Abū Naṣr Muḥammad al-Fārābī (d. 339/950), sometimes referred to as the “Second Teacher” in the Arabic tradition (after the “First Teacher,” Aristotle), was one of the foremost Arabic philosophers of the early, classical Islamic period. He was a polymath who wrote on a wide variety of topics, ranging from music, astronomy, astrology, and geometry, to physics, metaphysics, ethics, and the historical evolution of philosophy and religion. He had a decisive impact on the development of Arabic logic, cosmology, and metaphysics in particular, and his works are cited by luminaries as varied as Ibn Sinā (Avicenna, d. 428/1037), Ibn Bājja (d. 533/1139), Ibn Rushd (Averroës, d. 594/1198), and Maimonides (d. 600/1204). He was also known in mediaeval Europe through Latin and Hebrew translations of some of his works made during the sixth/twelfth and seventh/thirteenth centuries. In view of his contributions to the formation of an Arabic philosophical curriculum and of his intellectual originality, al-Fārābī stands out as one of the foundational figures of Arabic thought, when Greek science and philosophy were undergoing a slow and sustained process of assimilation and transformation in learned circles throughout the Islamic world.

1. The contexts of al-Fārābī’s philosophy

In spite of the extensive accounts on al-Fārābī found in some Arabic bio-bibliographic sources, little reliable information about his life can be retrieved from these works. This evidence has already been thoroughly examined (notably by Gutas, Biography; Vallat, Farabi
Abū Naṣr Muḥammad b. Muḥammad b. Ṭarkhān al-Ġārābī, as he is called by one of the earliest sources, Ibn al-Nadīm’s *Fiḥrist* (263), was born in about 256/870 into a family that was originally from Khurāsān or Transoxania. It is unclear whether—and if so, when—he migrated west to Baghdad, the capital of the ‘Abbāsid caliphate. The issue of al-Ġārābī’s ethnic and cultural background is also debated: his name could be of either Persian or Turkic origin. At any rate, he was active in Baghdad from the early fourth/tenth century to about 330/942, when he left for Syria and Egypt. He died in 338/950, in Damascus, after years of travel and teaching. The short narrative al-Ġārābī wrote on his philosophical pedigree—as transmitted by the later bio-bibliographer Ibn Abī Uṣaybi’a (d. 668/1270)—in which he traces the roots of his system back to Alexandria, has been shown to be inaccurate and fanciful to some degree (al-Ġārābī, *Fi zuhūr*; Stroumsa; Gutas, Alexandria to Baghdad; Lameer, Alexandria to Baghdad). In spite of this, we know that al-Ġārābī’s philosophy was shaped in the company of Syriac scholars, notably Ūḥānā b. Ḥaylān (fl. early fourth/tenth century) and possibly Abū Bishr Mattā b. Yūnūs (d. 329/940–1), and that he may also have studied grammar with Ibn al-Sarrāj (d. 316/928) in Baghdad.

Of the Christian scholars who contributed to al-Ġārābī’s philosophical formation, Mattā is the most noteworthy. He was one of the leading Aristotelian philosophers of Baghdad during this time and was both a translator of and a commentator on Greek philosophical works (via Syriac). In this dual capacity, he presumably played a key role in introducing al-Ġārābī to the thought of ancient and late antique authors, especially Alexander of Aphrodisias (fl. 200 C.E.), Themistius (d. 387 C.E.), and Philoponus (d. 570 C.E.), as well as Aristotle, and in familiarising al-Ġārābī with his own commentary-based approach. Not only are there striking parallels in the disciplines in which Mattā and al-Ġārābī specialised (e.g., logic and cosmology or “celestial physics”) and in their predilection for the commentary format—there is also some degree of doctrinal overlap on specific issues they tackled in their works.

In the absence of more decisive evidence pointing to his possible visit to Ḥarrān, in present-day southern Turkey (for this hypothesis, see Vallat, *Farabi*, 17–25), we must assume that it is also in Baghdad that al-Ġārābī consulted the various other Greco-Arabic sources that underlie many of his theories. In addition to much of the Aristotelian corpus, he probably had access to (a) Ptolemy’s *Almagest* and *Planetary hypotheses*; (b) Euclid’s *Elements* and commentaries on parts of it, as well as material derived from various other Alexandrian mathematical and astronomical treatises (possibly by Geminus, fl. first century B.C.E., Poseidonius, d. c. 51 B.C.E., Pappus of Alexandria, d. 350 C.E., and Theon of Alexandria, d. 405 C.E.); (c) several of Galen’s (d. 210 C.E.) medical works; (d) compendia of Platonic dialogues; (e) independent treatises, such as Alexander’s influential *On the principles of the cosmos*; and (f), sections of Neoplatonic works from both the Alexandrian and Athenian schools, translated and adapted into Arabic, especially the *Uthūlūŷāyā Aristāṭalīs* (The theology of Aristotle), essentially an adaptation of Plotinus’s *Enneads*, books 4–6, and the *Kitāb fi maḥḍ al-khayr* (“Book of pure good”), an
adaptation of Proclus’s *Elements of theology*. Although al-Fārābī’s philosophical approach may be connected primarily with the Alexandrian school of Ammonius, son of Hermeias (d. between 517 and 526 C.E.), he was probably familiar also with excerpts or doctrines from the works of Syrianus (d. c. 437 C.E.), Simplicius (d. c. 560 C.E.), and, especially, Proclus (d. 485 C.E.). The question of his knowledge of Theophrastus’s works has never been explored, although he surely knew of the existence of this philosopher.

Al-Fārābī’s attitude towards these sources is characterised by three main features. First, although he was sometimes critical of certain classical authors, he generally aimed at doctrinal synthesis and harmonisation. This may be seen, for instance, in his cosmology, in which Ptolemaic, Aristotelian, and Neoplatonic elements coexist and together constitute a new cosmological model, in some aspects of his physics, which betray not only Aristotelian, but, to a lesser extent, Galenic and possibly Stoic doctrines, and in his political ideas, which are inspired by Aristotelian, Platonic, and Neoplatonic theories. This general harmonising approach was bequeathed to him by the late antique Neoplatonic schools, which often integrated Aristotelian, Ptolemaic, and other philosophical and scientific trends into an overarching Platonic framework.

Second, although he worked chiefly within an Aristotelian paradigm, albeit with important Neoplatonic accretions, and was inscribed in the continuation of what has been called the “Ammonian synthesis” (a profound and sustained philosophical effort to reconcile Plato and Aristotle and to resort to some of Plato’s ideas to provide a seamless interpretation of Aristotle’s philosophy; see Wisnovsky), al-Fārābī carried out this project in an idiosyncratic way, because he aimed to establish a revised philosophical curriculum for an Arabic audience that could address the educational and social needs of his time. He accordingly endeavoured to present a picture of ancient knowledge that not only was coherent and synthetic but could be understood by an Arabic readership and would be relevant to the new social reality created by the Islamic conquests. Illustrations of this are his adaptation of Aristotelian logic, his emphasis on issues of philosophical terminology in Arabic, his views on the relation of philosophy and religion, and, perhaps most spectacularly, his elaboration of a cosmological, metaphysical, and theological model that bridges human affairs and the divine world and redefines the place of human beings in the cosmos. Al-Fārābī’s philosophy therefore provided an interpretation of various theological dogmas and religious phenomena, such as prophecy, revelation, the existence of God, and the social formation of religious groups in light of natural philosophy and logic.

The third aspect is al-Fārābī’s belief that, in spite of its comprehensiveness, the body of knowledge inherited from the Greeks contained lacunae, some of which may have been intrinsic to it, while others may have resulted from the process of transmitting and translating knowledge from one culture to another. He therefore regarded it as a priority to expound on specific points of doctrine that were lacking, obscure, or insufficiently elaborated upon, notably, with respect to metaphysics and linguistic theory and specific sciences such as music and astronomy. In spite of these points, it is often difficult to distinguish what al-Fārābī would
have regarded as the mere paraphrasing and explanation of an established doctrine from what he would have considered a personal departure from, or elaboration upon, the ancient sources.

Al-Fārābī himself taught a younger generation of Syriac scholars, chief among them Yaḥyā Ibn ʿAdī (d. 363/974). Again in this case, there is some continuity between the works of Yaḥyā and those of Al-Fārābī, pointing to a general philosophical milieu in which Muslims, Jews, and Christians gathered and exchanged ideas freely and constructively, albeit sometimes polemically. The Syriac milieu in which Al-Fārābī evolved is vital to our understanding of his philosophical formation and intentions, and it sheds much light on the form and content of his philosophical production. Through the Syriac translators and the living tradition of Syriac philosophising—as embodied in Mattā, who bridged the Syriac and Arabic trends—Al-Fārābī had privileged access to the works of the Aristotelian commentators of late antiquity, which are constantly lurking in the background of his interpretation of Aristotle and shaped many of his more personal philosophical views. Moreover, the emphasis Al-Fārābī put on the genre of the commentary is characteristic of his affiliation with this Syriac milieu, which had itself adopted this late antique practice. Yet, in spite of Al-Fārābī’s close ties to the Syriac thinkers, his philosophical priorities and intellectual originality distinguished him from his peers; these scholars developed divergent interpretations of the philosophical issues they addressed. For example, a quick comparison of Al-Fārābī’s and Yaḥyā Ibn ʿAdī’s works on the theme of unity, the Risālat al-wāḥid wa-l-waḥda (“Treatise on the one and oneness”) and al-Maqāla fi l-tawḥīd (“The treatise on divine oneness”) respectively, shows their profound differences in dealing with a similar theme.

Another key aspect of the intellectual milieu in which Al-Fārābī flourished consists of the various Muslim philosophical and theological circles that existed in Baghdad in the early fourth/tenth century. Three individuals and groups should be mentioned here. Although difficult to assess, Al-Fārābī’s knowledge of the philosophy and science produced by al-Kindī (d. c. 256/870) and the “Kindī circle” during the third/ninth century appears to have been limited, although it has been argued that the influence of al-Kindī and his school on Al-Fārābī was greater than might be assumed at first (Janos, Method, 235–56, 266–9, 279–82). Also important is Al-Fārābī’s possible reaction to the philosophical system of his older contemporary Abū Bakr al-Rāzī (d. 312/925), an original philosopher and brilliant physician who entertained pagan ideas and did not conform to Islamic dogma. Finally, the necessity for Al-Fārābī to reckon with the theories of the Arabic theologians (mutakallimūn) also defined his intellectual and social milieu. This group split into various factions and schools and lacked cohesiveness, but, according to some studies, Al-Fārābī was probably influenced by certain Muʿtazilī doctrines (Rudolph, Al-Fārābī und die Muʿtazila; Rudolph, Reflections), notably with regard to theology, as was the case earlier also with al-Kindī. On the basis of compelling formal parallels, Ulrich Rudolph has argued that the structure and contents of some of Al-Fārābī’s works mirror Muʿtazilī theological treatises produced during the third/ninth and
fourth/tenth centuries (Rudolph, Reflections). Finally, al-Fārābī may have written some works, such as *On the void* and a treatise addressed to Ibn al-Rawandi (fl. 235/850), with the specific aim of refuting specific theological theses (Rudolph, Abū Naṣr al-Fārābī, 403).

In brief, we may situate al-Fārābī’s thought at the confluence of various intellectual currents, including late antique philosophy and science, the early Syriac and Arabic Christian philosophical traditions, and Arabic speculative theology (*kalām*). The diversity of the scientific and religious traditions with which al-Fārābī came into contact in Baghdad accounts, to some extent, for his aim to establish a philosophical system and curriculum that would be based on demonstration (*burhān*) and certain knowledge (*ʿilm yaqīnī*) and that could therefore have universal appeal and transcend religious and ideological particularisms. At the same time, however, al-Fārābī intended his philosophy to be structured hierarchically on the basis of various epistemic criteria and hence to target different groups within society depending on their level of education. The cosmopolitan social and religious landscape of Baghdad at this time also accounts for his interest in clarifying the relation between philosophy and religion, concerning which he had a very pragmatic approach and which he articulated at length in his works (section 4, below). Finally, al-Fārābī’s exposure to the translation movement and to various languages, mostly Syriac and Arabic but also the various other idioms used in Baghdad, encouraged him to ponder the relation between language and philosophy, a theme for which he showed much sensibility and which he tackles repeatedly in his works. Al-Fārābī flourished when the movements for translation from Greek, Syriac, and Pahlavi into Arabic were still under way and when a specialised philosophical terminology in Arabic was slowly crystallising. As his *Kitāb al-Ḥurūf* (“Book of particles”) and his treatise *On the one* compellingly show, al-Fārābī was fully aware of the dependence of philosophical reflection on linguistic clarification, and he contributed significantly to this process in his own works (Zimmermann in al-Fārābī, *Al-Fārābī’s commentary*; Langhade; Lameer, Al-Fārābī; Shukri; Menn, *Al-Fārābī’s Kitāb al-ḥurūf*).

The various extant works ascribed to al-Fārābī present a wide diversity of genres, approaches, and style and defy easy categorisation. His corpus reflects some of the philosophical practices he inherited from late antiquity (especially his endorsement of the propaedeutic and commentary genres), and literary developments that shaped the early Arabic philosophical output (e.g., the genre of the short treatise, called *risāla* or *maqāla*). He also participated, to some extent, in the encyclopaedic tendencies of his time by composing various highly synthetic philosophical compendia covering a wide array of disciplines. His corpus, as it has come down to us, may be divided broadly into five parts: (a) the propaedeutic or methodological works providing instruction in the philosophical curriculum and its method, particularly points of logic; (b) commentaries, mostly on Aristotle; (c) short treatises on various specific and technical subjects; (d) philosophical compendia covering various topics in a systematic and integrated way; and (e), polemical works, mostly in defence of Aristotelian
tenets. These writings testify to al-Fārābī’s intellectual diversity and his intention not only to transmit but also to reshape the philosophical tradition that he had inherited from the Greek and Syriac thinkers who preceded him.

In spite of the upsurge of interest in the study of al-Fārābī, several major challenges remain. There is still much uncertainty concerning the historical development and structure of al-Fārābī’s corpus, about which we possess little information. There is, to begin with, disagreement among scholars concerning the authorship of several works attributed to al-Fārābī, striking examples of which are the Kitāb al-Jam‘ bayna ra’yay al-hakīmayn Afṭāṭun al-ilāhī wa-Aristūtālis (“Agreement between the views of the two philosophers, the Divine Plato and Aristotle”) and the Jawābāt li-masā’il su‘īla anhā (“Answers to questions asked [to al-Fārābī]”). Various interpretations of these problematic texts have been proposed, ranging from the interventionism of scribes or students of al-Fārābī (Rashed, On the authorship) to deliberate dialectical contradictions—or what Vallat calls “contestable topoi”—on al-Fārābī’s part for didactic purposes (Vallat, al-Fārābī, 308 ff.; Vallat, al-Fārābī, 349–50), to a developmentalist and chronological approach (Janos, Method). To complicate matters, several minor treatises attributed to al-Fārābī, both in the Arabic tradition and by modern scholars, probably belong to the circle of Ibn Sīnā, if they were not composed by Ibn Sīnā himself; this seems to be the case notably of ‘Uyūn al-mas‘āil (“Fundamental questions”), al-Ta’liqāt (“Notes”), Fuṣūṣ al-ḥikam (“The gems of wisdom”), and possibly Risāla fī ithbāt al-mufāraqāt (“On establishing the existence of the immaterial existents”). These textual issues point to the great need for additional investigation into the manuscript transmission of al-Fārābī’s corpus and, in many cases, for the improvement on the existing editions of his works, some of which were produced almost a century ago.

Another problem is that major facets of al-Fārābī’s philosophy remain poorly known to modern researchers, chiefly because of the incomplete transmission of his corpus. A case in point is al-Fārābī’s views on the question of the immortality of the human soul, which were presumably discussed in his commentaries on Nicomachean ethics and On the soul. As these works are lost, al-Fārābī’s doctrines can barely and only painstakingly be sketched from his surviving works and from quotations gleaned from the works of later authors. Moreover, al-Fārābī’s commentaries on the Physics and Ptolemy’s Almagest are likewise not known to have survived, thereby hindering a precise assessment of his potential contribution to physics and astronomy. There is, therefore, a stark realisation that major works by al-Fārābī (mostly large commentaries) dealing with mathematics, physics, ethics, and even possibly metaphysics are lost and that we are obliged to reconstruct these aspects of his philosophy from other, comparatively minor, writings. Research priorities should be to pursue the task of editing and translating al-Fārābī’s extant works, clarifying their stylistic and doctrinal connections and their chronological status, and refining our understanding of his contribution to the various topics and issues he inherited from the late antique background.
Al-Fārābī's conception of the philosophical curriculum has important parallels to the Alexandrian philosophical tradition, but it was also shaped considerably by developments that had occurred in the Syriac schools in the intervening centuries. Al-Fārābī, like the late antique philosophers, regarded logic as an instrument of philosophy and as a necessary propaedeutic before progressing to the various disciplines that constituted philosophy (falsafa) proper. He regarded philosophy as consisting of a theoretical part (mathematics, physics, and metaphysics) and a practical part (essentially ethics and political theory), but he also wrote on other more minor topics, such as medicine, astrology, and alchemy, that lay at the margins of the philosophical curriculum. It is largely as a result of his expertise in the various logical treatises of Aristotle that al-Fārābī earned his honorific title “Second Teacher” in the Arabic tradition.

Al-Fārābī wrote many commentaries of various sizes, as well as independent treatises on Porphyry's *Eisagōgē* (“Introduction”) to logic and on the entirety of the Aristotelian logical corpus, known as the *Organon*. Two aspects of his wide-ranging interest in logic will be highlighted here. The first is his keen interest in Aristotle's theory of the demonstrative syllogism (qiyyūs burhānī). This notion of the philosophical proof was based on deductive reasoning leading from premises to an incontrovertible conclusion amounting to certain knowledge (ʿilm yaqīnī). Demonstration is largely associated with Aristotle's *Posterior Analytics*, a work followed closely by al-Fārābī in redacting his *Kitāb al-burhān*, the first attempt in the Arabic tradition to address thoroughly Aristotle's demonstrative and epistemological theories (Black). His interest in this aspect of Aristotle's thought can be explained partly by the study of this work in the Syriac milieu and by the better Arabic translations produced shortly before or during al-Fārābī's time, but the chief factors were his devotion to the theoretical disciplines, in which demonstration plays a crucial role, and his intention to establish a mode of philosophical judgement and argumentation based on reason alone that could trump the dialectical and rhetorical discourses embraced by the theologians (mutakallīmin). In addition to demonstration and certain knowledge, al-Fārābī discusses important concepts such as observation (arṣād), experience (tajriba), and induction (istiqrāʾ), which form part of his scientific methodology and which he connects with the study of physics, astronomy, and medicine, in particular. Like Aristotle before him, he is deeply concerned about the issue of how epistemological principles are transferred from one science to another and of how the various parts and disciplines of his philosophical system interrelate. In brief, Aristotle's logical treatises, especially the *Posterior Analytics*, represented the foundation of al-Fārābī's methodology and epistemology, which he nevertheless combined with contemporary scientific advancements in the fields of astronomy, music, medicine, and other disciplines. Not surprisingly, al-Fārābī showed some interest also in experimentation, as is apparent in his *Treatise on the void* (al-Fārābī, *Risāla fī l-khālā*), as well as in the practical
and mechanical aspects of music and astronomical research. His treatise on alchemy is mostly theoretical but indicates that he, like al-Kindi before him, may have been keen to explore the experimental and practical potential provided by this discipline (al-Fārābī, *Maqāla fī wujūb*).

Al-Fārābī’s works contain two differing accounts of the order of learning that follows the acquisition of logic. In his work *Ṭaḥṣīl al-saʿāda* (“The attainment of happiness”) the Second Teacher advises students to begin with the study of arithmetic and geometry and move on gradually to the study of optics, music, astronomy and mechanics, before embarking on physics. These mathematical objects of knowledge are, according to al-Fārābī, the ones “in which perplexity and mental confusion are less likely to occur,” an approach indebted to the Neoplatonic and ultimately Platonic emphasis on the didactic quality of mathematics (al-Fārābī, *Ṭaḥṣīl*, 129). Once these have been mastered, one proceeds to physical pursuits. In physics the four causes (material, formal, efficient, and final) are sought. The physical inquiry requires that one proceed inductively from effects to causes in search of yet higher principles, until one reaches the celestial bodies, whose existence, in turn, can be explained only by positing higher immaterial principles. At this point, the student begins his inquiry into metaphysics, which marks the end of natural philosophy.

A divergent program of study, not explicitly formulated but implicitly reflected in the structure of al-Fārābī’s two philosophical compendia, *Mabādiʾ ārāʾ ahl al-madīna al-faḍīla* (“The principles of the views of the inhabitants of the virtuous city”) and *Mabādiʾ al-mawjūdāt* (“The principles of existents”), known also as *al-Siyāsa al-madaniyya* (“The political regime”), proceeds from the more theoretical to the more practical disciplines. Instead of the scheme presented above, these treatises open with a discussion of theology and cosmology, detailing the various levels of existents that constitute the cosmos: God, the separate intellects, and the celestial bodies and souls. Only then are sublunary physics, human psychology, and political and ethical theories tackled, the idea being that these lower existents and the areas of knowledge to which they correspond depend ontically on the higher principles discussed in the first section of these works. The orientation that governs these treatises is therefore an ontological and causal one, with the various existents being arranged hierarchically from the most primary and fundamental to the more deficient and material. Although al-Fārābī does not explicitly articulate such a curriculum in his works, he obviously considered this disciplinary order to possess a didactic appeal, as it informs the structure of his two most famous treatises.

Al-Fārābī’s physical system is incompletely known, due to the loss of his commentaries on Aristotle’s *Physics*, *On the heavens*, *On generation*, and *Meteorology* (with the exception of a short fragment possibly derived from the first work; see Birkenmajer), as well as the lack of critical studies on the various minor physical treatises ascribed to him. He broadly follows Aristotelian tenets, including hylomorphism, the theory of the four causes, the four elements, and the infinity of time and motion (in at least some of his works), and he did not hesitate to defend, on some occasions, Aristotle against critiques by Philoponus and al-Rāzi (Rashed, Al-
Al-Fārābī's lost treatise); the exact polemical context of these treatises nevertheless remains unclear. Al-Fārābī himself, however, departed from Aristotle on specific points of doctrine, as can be seen in his theories of celestial matter, prime matter, efficient causality, and human psychology, even though the question of whether he would have regarded these theories as departing deliberately from his model is unclear. Al-Fārābī's main interest in physics, apart from issues dealing with the celestial world, pertained to the human soul, physiology, elementary motion, and the elementary constitution of bodies, questions to which he dedicated several treatises.

Although a long commentary on On the soul is attributed to Al-Fārābī in the Arabic tradition, it is unclear whether it is extant (see Vallat in Al-Fārābī, Épître, 65–7). Broadly speaking, his psychology reflects the general tendency of other early Arabic philosophers, such as al-Kindī, to interpret Aristotle's views in light of the commentators and to envisage psychology in close connection with cosmology and metaphysics. The human soul possesses various faculties or powers (quwwā, sing. quwwa) that enable it to perform its bodily and mental functions. Al-Fārābī postulates five faculties: 1) the nutritive, 2) the sensitive or perceptive, 3) the appetitive, 4) the imaginative, and 5) the rational. Whereas Ibn Sīnā, following Galen, was to emphasise the brain as the seat of reflection and the inner senses, Al-Fārābī locates most of these faculties in the heart, which he describes as the ruling organ (the brain occupying a secondary position in his physiology). Of particular importance in Al-Fārābī's philosophy is the faculty of imagination, which contributes to his explanation of prophecy, as it translates into images and symbols the various intelligibles (maʿqūlāt) that the human intellect receives from the Agent Intellect (al-ʿaql al-faʿāl). The principal quality of imagination is accordingly mimesis, or imitation: it imitates both sensations and percepts on the one hand and intelligibles on the other, thereby mediating between the lower and higher faculties of the soul. In other words, it is influenced by both the rational faculty and the elementary and material constitution of bodies. There is no mention in his works of the other internal senses that later on played such an important role in Ibn Sīnā's psychological theories.

According to Al-Fārābī, the human soul is crowned by a rational faculty, which, unlike imagination, is completely immaterial. The human rational soul or intellect (ʿaql) is divided into three main faculties, powers, or stages—the potential or material (al-ʿaql bi-l-quwwa or al-ʿaql al-hayūlānī), the actual (al-ʿaql bi-l-fiʿl), and the acquired (al-ʿaql al-mustafād)—all of which correspond to stages in the process of learning and reflection. The first stage in the process of learning is when the material or potential intellect acquires the primary intelligibles, such as the axiom that the whole is greater than the part. Scientific knowledge proper develops once the first intelligibles have been assimilated by the potential intellect and are employed to compose syllogistic combinations. Repeated acts of cognition and conjunction with the Agent Intellect lead the human rational soul to its final and consummate stage, the acquired intellect. Al-Fārābī's views on the rational faculty as discussed in Risāla fī l-ʿaql (“On the intellect”) rely heavily on the late antique commentators. The views of Alexander
as conveyed in the Arabic versions of his commentary on *On the soul* and his treatise *On the intellect*, as well as the texts of the Arabic Plotinus, seem to have exercised a profound influence on the Second Teacher (Geoffroy; Vallat in al-Fārābī, *Épître*).

Knowledge in general and the human soul’s transition from potentiality to actuality is made possible by the activity of the Agent Intellect, which is the tenth intellect of al-Fārābī’s cosmology. It is a separate, immaterial being that is always in actuality and whose relation to human thought is like that of the sun to human vision. Through its assistance, the human mind can abstract forms from their material substrates and apprehend them as intelligibles. Al-Fārābī’s conception of the Agent Intellect betrays a particular interpretation of Aristotle’s *On the soul* III.5 informed by the commentators, although the precise sources and textual genealogy underlying the Arabic philosophers’ theory of the Agent Intellect are still the objects of research.

Two activities govern rational thought: conceptualisation (*tašawwur*) consists in the representation of a simple concept in the mind and assent (*tašdiq*) in judging whether a cognitive act is true or false. These acts underpin both theoretical and practical knowledge, the former dealing with knowledge in itself, that is, principles that are unchanging (mainly mathematics, physics, and metaphysics), the latter with human affairs, including both ethics and political theory. In this connection, al-Fārābī’s views about human happiness and the fate of the soul after death are difficult to reconstruct. With regard to earthly happiness (*saʿāda*, corresponding roughly to the Greek term *eudaimonia*), he probably regarded both the theoretical and practical intellect as playing crucial roles in leading human beings to this exalted state. Individual happiness is dependent on how assiduously one cultivates one’s propensity towards contemplation and theoretical knowledge. This kind of activity can be envisaged, however, only in a society that is conducive to philosophical practice and possesses a satisfactory political structure and ethical standard, which rely, in turn, on the practical intellect; indeed, no form of happiness can be experienced in a thoroughly corrupt, cruel, and materialistic society. Only a virtuous and peaceable community in which individuals devote themselves to philosophical pursuits can guarantee felicity in this life and perhaps in the next (it is unclear whether al-Fārābī regarded the rational faculty as immortal and whether he changed his views on this issue; for the ongoing discussion on the matter, see Vallat, Farabi, 102 ff., and Neria, Al-Fārābī’s lost commentary). It is in this sense that the theoretical disciplines intersect with ethics and political theory in al-Fārābī’s philosophy and participate in the achievement of human happiness.

In the field of mathematics, al-Fārābī is said to have composed several treatises on arithmetic, geometry, music, and astronomy, although only a few of these works have been the object of detailed analytical studies (for an overview, see Kubesov, and Rudolph, Abū Naṣr al-Fārābī, 366, 390–2, 422–4). The Second Teacher attributed much importance to mathematics in his curriculum, as he believed it prepared the soul for the contemplation of the immaterial existents and familiarised it with certain knowledge and the demonstrative method. This
being said, al-Fārābī followed Aristotle and the Peripatetics in defining the objects of mathematics as entities existing only in the human mind and not in the extramental world. Al-Fārābī surely knew Euclid's *Elements*, which inspired several of his geometrical treatises, but he seems also to have been familiar with some of the ideas of Alexandrian mathematicians and with techniques such as analysis and synthesis (Freudenthal, and al-Fārābī, *Matematicheskie traktaty*).

As for astronomy and astrology, al-Fārābī was particularly keen on separating mathematical astronomy (ʿilm al-nuṣūm al-taʿlīmī) from judicial astrology (aḥkām al-nuṣūm). He fully embraced the former, but he rejected the latter, on methodological and epistemological grounds. In discussing the principles of astronomy—which, following a late antique tradition, he believed had to be derived from geometry, physics, and metaphysics—al-Fārābī pursues an ancient discussion in the Arabic context. His conception of astronomy was, as for many other Greek and Arabic thinkers, essentially a combination of mathematical aspects and physical and metaphysical premises. He was acutely aware that astronomical progress depended on the accumulation of new observational data, and he refers briefly to the construction and use of instruments and to the relation between astronomical practice and theory. His cosmology nevertheless had a physical foundation, in that he considered the celestial spheres of the planets and stars to be physical and concrete beings and to possess corporeal qualities. His basic planetary models were based on the Ptolemaic tradition and probably included eccentrics and epicycles, but they cannot be known with accuracy, on account of the probable loss of his commentary on the *Almagest* and the scant evidence to be found in his other works (see Johannes Thomann on the Tehran Majlis MS 6531, which purports to contain al-Fārābī’s commentary on *Almagest* but whose attribution has not been definitively established). The actual causes underlying celestial motion were tackled not by astronomy but by physics and, especially, metaphysics, as these causes depended on the existence of immaterial unmoved movers.

3. Metaphysics, theology, and cosmology

Al-Fārābī’s conception of metaphysics has its roots in the ancient Greek philosophical tradition. It relies chiefly on the Arabic translations of Aristotle’s *Metaphysics* and parts of Greek works attached to it, notably by Alexander and Themistius, in the form in which these texts were transmitted and studied in the Syriac and Arabic philosophical milieux of the third/ninth and fourth/tenth centuries. Apart from this body of Greco-Arabic sources, al-Fārābī’s approach to metaphysics was probably shaped also by his reaction to the ideas articulated in the works of earlier Arabic philosophers. For al-Kindī, metaphysics was fundamentally equivalent to theology, while Abū Bakr al- Раʿzī’s cosmology was vaguely inspired by Platonism and served as a backdrop for his elaborate theories on the human soul and soteriology. Al- Раʿzī’s postulation of five eternal principles responsible for the existence and order of all things would surely have appeared flawed to a thinker like al-Fārābī, schooled in the Aristotelian tradition.
Al-Fārābī follows the Aristotelian programme more faithfully than do these two thinkers, as he regards metaphysics as the discipline that investigates *wujūd al-*muḫlaq (being in itself, or absolute being) and its various attributes and properties. As can be seen from his *Fi aghrāḏ al-ḥakīm fī kull maqāla min al-kitāb al-mawsūm bi-l-ḥurūf* (“On the aims of the books of Aristotle’s *Metaphysics*”) and *Book of particles*, al-Fārābī considered the subject matter of metaphysics to include a set of questions focusing primarily on existence and related concepts, such as unity and multiplicity, cause and effect, and potentiality and actuality; on ascertaining the first principles and scientific axioms of the sciences; and on investigating the immaterial principles of existence and God (Druart, Al-Fārābī, emanation; Bertolacci, Ammonius; Bertolacci, From al-Kindi). In al-Fārābī’s treatment of metaphysics, the first issue stands out. Indeed, he regarded existence and oneness as the two most general concepts of reality and those that deserve the most careful analysis, contributing new insight and theories to an ancient discussion on these concepts (Menn, Al-Fārābī’s *Kitāb al-ḥurūf*; Menn, Fārābī in the reception). As shown by his *Book of particles* and the short treatise *On the one*, al-Fārābī was also aware of the intricate relation between metaphysical reflection and linguistic usage, continuing and amplifying in these two works the approach sketched in Book Delta of the *Metaphysics*.

Perhaps partly as a result of al-Kindi’s influence, al-Fārābī devotes much attention to theology, which he nevertheless regards as but one part of the metaphysical enterprise. In the narrow sense, theology means, for al-Fārābī, the discourse about God’s special existence and qualities and his causation of the other beings. In a broader sense, as when he refers to the “divine principles” (*al-mabādi’ al-ilāhiyya*), in his Taḥṣīl (141), it includes the entirety of the immaterial existents and their intellectual and causative activity. It is this broader conception of theology that is tackled in his two treatises *The principles of the views* and *The principles of existents*, although it is already alluded to in the earlier and more programmatic *Iḥṣā’ l-ʿulūm* (“Classification of the sciences”). This overarching scheme implies a discussion of the divine essence and of how divine causality is manifested in the world, as well as of how God relates to the other immaterial and material existents. Al-Fārābī accordingly opens the first two works with a discussion of “the First” or “the First Cause,” which possesses pure existence and unity and which is described as an intellect thinking its own self or essence. God’s oneness is asserted with respect to both His absolute simplicity (indivisibility) and His absolute uniqueness. All other existents in the universe are, in comparison, affected by multiplicity (of an intelligible or a material kind) and are therefore deficient. God is the First Principle and First Cause of only one effect, the first caused intellect, and, through its intermediary, of the subsequent effects deriving from this First Effect. Through a process of immaterial causation, the concept of which was inspired by late antique Neoplatonic sources, al-Fārābī posits the existence of a series of immaterial existents and separate intellects, which, by intellecting the First and their own essence, cause other beings to exist—either another, separate intellect, or a celestial sphere together with its celestial soul. As in his metaphysics, al-Fārābī considers being (wujūd) and oneness (wahda) the foundational concepts of theology, as they alone can be ascribed to God in a direct way, the other names and qualities (including intellect, ‘aql)
constituting merely a secondary and derivative predication of the divine being. It is accordingly to these two concepts that al-Fārābī devoted most of his metaphysical and theological reflection.

Al-Fārābī’s cosmological model includes separate intellects, celestial souls, and celestial bodies. The so-called secondary intellects or secondary causes (al-thawānī) exist at a level intermediate between the heavenly bodies and the First Cause, and they are fully absorbed in contemplation of the self and of God’s perfection. These separate intellects, which number nine (excluding God and the Agent Intellect), correspond to the nine main celestial spheres, for which they act both as efficient causes of existence and final causes of motion.

The cosmos, as al-Fārābī conceived it, consists of a finite sphere in which there is no void. The heavens contain nine main concentric spheres that carry the planets and stars around a fixed, spherical earth located at the centre of the universe. From the sphere of the moon upward, the corporeal existents were thought to be eternal and unchanging, each consisting of an immaterial substrate and a permanent and unique form, and to be in perpetual circular motion. Al-Fārābī’s theories of celestial motion—as far as they can be reconstructed from the existing evidence—are characterised by a combination of astronomical considerations on the one hand and physical and metaphysical premises on the other. Among the latter are the postulation of the uniqueness of the celestial substance associated with circular motion and the idea that the motion of the planets is caused by the contemplation of the celestial souls of the higher immaterial principles. Each of these souls, which inhere in, animate, and move the various celestial bodies, is constantly engaged in the contemplation of God and the separate intellect responsible for its causation, as well as its own essence.

Below the sphere of the moon is the world of generation and corruption, whose unceasing changes are caused by the various influences transmitted by the heavens. These influences consist both of forms transmitted by the Agent Intellect and of powers (quwā) resulting from the various motions of the planets and spheres. According to al-Fārābī, the Agent Intellect is also responsible for the apparition of prime matter (al-mādda al-ūlā). Whether prime matter itself possesses intrinsic and autonomous existence when devoid of all forms is unclear and difficult to determine on the basis of the evidence al-Fārābī provides, but its chief function is to provide the ultimate substrate for the existence of subsequent levels of materiality. Accordingly, every sublunary corporeal existent consists of a combination of the four elements—fire, air, water, and earth—in various forms, which, in turn, explain the differences in bodily humours, temperaments, and qualities among animals. These four elements can also assume a pure state, with the sphere of fire being the highest, adjacent to the sphere of the moon, followed by those of air, water, and earth.

Although many parallels have been noted between al-Fārābī’s works and the Graeco-Arabic sources, no precedent encapsulating the structure of al-Fārābī’s cosmology and its related theory of intellective causality has been found. He seems to be the first in the early Islamic context to uphold a cosmological model that both thoroughly combines Ptolemaic,
Aristotelian, and Neoplatonic theories and explicitly posits a level of secondary causes to account for the existence, sustenance, and activity of the lower corporeal beings. As such, this model exercised a profound influence on later Arabic thought through the intermediation of Ibn Sīnā, who endorsed its broad features but modified it considerably.

Most modern interpreters have stressed al-Fārābī’s reliance on Aristotelian and Neoplatonic theories of efficient and final causality in his account of how multiplicity and the world as a whole are caused to exist from a single, simple cause. It is the extensive use of these causal theories and, especially, al-Fārābī’s understanding of how intellection and causality are intertwined in the immaterial world that point to his creative adaptation of the Neoplatonic sources. More specifically, al-Fārābī’s belief that the intellection (including self-intellection) of the immaterial beings is inherently causative or demiurgic seems deeply indebted to the Greek and Arabic Plotinus and Proclus and possibly to other Neoplatonic sources.

There is, nevertheless, still much disagreement among scholars about how these Neoplatonic features square with al-Fārābī’s conception of Aristotle’s metaphysics. One issue is whether he regarded the model of efficient causation he developed—that is, the idea that the existence of each entity, whether material or immaterial, is caused by a higher ontological principle—as a genuinely Aristotelian doctrine or as a doctrinal elaboration whose aim was to expand and complete Aristotle’s metaphysical program. Equally vexed are the issues of whether al-Fārābī was aware of the provenance and authorship of the Arabic Neoplatonic texts (which are attributed to Aristotle in the Arabic tradition) and how he envisaged their relation to the Metaphysics. Finally, these two issues are connected directly to the problem of the doctrinal discrepancies in the Fārābīan corpus and the authenticity of some of his works. This cluster of problems is important insofar as it affects our understanding of al-Fārābī’s general metaphysical project and what he sought to achieve in interpreting ancient thought.

One of the thorniest issues concerns al-Fārābī’s theories of immaterial causation and divine creation, as there seems to be some inconsistency in the views laid out in his various works. Modern interpretations have varied greatly, in defining the nature and extent of these textual differences and in trying to make sense of the evidence. At stake here is not only the unity of the Fārābīan corpus but also notions of philosophical coherence. The main problem is that al-Fārābī seems in some works to defend the view of God’s creation of the entire world in or with time and from nothing, while in other works he focuses on God’s causation of a single immaterial effect and develops a model of eternal causation involving the autonomous and variegated agency of the separate intellects. Moreover, he defends the theses of divine will and knowledge in some works while omitting or rejecting these theories in others.

No consensus regarding these various questions has so far been reached, in spite of various interpretations of the evidence (Druart, Al-Farabi, emanation; Druart, Al-Farabi, emanationism; Mahdi; Galston, Re-examination; Vallat, Farabi; D'Ancona; Bonadeo, in al-Farabi, L’armonia; Rashed, On the authorship; Genequand; Janos, Method, 203–333; Rudolph,
Abû Naṣr al-Fārābî, 427–34). In any case, al-Fārābî’s understanding of Aristotle’s metaphysics was, in essence, a product of the late antique tradition. It is this “transformed Aristotle,” together with the various layers of Neoplatonic interpretations and accretions that it implies, that was his principal source of inspiration for his approach to metaphysics and theology. Some scholars have accordingly referred to al-Fārābî’s “neo-Aristotelianism” (Reisman), which continues the late antique trend of interpreting and transforming Aristotelian thought in light of philosophical exegesis.

4. Political ideas

Much has been written on al-Fārābî’s views on religion, politics, and the ideal society, but little effort has been devoted to connecting these aspects of his thought with his metaphysics (for an exception, see Vallat, *Farabi*). It is still unclear how much of his interest in the political and religious ramifications of his metaphysical and cosmological model was inspired by the Syriac context in which he learned philosophy—several Syriac thinkers directly associated with him seem to have devoted themselves to similar pursuits (Watt, *Christianity*)—but defining the relation between philosophical learning on the one hand and the kind of knowledge obtained through scriptures and revelation on the other seems to have been common to many Jewish, Christian, and Muslim thinkers of this epoch.

Especially influential in this regard was the interpretation put forth by Muhsin Mahdi and inspired by the theories of Leo Strauss. According to Mahdi, al-Fārābî’s philosophy consists chiefly of a kind of rhetorical and dialectical system aimed at establishing an ideal politico-philosophical society congruent with the Islamic revelation. Moreover, Mahdi’s thesis hinges on the belief that al-Fārābî maintained a sharp distinction between esoteric and exoteric works, in an attempt to conceal his true doctrine from the masses. Although this interpretive paradigm was adopted by other scholars (notably Galston, *Politics*, and Parens), Mahdi’s general claims concerning the nature of al-Fārābî’s philosophy and his interpretation of Arabic political theory have been challenged (notably by Gutas, *Study*; Vallat, *Farabi*; Janos, *Method*). As Vallat has shown, al-Fārābî’s political thought—if we can speak of “political thought” at all in a mediaeval Islamic context (Gutas, *Study*)—is essentially dependent on, and a continuation of, his metaphysical reflection and his views on the order and hierarchy of existence and learning. Indeed, the microcosms of the individual and of the political entity should be organised in accordance with the fundamental laws governing the universe, with the result that the best political system is one constructed on a sound philosophical foundation and a thorough grasp of scientific laws and principles. This belief is textually and structurally apparent in al-Fārābî’s philosophical compendia, in that he switches to a discussion of politics only after having treated theology, cosmology, and physical and psychological issues.
Al-Fārābī’s ideal polity is, like Plato’s, a society in which the life and conduct of the citizens would be ordered and dictated by philosophical principles and cognisance of the greater good. There is clearly an idealistic vein running through al-Fārābī’s political deliberations, traceable partly to his interest in the *Republic* and the *Laws*, parts of which he knew through compendia, and partly to ideas emanating from Middle Platonic (Walzer, in al-Fārābī, *Al-Farabi on the perfect state*) or Neoplatonic (O’Meara) political thought. But al-Fārābī was, at the same time, highly pragmatic and realistic in his realisation that most political regimes and religious systems are either deficient or downright corrupt. Indeed, he held a strikingly relativistic estimation of the development of human religions, claiming no absolute right or priority for any of them (not even Islam) but simply acknowledging their constantly evolving structures as a result of cultural and social contingencies. Accompanying this view is the fundamental and idiosyncratic Fārābian notion that religions are, in the best cases, essentially mimetic of deeper philosophical truths, which they convey through dialectical, rhetorical, or poetical means. As a corollary, their followers and practitioners apprehend only opinions, symbols, or images, not the philosophical principles in themselves. This, in turn, means that knowledge can easily be lost or distorted as a result of the poor intellectual and moral standards of the community in question. This inherent shortcoming in religious undertakings explains al-Fārābī’s hope for the establishment, at least theoretically, of a philosophical polity governed by a philosopher-prophet who is able to translate the intelligibles he obtains from the Agent Intellect into modes of expression appropriate to society at large, while respecting philosophical truths. As philosophical education is, nevertheless, restricted to a minority, it is clear that al-Fārābī, while demoting religion to a secondary position, nonetheless recognised its practical utility and perhaps even its necessity in the unfolding of human history.

The figure at the centre of al-Fārābī’s theory is the philosopher-prophet, who embodies the highest degree of human knowledge and is able to join with the Agent Intellect by virtue of his perfected acquired faculty (the highest level of al-Fārābī’s four-fold noetics). It is this figure who, as philosophical teacher, leader, and lawgiver, bridges the gap between philosophy and religion on the one hand and the superlunary and sublunary realms on the other. As such, and given his importance as a medium of social order, education, and cohesiveness, al-Fārābī’s philosopher-prophet would have a profound influence on later Arabic thought, if only because Ibn Sinā endorsed this theory, albeit with major modifications, and helped propagate it throughout the post-classical tradition.

5. Al-Fārābī’s legacy in the Arabic, Hebrew, and Latin traditions

No comprehensive study of the reception of al-Fārābī’s philosophy in the later Arabic and Persian traditions has yet been undertaken. The picture that can so far be sketched is incomplete and puzzling. Al-Fārābī seems to have been an author frequently cited by name yet rarely read systematically. Several major thinkers—such as Ibn Sinā, al-Ghazālī, Maimonides, Ibn Bājja, and Ibn Rushd—frequently mention or cite him when discussing specific issues, but al-Ghazālī, for one, made little effort to distinguish al-Fārābī’s theories
from those of Ibn Sinā, which are often combined for polemical purposes. Moreover, the references made by these later authors to al-Fārābī’s works often focus on minute points of doctrine but rarely engage—as paradoxical as that may seem—with the theories that modern scholars deem his more original and important contributions. Accordingly, al-Fārābī’s cosmological system and his metaphysical, psychological, and political theories are rarely discussed substantially by later Arabic philosophers. Even Ibn Sinā, whose metaphysics, theology, cosmology, psychology, and prophetology owe so much to al-Fārābī, is remarkably laconic in referring to his illustrious predecessor. A noteworthy exception is his gracious admission that he could not have grasped the true meaning of Aristotle’s *Metaphysics* without having read al-Fārābī’s treatise *On the aims*. More generally, al-Fārābī was famous and respected by later philosophers as a commentator of the *Organon*. Yet even in this domain, Ibn Sinā’s logical commentaries and treatises overshadowed those of his predecessor and established themselves as the philosophical standard in both philosophical and theological circles.

Al-Fārābī’s influence is most clearly discernible in the decades immediately following his death, when Christian and Muslim thinkers alike in Baghdad continued to work within the philosophical framework that he and Mattā b. Yūnus had established. Among the striking “school” features that characterise this philosophical production are an emphasis on logical commentaries, reflection on the relation between philosophy and religion, and parallels in the framing and analysis of specific cosmological and metaphysical issues. Yahyā Ibn ‘Adī’s *On divine oneness*, for example, is clearly indebted—the divergence in their aims and purposes notwithstanding—to al-Fārābī’s *On the one*, while Ibn Suwār’s work entitled *Kitāb al-wifāq bayna ra’y al-falāsifa wa-l-naṣārā* (“Agreement between the opinion of the philosophers and the Christians”) reminds one of al-Fārābī’s *On the agreement of the opinions of the two philosophers, the divine Plato and Aristotle* in its intention to show the unity of philosophy and its compatibility with the revealed religions. The association between al-Fārābī and some of these thinkers (notably Yahyā b. ‘Adī and Ibrāhīm b. ‘Adī, Yahyā’s brother and secretary of al-Fārābī) was, in fact, so close that the issue of authorship may legitimately be raised with regard to some texts, notably in connection with *On the agreement* and *Answers to questions asked*.

Additional research will be needed for a precise assessment of al-Fārābī’s impact on the post-classical tradition. Ibn Sinā is undeniably the towering figure, and his fame and influence may account, in part, for the minor role al-Fārābī’s philosophy seems to have played from the sixth/twelfth century onwards. Neither al-Suhrawardī (d. 587/1191) nor Fakhr al-Dīn al-Rāzī (d. 606/1209–10), for instance, appears to have dedicated much time to al-Fārābī’s writings, except, perhaps, in the field of logic. In addition to Ibn Sinā’s dominance in post-classical philosophical circles, al-Fārābī’s theses on sensitive issues such as divine causality and the relation of philosophy and religion also may have contributed to the decline of his influence in the later tradition. In particular, his views on the causality of the secondary intellects and his sober, historical, and pragmatic assessment of religion—not to mention his claim concerning
its mimetic and derivative nature—might have displeased or even offended some of the more conservative contingents and made Ibn Sinâ's views appear more compatible with the theological and legal viewpoints endorsed by these groups. One exception is ʿAbd al-Laṭif al-Baghdâdî (d. 629/1231), who seems to have highly esteemed al-Fârâbî's philosophy, often at the expense of Avicenna's (Bonadeo, ʿAbd al-Laṭif). Finally, as Daniel de Smet has shown, al-Fârâbî's doctrines probably shaped some aspects of Ismaʿîlī cosmology, notably the works of Ḥâmid al-Dîn al-Kirmâni (d. 412/1021), but their influence on the later Ismaʿîlī tradition requires further research.

Al-Fârâbî appears to have exercised a lasting influence on Jewish philosophical circles active in both the Islamic and Latin milieux. Maimonides relies on him repeatedly in treating questions of physics and ethics, and al-Fârâbî’s theories on logic and on the classification of the sciences, including the place of medicine, as well as his views on the relation of religion and philosophy, seem to have been instrumental in shaping a Jewish philosophical curriculum (Zonta, Reception; Zonta, Arabic).

The Latin al-Fârâbî remains inadequately studied by modern scholars, especially with respect to the philosophical reception of his theories in mediaeval European intellectual circles. Even though some of his major writings were translated into Latin during the sixth/twelfth and seventh/thirteenth centuries (Salman; Zonta, Reception; Burnett, Arabic into Latin), al-Fârâbî’s philosophy was apparently less widely disseminated than that of either Ibn Sinâ or Ibn Rushd and exercised less influence on the development of scholasticism. These translations, the majority of which were made in the sixth/twelfth century by Dominic Gundisalvo and Gerard of Cremona in Spain, were often adapted and modified to fit the needs of a new readership. The interest devoted to al-Fârâbî in the Latin tradition seems to have focused on his epistemology, noetics, and logic (Gilson) rather than on his cosmology and metaphysics, but some attention was also paid to his views on mathematics and physics (Birkenmajer; Burnett, Euclid and al-Farabi).

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