of the relationship between science and religion (pp. 31–44); (4) a scientific refutation of the theory of human evolution, itself in two parts: first, a criticism of evidence presented by Darwin in *Descent of Man*, and second, a refutation of the evidence given by other human evolutionists, such as Ernst Haeckel, Eugène Dubois, etc. (pp. 44–120); and (5) a critical survey of the basic elements of Darwin's theory,

[6] This claim, at least for some of them, has largely been discarded on historical grounds. For example, for Darwin, see Bowler (1989, pp.154–155).

i.e., struggle for existence, heredity, and natural and sexual selection (pp. 120–241). Below I provide an analytic survey of the fourth and fifth parts of the first volume.[7]

Iṣfahānī on the Relationship Between Science and Religion

According to Iṣfahānī, science is consistent with religion, since both seek the truth. Nevertheless, he acknowledged the superiority of religion over science; by this, he meant that religion is allowed to comment on the realm of science, but not vice versa.[8] For this reason, in the case of any apparent conflict between a scientific statement and a religious doctrine, he would doubt that a scientific statement would be a "certain fact" (p. 32). In his opinion, scientific achievements are of two kinds: (1) certain facts: proved by concrete evidence, e.g., the theory of heliocentrism (pp. 32–33) and (2) speculations: not proved by concrete evidence, e.g., the hypothesis of human evolution, which at the time had yet to be confirmed by scientific methods. Iṣfahānī concluded that it is not surprising for speculation to be in contrast to the religious teachings (p. 38).

Iṣfahānī expressed the view that the theory of evolution can be considered as an incontrovertible fact when applied to nonhuman organisms. He believed that not only do all religions oppose heterogenesis, but they also approve of a gradual process of creation. At the beginning of his book, Iṣfahānī wrote: "How can one assert that God has created everything suddenly while the Quran and the Bible affirm gradual creation? God creates fruits from trees and trees from plants" (p. 17). He further believed that there is no heterogenesis in either ontogeny or phylogeny. For the same reasons, he endorsed cosmological and geological evolutionary theories as well (p. 41). Accepting these views did not lead to having to deny the role of God in creation. For support, he quoted Jaʿfar Ṣādiq (702–765 C.E.), the sixth Imam of the Shiites: "Allah forbears from performing His activities except through causes" (p. 40).[9] Iṣfahānī concluded that all the mechanisms of evolution and the natural laws of our universe are designed by God and are operating under his supervision.

Such an account of the divine action in the universe manifested as natural laws was not new. Ṣarrūf and Nimr also held that natural selection, like gravity, is a natural law created by God. And they also believed that if something does not agree with religion, it should be rejected. In support, they quoted James McCosh (1811–1894), president of Princeton University, who said: "evolution is a law of God" (Elshakry 2013, pp. 107, 40). Even Darwin himself had spoken of a "Creator" who impressed the laws of evolution into matter but did not perform miracles (Darwin 1860, p. 490; see Dilley 2012, p. 49). Iṣfahānī, however, went further: in the fifth part of the first volume, he rejected a fortuitous interpretation of the theory of natural selection. In

[7] For a brief survey of other parts this work, see Ziadat (1986, pp. 95–98).

[8] Ziadat wrongly asserted that "Iṣfahānī was almost ready to divide science from religion" (1986, p. 97).

[9] See al-Kulaynī (1407 H., vol. 1, p. 183); Muhammad Sarwar translates this phrase as "Allah did not want to permit things to work without their means and reasons" (vol. 1, part 4, Chap. 7, p. 147, hadith 7), but it appears that by "*Asbāb*," Iṣfahānī means "causes" rather than "reasons."

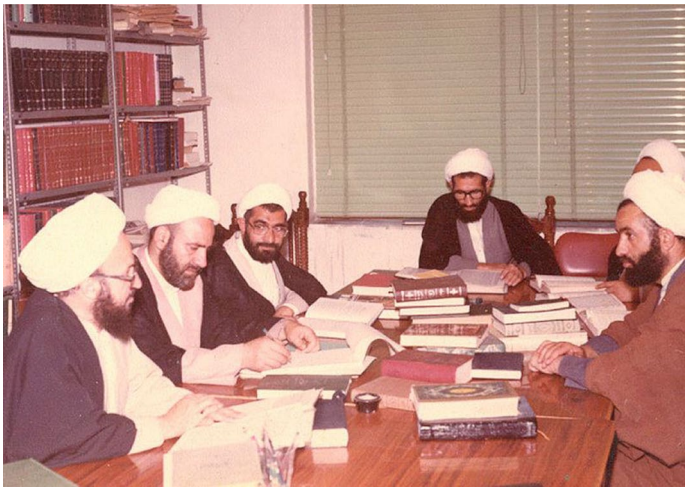


Fig. 4 Nāsir Makārim-Shīrāzī (b. 1927) (on the far left) and his colleagues, writing *Tafsīr Nimūnah*, inspired by the idea of the scientific miracle of the Quran (around 1980) (mohammadieshtehardi.ir). This Quranic exegesis had great influence on the official Islamic teachings in Iran. *Source* Nāsir Makārim-Shīrāzī and his colleagues: www.mohammadieshtehardi.ir/index_file/pic/p6.jpg

his eyes, God could act directly in the universe and lead natural selection toward a "divine amelioration" (*al-taḥsīn al-ilāhī*).[10] While discussing the importance of botanical beauty in attracting insects, for example, he wrote:

> If he [Darwin] had grown to his mental maturity, he would use the term divine amelioration instead of natural amelioration. I do not know how nature can distinguish between beauty and non-beauty, while in their [evolutionists'] opinions, she [nature] is blind. How does she ameliorate [the organisms], while they consider her unconscious? Why does the beauty remain [in organisms], while, according to their beliefs, nature is aimless? (p. 152)

As an opinion, the weak creationism that appears in the quotation above was not unique to Iṣfahānī. *Al-Muqtaṭaf*'s editors shared a similar view and advanced for their readers a gradual evolution under divine providence (Elshakry 2013, p. 106). It was precisely the position of many contemporary scientists, for example, Asa Gray (1810–1888), John Herschel (1792–1871), and St. George Jackson Mivart (1827–1900), all of whom believed in divine intervention in the process of evolution (Bowler 1989, p. 197; Larson 2009, pp. 16–17).

Despite his comments about nonhuman organisms in the theory of evolution, human evolution was for Iṣfahānī a contentious notion. The controversy around the theory of human evolution in the Arab world had started several decades before Iṣfahānī. In 1876, Rizqʾallah al-Birbarī, a native tutor at the Syrian Protestant

[10] See Ziadat (1986, p. 102). I think that the term *taḥsīn* probably comes from Quran 32:7: "alladhī *aḥsana* kulla shayʾ khalaqahu" ("Who made all things beautiful which He created").

College, declared that belief in the evolution of humans from animals was irrational. Bishāra Zilzāl reached the same conclusion in the following year, even though the materialists, like Shumayyil, strictly defended human evolution theories as well as the spontaneous generation of life. Between these two poles of thought, the editors of *al-Muqtaṭaf* emphasized the mental differences between humans and animals while admitting that the differences were a matter of degree. In an article published in 1887, Ṣarrūf and Nimr informed readers that most scientists rightly agreed with Alfred Russel Wallace, who rejected human evolution (Elshakry 2013, pp. 34, 38, 42, 116).

For Iṣfahānī, not only is human evolution inconsistent with religious beliefs, but also not supported by scientific evidence. In other words, human evolution can be regarded as nothing more than pure "speculation" (p. 38). Iṣfahānī noted the huge gap between the capabilities of the human mind and animals. As he wrote, somewhat rhetorically, if any time on Earth you could find a monkey "who could invent a sextant or discover the logarithm, a new moon for Jupiter, a new ring for Saturn, or a planet farther than Neptune, give my greetings to him" (p. 88).

In posing a significant difference between the human mind and the mentality of animals as evidence against human evolution, Iṣfahānī referred to some of the views of evolutionists who were contemporaneous with Darwin, including Alfred Wallace (1823–1913) and Rudolf Virchow[11] (1821–1902), but he did not mention Charles Lyell (1797–1875), who also shared this view (pp. 39, 51). They believed that humanity's abilities in mathematics and music are beyond the physical capability of animals and thus may not have evolved from prehuman animal forms (Bowler 1989, pp. 229–230).[12] Although not a theist, Virchow did not accept the theory of human evolution (Montgomery 1988, p. 86). The root of Iṣfahānī's rejection of the theory of human evolution is probably his conception of human's spiritual essence. The mental and spiritual abilities of humanity were the main obstacles between many Western intellectuals and the theory of human evolution. For this very reason, Darwin dedicated chapters two to six of *Descent of Man* to the mental and emotional similarities between humans and animals. These chapters were not available to Iṣfahānī. Nevertheless, he was aware of this deficiency, since he wrote:

> The books of Darwin and other leaders of this philosophy are not available to me and our lands are far from the lands from which these ideas have stemmed. I have ordered them from their locations. And it was prudence to defer the writing of my book to once I receive them, [but I did not do so] because of religious motivations and according to my supposition that it is urgently needed. (p. 7)

[11] In 1913, someone with the name of ʿAli ibn Muḥammad al-Iṣfahānī asked *al-Hilāl*: "who is Virchow who rejected Darwin's opinions and what was his idea?" (al-Hilāl 1913, p. 235). It seems that Virchow's scientific position as an opponent of Darwin was interesting for many Iranian-Arab readers.

[12] Iṣfahānī had access to Wallace's opinion through several articles in Arabic periodicals, such as al-Muqtaṭaf (1882, p. 126).

All the same, Iṣfahānī presented a scientific refutation of the theory of human evolution using a summary of the first chapter of Darwin's *The Descent of Man*, in addition to the latest papers published in Arabic scientific periodicals and other sources on this topic available to him.

A "Scientific" Refutation of the Theory of Human Evolution[13]

Iṣfahānī posed a list of Darwin's experimental evidence for human evolution and criticized them one by one. For this purpose, he referred to Darwin's *The Descent of Man* (1871). Although an Arabic translation of the book was not available at the time, a summary of the first chapter appeared through Khalīl Saʿd's Arabic translation in *al-Hilāl* (Saʿd 1904). Saʿd's translation is nothing but a summary, lacking the figures and citations to academic references in the original text. Also, many details are eliminated. Nevertheless, Saʿd quotes Darwin's main ideas of the first chapter that makes it possible for Iṣfahānī to criticize them according to his knowledge of modern biology.

At the end of his work, Saʿd suggested a solution for the contradictions between religious texts and the theory of human evolution. He believed that the Quranic verses asserting the creation of Adam by God and breathing into him of His spirit[14] should not be understood literally, since God is not corporeal and lacks hands or a mouth. Therefore, these verses should be interpreted metaphorically (Saʿd 1904, p. 147). Iṣfahānī, in response, asserted that a metaphorical interpretation of the holy text is acceptable only if there is evidence, as in the case of "God's hand" or "His breath," while human evolution is not a fact based on evidence (pp. 42–43). That is why he offered his criticism of Darwin's evidence for human evolution. Nevertheless, Iṣfahānī believed that even if in the future it could be claimed that human evolution is scientifically proven, the direct Divine creation of humans should never be understood as a metaphor because the belief in direct creation of man is necessary for religion (p. 44). As Arjomand rightly interpreted, Iṣfahānī thought that there are ample unequivocal verses that distinguish between the creation of humankind and that of animals (Arjomand 2020, p. 81).

To understand Iṣfahānī's criticism, we have to start from the beginning of the first chapter of Darwin's *Descent of Man*, where Darwin recommends anyone who

[13] In ***Western Science in the Arab World*** (1986), Adel Ziadat gives a short survey of Iṣfahānī's consideration of the human theory of evolution (pp. 98–100), while Marwa Elshakry and Najm Bezirgan made no mention of Isfahānī. They also do not mention Mehmed Elif Efendi's ***Darvin'e Cevab İrşadu'l-Ğâvîn Bi-Reddi Nazariyeti Feylesof Darvin*** (1925), written by a sheikh in one of the most essential lodges of Ottoman Istanbul (see İbanoğlu 2018). Bezirgan, in the introduction to his article, claims that "the significance and proportions of the controversy on the theory of evolution are greater in the Arab Islamic world than in other parts [of the Islamic world]" (1974, p. 375), while half of his study concentrates on Jamal al-Dīn Afghānī [AsadĀbādī] and Sayyid Ahmad Khān, two influential scholars from Iran and the Indian subcontinent.

[14] For example, see Q38:72.

"wishes to decide whether man is a modified descendant of some pre-existing form" to

> first enquire whether man varies, however slightly, in bodily structure and in mental faculties; and if so, whether the variations are transmitted to his offspring in accordance with the laws which prevail with the lower animals. Again, are the variations the result, as far as our ignorance permits us to judge, of the same general causes, and are they governed by the same general laws, as in the case of other organisms? (Darwin 1871, p. 9)

Although Darwin deferred these inquiries to the next chapters, Saʿd eliminated the question marks and added that "these requirements [of human evolution] are all satisfied" (Saʿd 1904, p. 145). Thus, he represented them as Darwin's first reason for human evolution: "capability of change." Iṣfahānī properly finds these assumptions without any proof, as he did not have access to the next chapters of Darwin's book.

Darwin followed by putting forward three heuristic hints, which Saʿd again misrepresented as "reasons."[15] As the first heuristic hint, Darwin claimed that a common descent for humans and other mammals can be concluded from their structural similarities:

> All the bones in his [a human's] skeleton can be compared with corresponding bones in a monkey, bat, or seal. So it is with his muscles, nerves, blood vessels and internal viscera. (Darwin 1871, p. 10; Saʿd 1904, p. 145)

Darwin went further and referred to some common diseases and behaviors such as drinking coffee and alcohol seen in primates other than humans (Darwin 1871, p. 12; Saʿd 1904, p. 145). Even though Darwin described this heuristic hint completely by referring to the works of other anatomists of his time, Saʿd excluded all the references from his translation. Iṣfahānī responded by referring to Shiite Imams and the classic Arab scholars who had written about the structural and behavioral similarities between humans and monkeys, such as Imam Jaʿfar Sādiq in his *Tawḥīd al-Mufaḍḍal* (eighth century), Ikhwān al-Ṣafā in their *Letters* (ninth century) (Ikhwān (1412) 1991, p. 170), and Damīrī in *Life of Animals* (*Ḥayāt al-Ḥayawān al-Kubrā*) (fifteenth century) (Damīrī 2003, vol. 2, p. 330). Iṣfahānī claimed that, in spite of their awareness of these similarities, none of the aforementioned authors had concluded that humans evolved from animals. He thus concluded that structural similarities do not necessarily lead to the existence of a common ancestor (p. 53).

Darwin's second heuristic hint for human evolution focused on similarities between the embryos of humans and animals. Saʿd brought forward Darwin's quotation of Ernst von Baer's embryological observations: "the feet of lizards and mammals, the wings and feet of birds, no less than the hands and feet of man, all arise from the same fundamental form" (Darwin 1871, p. 14; Saʿd 1904, p. 146). Darwin followed this by citing Thomas Henry Huxley's observation in the cases of three closely related mammals: "It is quite in the later stages of development that the

[15] Saʿd used the word "adilla" (1904, p. 147).

young human being presents marked differences from the young ape, while the latter departs as much from the dog in its developments, as the man does" (Darwin 1871, p. 14; Saʿd 1904, p. 146). Although Saʿd translated this quotation, he omitted the drawings by Theodor Bischoff and Alexander Ecker's drawings of 25-day-old dog and human embryos, which was reproduced by Darwin on the following page (Darwin 1871, p. 15). The omission of citations and drawings by Saʿd led Iṣfahānī astray again. Iṣfahānī considered embryological drawings untrustworthy, since sometimes fraud was reported about Western scientists. To support his claim, he brought up Haeckel's supposed "scandal" that was revealed by Arnold Brass a decade before Iṣfahānī's writing (p. 60). The story was that Ernst Haeckel, as a materialist and a faithful supporter of human evolution, presented in some of his lectures some schematic figures of embryos of human and different animals to illustrate their similarities and, consequently, their common ancestor. In 1908, Arnold Brass, a member of Der Keplerbund zur Förderung der Naturerkenntnis, attacked Haeckel's figures to fulfill his duty of defending Christianity against mand Darwinism. Brass claimed that the schematic figures used by Haeckel in one of his lectures misrepresented the original ones. Later, he went even further and asserted "Haeckel has falsely represented the developmental condition of the human, ape, and other mammals, in order to be able to sustain his hypothesis" (see Richards 2005, p. 107).

In comparison to the original references, namely Emil Selenka (1842–1902) and Wilhelm His (1831–1904), the head of the gibbon in the second stage of Haeckel's schematic (Figs. 6 and 7) of embryos was replaced by that of a human's. Haeckel, in the December 29, 1908 number of the *Berliner Volkszeitung*, acknowledged that in the process of schematization, the illustrator eliminated some unnecessary details (Richards 2005, p. 108).

The tension between Haeckel and Brass was mirrored in the Arab periodicals *al-Muqtaṭaf* and *al-Mashriq*. Louis Cheikho produced propaganda in his journal against *al-Muqtaṭaf* (al-Mashriq 1910a, pp. 238–239; Maʿlūf 1910a, pp. 725–728; al-Mashriq 1910b, p. 719). Consequently, an Arabic version of Haeckel's abovementioned article appeared in *al-Muqtaṭaf* (Maʿlūf 1910b, pp. 833–839). Iṣfahānī responded to this controversy, stating that he considered Haeckel's article as a confession of dishonesty, asserting that "Haeckel's reputation is destroyed among scientists forever" (p. 60).

Iṣfahānī represented this case as a scandal in the Western scientific community. However, he did not bother to study the details of the case. He did not recognize that Haeckel's figures were not original but rather a schematic copy from other scientists' works. He did not even realize that Darwin never used Haeckel's drawings to support his theory. Even if Darwin had used misrepresented figures, it would not have affected the core of his message—namely, that the similarities between embryos of human and other mammals are undeniable, and that the best explanation for these similarities could be found in the theory of common descent.

In addition to Darwin, Iṣfahānī mentioned and criticized other evidence for human evolution based on the similarities of the embryos. By referring to Joseph Le Conte's (1823–1901) book, *Evolution: Its Nature, Its Evidences, and Its Relation to Religious Thought* (2nd rev. ed., 1891), he brought up Louis Agassiz's (1807–1873) recapitulation hypothesis (Bowler 1989, p. 127). Although Agassiz considered this

hypothesis as a plan-like development rather than an argument for evolution, Haeckel later developed this idea, expressed in the famous adage "ontogeny recapitulates phylogeny," to support Darwinism (Montgomery 1988, pp. 107, 109). Iṣfahānī summarized this hypothesis as follows: "an individual during its development passes the very stages that its species has passed" (p. 65).[16] From the similarities between the stages of the human embryo and adult forms of lower organisms, Le Conte concluded that there is common descent between them. In his response, Iṣfahānī referred to a British lecturer called Marshall[17] who had put forward three criticisms of the recapitulation hypothesis:

1. The recapitulation happens only in the embryos of oviparous organisms.
2. Even the embryos of oviparous species do not represent all of the successive adult stages of their remote ancestors.
3. The stages of embryos do not follow the exact order of evolutionary stages. For instance, common frogs bear gills as tadpoles—to represent the path their aquatic ancestors once passed through—but there is a species of frog in America that never bears gills in its life cycle (pp. 65–66).

By quoting this criticism, Iṣfahānī claimed that the recapitulation hypothesis is not valid. Therefore, one cannot infer human evolution from similarities between the stages of human embryo and adult forms of lower organisms.[18]

Darwin's third heuristic hint was based on the existence of vestigial organs in the human body. As he wrote:

> Rudimentary organs … are either absolutely useless, such as the mammae of male quadrupeds, or the incisor teeth of ruminants which never cut through the gums; or they are of such slight service to their present possessors, that we can hardly suppose that they were developed under the conditions which now exist. (Darwin 1871, p. 17; Saʿd 1904, p. 146)

Darwin went into details and mentioned more examples of rudimentary muscles:

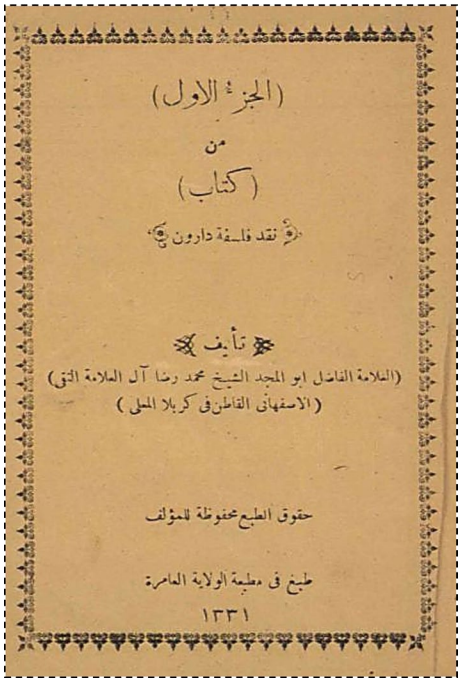
> The extrinsic muscles which serve to move the external ear, and the intrinsic muscles which move the different parts, are in a rudimentary condition in man, and they all belong to the system of the panniculus; they are also variable in development, or at least in function. I have seen one man who could draw the whole ear forwards; other men can draw it upwards; another who could draw it backward. (Darwin 1871, p. 20; Saʿd 1904, p. 147)

Saʿd, in his translation, eliminated Darwin's well-detailed description of how much the muscular system of the human ear, in comparison to lower mammals, is rudimentary. To validate his representation of humans' rudimentary organs, Darwin

[16] Iṣfahānī added that he could not find any demonstration for this hypothesis in physiological books.

[17] Probably he means Arthur Milnes Marshall (1852–1893). See the Arabic version of Marshall's ideas (1890, pp. 97–102).

[18] Haeckel knew that this is not a law without any exception (Montgomery 1988, p. 109).


(الجزء الاول)

من

(كتاب)

نقد فلسفة داروين

تأليف

(العلامة الفاضل ابو المجد الشيخ محمد رضا آل العلامة التقي)
(الاصفهاني القاطن في كربلا المعلى)

حقوق الطبع محفوظة للمؤلف

طبع في مطبعة الولاية العامرة

١٣٣١

Fig. 5 *The cover of the first volume of Iṣfahānī's* A criticism of Darwin's philosophy (Iṣfahānī 1912)

referred to the works and observations of many different scientists, all of which are excluded from the Arabic translation.

In response, Iṣfahānī asserted that the history of physiology shows a gradual discovery of the functions of the organs. For example

> in the Middle Ages, the imperfection of science of anatomy caused man's ignorance about [the function of] the heart which is the most important organ in the higher animals, let alone its enormous benefit; [and also caused] man's ignorance about [the function of] valves [of the heart], let alone their benefits.... Even though a benefit [of the heart] was realized before, the main benefit was not realized prior to the discovery of blood circulation by [William] Harvey [1578–1657]. (p. 71)

Iṣfahānī believed the same fate can be considered for the organs that Darwin called rudimentary.

This response may be comparable to what Husayn al-Jisr had proposed in his *al-Risāla al-Ḥamīdīyya*, not only to refute human evolution but also to reject any form of evolution. In his view, invoking the vestigial organs is the most powerful argument (al-Jisr 1904, p. 232). In response, al-Jisr wrote:

> What is the obstacle [to accept] that these vestigial organs have a benefit and there is a reason for them that is hidden from you, as the benefits of many things that are found in the bodies of plants and animals are hidden from you? For example, it would be apparent by referring to books on pathology that the

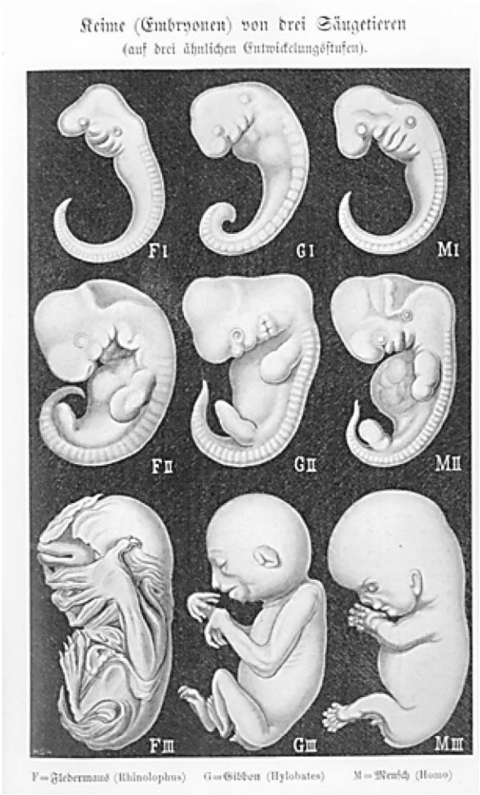


Fig. 6 Haeckel's schematic drawing of embryological stages of three species of mammals. From left to right: bat, gibbon, and human (reproduced from Haeckel's Menschen-Problem, in Richards 2005, p. 105)

> benefit of this colored matter in the animal body is unknown in most components of body except in [iris of] eyeball, while the reason behind its [existence] in the eyeball is to absorb the redundant rays of light. (al-Jisr 1904, pp. 234–235)

Iṣfahānī and al-Jisr did not consider that the general function of some organs and tissues, like muscles, is known and that it is wrong to say that the function of the useless muscles of the human ear will be discovered in the future. Iṣfahānī, possibly due to his awareness of the weakness of his response, added another one. He proposed that rudimentary organs may become functional in the future of human history. Regarding the recapitulation theory, Iṣfahānī suggested an analogy between a human, as an individual, and the human as a species. While talking about the nipples in human males, he argued that as breast develops into its functional form during a female individual's life span, the nipples of human males can develop into their functional form in the long term (p. 74).

From these statements, it seems that Iṣfahānī wrongly considered rudimentary organs under a different concept that Darwin called "nascent organs." Darwin had already distinguished between rudimentary and nascent organs:

> Rudimentary organs must be distinguished from those that are nascent; though in some cases the distinction is not easy. The former are either absolutely useless... Nascent organs, on the other hand, though not fully developed, are of high service to their possessors, and are capable of further development. (Darwin 1871, pp.17–18)

Since the above paragraph is not included in Saʿd's translation, however, Iṣfahānī did not figure out the precise difference between rudimentary and nascent organs. It is fascinating that Iṣfahānī unconsciously got very close to the concept of nascent organ based on his own naïve knowledge. He explicitly granted a form of micro-evolution within human species, but not more (p. 75).

Iṣfahānī offered another response in relation to the rudimentary organs in humans, such as wisdom teeth and the plica semilunaris of the eye. He postulates that they might have been functional before the advent of civilization:

> Before being guided to the arts of milling and cooking, [a human] needed more teeth. Since he did not know building techniques, it was necessary to cover his eye from sunlight, so he needed a third eyelid.... Then after he achieved the civilization ... the divine wisdom removed those [organs], [the same way He] had developed them for [humans] once they were needed. (pp. 76–77)

This response is also comparable with what al-Jisr had proposed to explain the vestigial organs in animals. Al-Jisr believed that the vestige of feet in some snakes might show the existence of feet in the past. He noted that snakes probably possessed feet similar to lizards, but God changed and faded them away, since snakes had started living inside the earth and were no longer using their feet (al-Jisr 1904, p. 235). It seems that al-Jisr accepted a kind of micro-evolution in animals, but not more, while Iṣfahānī granted macro-evolution in animals and not in humans. For him, in the realm of humans, only micro-evolution is allowed. However, both of these authors ascribe micro-evolution as a direct act of God.

Iṣfahānī payed special attention to Darwin's example of a human male's nipple as a rudimentary organ. He argued that this hypothesis leads to one of two hypotheses: (1) humans evolved directly from a gender-neutral ancestor, or (2) humans and the rest of the mammals evolved from a gender-neutral ancestor. The former hypothesis, in Iṣfahānī's opinion, is obviously wrong because the useless nipple also appears in males of lower mammals (pp. 77–80).To reject the latter, Iṣfahānī referred to Ibn Sīnā (Avicenna)'s *al-Shifā*, in which the lack of nipple in male hooved mammals is mentioned (al-Iṣfahānī 1912, vol. 1, p. 78; see Ibn Sīnā (1406) 1985, vol. 3, p. 28). Iṣfahānī concluded that humans could not be evolved from lower mammals. Although clever, Iṣfahānī's logic did not recognize that hooved mammals and humans are two polyphyletic groups. Nevertheless, his awareness of the traditional Islamic zoological studies played a major role in shaping his dialogue with modern zoology.

After examining Darwin's heuristic hints for human evolution, Iṣfahānī turned his attention toward other evidence in favor of human evolution, among them the discoveries of Eugène Dubois's (1858–1940). In 1891, working in Java (Indonesia), Dubois excavated a skull, a tooth, and a thighbone of a humanlike being far

more primitive than Neanderthals. From analyzing the shape of the bones, Dubois inferred that they belong to a humanlike being who had a brain smaller than a human's, walked erect, and had the ability to speak. He introduced it as the link between humans and animals (Bowler 1989, p. 232).

Nevertheless, the scientific community received this result with skepticism. At a zoology congress in 1895, Wilhelm Krause and Rudolf Virchow condemned this claim by asserting that Dubois's findings were nothing more than a gibbon skull and a human thighbone found together (Shipman and Storm 2002, p. 111). Iṣfahānī, being aware of this rejection (since he referred to Virchow),[19] added four other doubts concerning Dubois's discoveries:

1. One may not apply a fossil record, which remained for years under natural forces, as a piece of scientific evidence because it may have been deformed.[20]
2. The human brain is smaller than many animals, and some humans have brains even smaller than monkeys.[21]
3. Walking erect is not an instinctive human trait but is rather learned by training and habit. Moreover, there are some primates, such as gibbons, which mostly walk erect.[22]
4. The ability to speak is not a trait unique to humans, since there are also some monkeys with this ability. Therefore, the specimen that this skull belongs could not have been more evolved than a monkey and cannot be the missing link between human and other mammals (pp. 97–99).[23]

Although not exactly true and professional, Iṣfahānī's argumentation, by invoking scientific achievement and experimental observations of his time to carry on a dialogue with one of the most modern scientific theories, is fascinating and shows how a representative of traditional Islamic thought was able to understand and apply modern knowledge to analyze the new scientific theories.

Iṣfahānī's Legacy

In his review of Marwa Elshakry's *Reading Darwin in Arabic*, Peter Bowler wrote: "[I]n the literal sense, hardly anyone read Darwin in the Islamic world" (2015, p. 1255). As is shown above, although Iṣfahānī's account of Darwin's theory was not based on a complete reading of Darwin's original writings, he devoted his survey

[19] The name "Virchow" was wrongly typeset as "Qirshū" (وشرق) (p. 97), probably due to the similarity of the letters Fā (ف) and Qāf (ق) in the Arabic alphabet.

[20] It is noteworthy that after the discovery of the first specimens of Neanderthals in 1856, similar doubts were expressed by some biologists (Bowler 1989, p. 231). Among others, Virchow considered the Neanderthal skull segment as merely pathological (Montgomery 1988, p. 96).

[21] He refers to a British individual he called "Lānj" (p. 98).

[22] He refers to Büchner. See Shumayyil's translation of Büchner (1910, p. 163).

[23] Referring to Richard L. Garner (1825–1894). See an article with similar content in al-Muqtaṭaf (1893, p. 710–711).

to a summary of Darwin's original text, not merely to popular-science articles, and never relied on oral or unreliable information. His various references to books, papers, and Western scientists and philosophers prove that he did his best to update himself about recent works in order to contribute fully to scientific knowledge of the time (Fig. 8).

Unfortunately, Iṣfahānī's work did not attract the attention of either Muslim or Christian intellectuals and scholars as it ought to have. Shiblī Shumayyil, after receiving a copy of Iṣfahānī's book, told him: "your excuse is your ignorance" (Ostadi 1992, p. 584)! This reaction shows Shumayyil's inability to enter into a dialogue with a representative of traditional rational thinking who did his best to understand the language of modern science. In other words, if Shumayyil's prejudice had not been an obstacle, a fertile conversation could have emerged in the Arab world, but, unfortunately, Iṣfahānī was not seriously received among the secular writers who presented themselves as modernists. Among Arabic scientific journals of the time, *al-Muqtaṭaf* did not pay any attention to Iṣfahānī's book, but *al-Hilal*, two years after the book's publication, commented on it, stating: "the author applied himself to collect evidence and to infer arguments. Reading the book is useful for both supporters and opponents of [Darwin's] theory" (al-Hilāl 1914, p. 319).

Shumayyil's reaction led some Shiite clergy, such as Muḥammad-Bāqir Sabziwārī, to judge Iṣfahānī as someone "without any idea about natural sciences" (Ostadī 1992, p. 585). Although Iṣfahānī was considered by the Shiite ulama of his time as one of the greatest Muslim scholars (see Najafi 2014, pp. 67–73), Shiites who wrote about Darwin immediately after Iṣfahānī, like Asadallāh Kharaqānī (1838–1935) in *A Treatise to Criticize the Darwinists' Article* (*Risāla Tanqīd Maqāliyi Dāwīnīst-hā*) (1919), ʿInāyatallāh Dastghayb-Shīrāzī (d. 1928) in *Darwin and Eastern Philosophers* (*Dārwīn wa Ḥukamāyi Mashriq Zamīn*) (1922), and Mahdī Najafī-Iṣfahānī (1880–1972) in *Kitāb al-Murtafaq* (1928), did not refer to Iṣfahānī's work and ideas at all. The first reference to Iṣfahānī appeared only decades later the works of some Iranian writers.

In religious courses Iṣfahānī taught in Qom (Iran), four of his students—Majd al-Dīn (his son), ʿAbdullāh Tabrīzī, Muḥammad-Bāqir Kamariʾī, and Rūhallāh Khomeini (Fig. 9) (who later became the leader of the Iranian Islamic Revolution in 1979)—asked him to teach them about his *A Criticism of Darwin's Theory* (Ostadī 1992, p. 590). Unfortunately, only one year later, Iṣfahānī abandoned teaching and returned to Isfahan. As Ayatollah Khomeini later wrote: "Iṣfahānī was a well-educated scholar, but he was fast in talking … and it was difficult for one to learn from him. Nevertheless, I remained his student as long as he was in Qom" (Sharif Rāzī 1953, vol. 1, p. 77).

It should be noted that Iṣfahānī actively sought to understand the theory of evolution. Unlike his Muslim and Christian counterparts, such as al-Jisr and Louis Cheikho, he treated this theory with more sympathy and, in the case of humans, examined the theory in detail. He did not consider the theory of human evolution as a religious or philosophical approach but as a scientific one, even though he was unable to grasp sufficient scientific knowledge.

While Iṣfahānī was undeniably under the influence of other scholars, his voice was his own. Contrary to Muḥammad-Ḥusayn Shahristānī, he believed that the

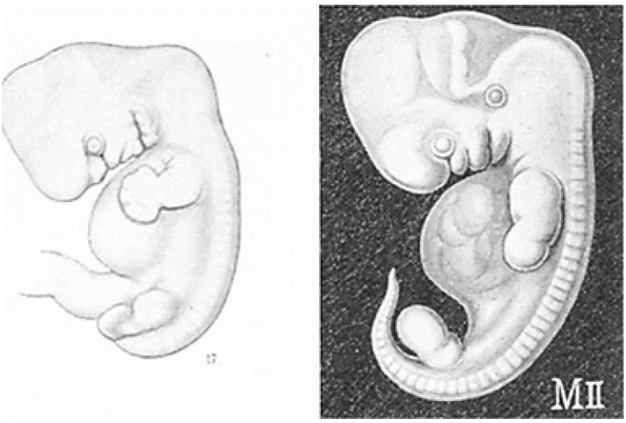


Fig. 7 Left: His's original drawing of the second stage of human's embryo; right: Haeckel's schematic figure (Richards 2005, p. 107)

Islamic holy texts contain considerable scientific facts. Although Iṣfahānī agreed with Hibat al-Dīn Shahristānī that modern science endorses the absolute truth of Islam, he defined his duty to be showing that modern biology does not refute the absolute truth of Islam. In contrast to the early works of Afghani, Cheikho, Hourani, and al-Jisr, he accepted the theory of evolution as a scientific theory, a theory that could be found in the Quran. However, contrary to ʿAbduh, he was not ready to reconcile the theory of human evolution with the Quran, not only for religious reasons but also because of the paucity of scientific evidence. His position was similar to that of Ṣarrūf and Nimr more than anyone else, in that he accepted evolution theory in general and denied it only in the case of humans. His approach, in contrast to other clergymen and especially al-Jisr and ʿAbduh, was that he devoted his book to scientific considerations in detail.

Conclusion

This work suggest that the cliché of the opposition of religious scholars to modern science should be reconsidered, especially in the case of non-Western societies.[24] In fact, the story is much more complicated than it has usually been portrayed. Not only Muslim clergymen but also Confucian and Hindu intellectuals argued that modern sciences, such as modern astronomy and evolution, had been echoed in their holy texts (Elshakry 2013, p. 7). To find an opportunity to immunize their systems of belief from modern objections, some Muslim clergymen adopted modern science to propagate their religion. ʿAbduh, as a Sunni scholar, claimed that the struggle for survival is fully expressed in the Quran (Bezirgan 1988, p. 386), and Hibat al-Dīn

[24] In the course of writing this paper, I provided some references to historians who claimed this opposition, such as Arjomand (1997) and Bezirgan (1988).

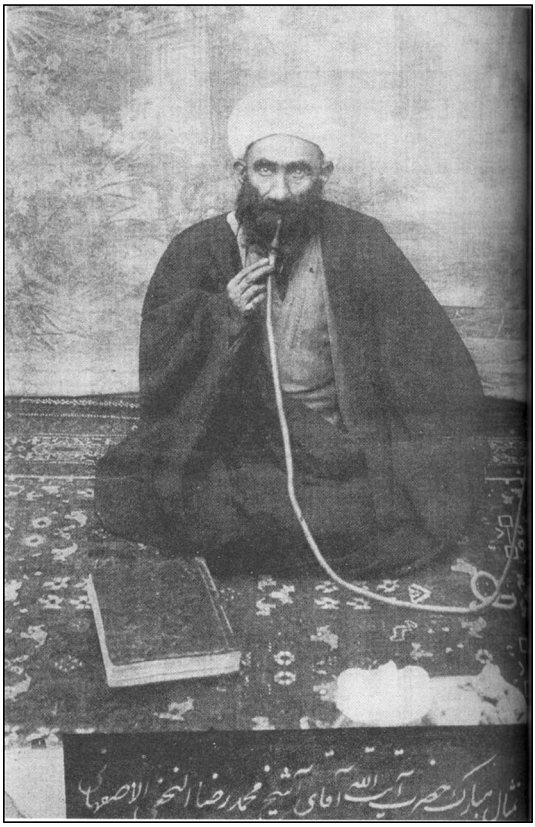


Fig. 8 Muḥammad-Riḍā al-Najafī al-Iṣfahānī (mtif.ir). *Source* Muḥammad-Riḍā al-Najafī al-Iṣfahānī: www.mtif.ir/thumbnail.php?table=pic&full_size=1&id=4871

Shahrīstānī, as a Shiite scholar, found the theory of the rotation of the Earth in the Quran and in Imams' sayings. Several decades later, Abu-l-Qāsim Khuʾī, in his Quranic exegesis *al-Bayān* (first published in 1956) quoted Hibat al-Dīn Shahristānī to show that Shiite ulama not only accepted modern astronomy but also found it stated in their holy texts, while the Christians forbade new research:

> Galileo the Wise, who proved both of the motions of the Earth, was insulted and persecuted, to the point that he was about to be killed. Then he was prisoned for a long time, despite his glory and scientific reputation. Since then, the European scientists were hiding their elegant discoveries that were in contrast to the old superstitions because of their fear of Roman Church. (Khuʾī 1974, p. 73, n. 1)

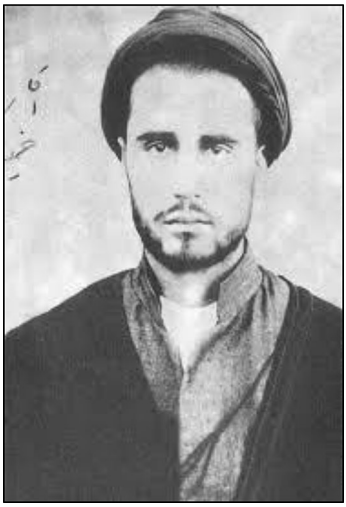


Fig. 9 Rūhallāh Khomeini as a young student in Qom, around 1920 (imam-khomeini.ir). *Source* Rūhallāh Khomeini: www.statics.imam-khomeini.ir/fa/Files/NewsAttachment/2016/aks-0000-hn-aks-101,1-2.jpg

For Khuʾī and many other Shiite clergymen, modern science was a new way to prove Shiite Islam's undeniable truth.[25] Of course, this rhetoric was not new. Before them, the founders of the Syrian Protestant College had been motivated by a similar impetus to demonstrate the Protestant church's rational superiority over Catholicism. The Catholics themselves realized the power of modern science as a missionary "weapon" before them. Eugène Boré (1809–1878), a French Lazarist missionary, opened his schools in northwest Iran around 1838, arguing that: "Mohamadanism, which must necessarily perish as an anti-natural and antisocial religion, cannot be attacked except by the weapons of science" (Boré 1840, vol. 2, p. 109; translation from Ringer 2001, p. 113).

Many years earlier, Pietro della Valle (1586–1652), an Italian traveler and missionary, acquired a similar weapon. He wrote a treatise in 1658 about the modern astronomy of Tycho Brahe for an Iranian astronomer, to impress him by illustrating the rational superiority of Christianity and encourage him to convert to *the only true faith* (Brentjes 2004, p. 410).

After all the years of missionary activities, ulama realized the power of science as a weapon for proselytizing. Thus, the cliché of the clergymen waging war against modern science oversimplifies the story of the encounter between modern science and religion in non-Western societies. In contrast, many clergymen competed with each other to reconcile their religious teachings with modern science in order to manifest the rational superiority of their faith, some with little sympathy for science and some with more Iṣfahānī did his best to express much sympathy for science. He believed in science as a powerful ally of religion: "I swear to my life that in every

[25] Of course there were some ulama among other Islamic sects, such as Abdulaziz ibn Bāz (1910–1999), a Wahhābī from Saudi Arabia, who refuted modern scientific theories such as heliocentrism and evolution at all (Determann 2015, p. 10).

step of her development, science reveals the hidden secrets of religion" (al-Iṣfahānī 1912, vol. 1, p. 37).

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Authors and Affiliations

Amir-Mohammad Gamini[1]

✉ Amir-Mohammad Gamini
amirgamini@ut.ac.ir

[1] Institute for the History of Science, University of Tehran, Tehran, Iran