

The “Ideology” of Arab-Islamic Science and Ramon Llull

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If anything has been revealed by the research undertaken on the connection between Ramon Llull and high Arab-Islamic culture – since the times of Ribera and Asín Palacios until Urvoy, Galmés de Fuentes, Garcías Palou, Vernet and many others – it is that everything has yet to be fully clarified. Ramon Llull is a heterodox from all points of view, and none of the three or more cultures with which he is related provides an adequate conceptual framework to comfortably accommodate his person and work. There are, however, some affirmations that, because of their concision, provide us with some useful keys, and one of them is by Urvoy (1980) when he states that Ramon Llull is a 12th century wise man despite living halfway between the 13th and 14th centuries. This must be understood from the Arab-Islamic perspective because if we consider it from the Christian and western side – the Byzantine world is very distant from us –, the expression “12th century wise man” does not mean much more than someone who tries to save himself from ignorance through the knowledge written in Arabic. Nevertheless, what does “being a 12th century wise man” mean exactly? And, more precisely, what does it mean in terms of the history of science? To attempt to answer this, it is first necessary to try to define Ramon Llull’s position in relation to high Arab-Islamic culture, at least tentatively and provisionally.

The first thing to say is that the relation with this knowledge was difficult. Ramon Llull flourished when the great moment of

Arabic-Latin translations had passed, which ranged from the 11th century until mid-13th century. Moreover, he lived in a time when, on the one hand, institutional knowledge in western Europe elevated the texts translated in recent times to manuals of the incipient university studies and, on the other, would search for texts in Greek to translate directly. This world, as is well-known, is not that of Ramon Llull, and even less that of the Ramon Llull in training (Garcías Palou, 1989). Therefore, access to Arab-Islamic knowledge would be difficult for him and he would never achieve knowledge similar to that which any member of the academy of his time could have.

What can we say of the high Arab-Islamic culture that Ramon Llull found at home, in Majorca? Apparently, very little that can give us immediate answers. Some time ago, before approaching his well-known work on Islam and Ramon Llull (1980), Dominique Urvoy first undertook a study on the intellectual and spiritual life in the Balearic Islands in Islamic times (1972), and the harvest was very meagre. In fact, the research, both before and after Urvoy’s, tells us that Majorca was never ruled by one of those enlightened dynasties that filled the cities of al-Andalus with knowledge and books. The recently arrived Christians did not find well provided libraries similar to those existing in the valley of the River Ebro, Toledo or Seville (as is well known these libraries were the basis of the process of translations that took

place in the Hispanic kingdoms from the late 10th century onwards). At most, and Urvoy's painstaking work leaves little room for surprise, it is possible to find traces of three major seams:

- A mystic seam, which connects the great 12th century al-Andalusian masters, Ibn al-'Arīf and Ibn Barraġān with Majorca in the person of Abū Bakr al-Mayūrġī. However, he spent his active life far from the islands.
- A philosophical, very weak, seam in the person of Ibn Ḥawṭ Allāh, a disciple of Averroes who devoted himself to jurisprudence and, as far as we know, had nothing to do with philosophy.
- Finally, a theological seam represented by the famous Ibn Ḥazm (a notable theologian and philosopher) in the mid-11th century, when he practised for ten years as a mufti, although his stay in Majorca was not exactly happy. Despite all the talk of the possible mark left by his theological mastery, the truth is that nobody has been able to support it with reliable data. In this field, Urvoy puts forward a second element to consider: the so-called "Almohad ideology" preached by Ibn Tumart, or interpretation of Islam that became official during the second half of the 12th century in al-Andalus and a large part of the Maghreb and radically changed the state of knowledge, from the legal to the philosophical (Fierro, 2000); the most comprehensive information about all dimensions of Almohadism is found in Viguera (1997) and Cressier, Fierro and Molina (2005). The Almohadism consists of a rationalist conception of faith that rests on the notion of *tawḥīd* or divine unity, involving, among other things, the use of reason to fully understand the revelation and not fall into errors such as the anthropomorphisation of God, of the rejection of jurisprudential casuis-

try that diverts us from the essence of the message; the division between what the people can believe and what the enlightened minority must understand, a precedent of the famous "two truths"; the cooptation of philosophers (Ibn Ṭufayl or Averroes) as theologians of the new interpretation; and the creation of a broad body of conservers and disseminators of this ideology, the *ṭalaba* (Fierro [1997] and the cited bibliography, especially Urvoy's). Perhaps this is the strongest link between Ramon Llull and the world of Muslim speculation, insofar as the inevitable familiarity of Majorcan Muslims with this ideology for many years could have left a deposit which Ramon Llull, some time later, could in some way have exploited. In fact, the only Arab thinkers that Ramon Llull seriously studied, al-Ghazali (remember the *Lògica del Gatzell posada en rims*), points in this direction (what Llull tells us about Averroes does not count because his approach to the latter is filtered by European scholasticism). Urvoy (2005) tells us that late Almohadism looked towards al-Ghazali after Averroes had criticised him and that this can be seen in the works of logic by the physician-philosopher Ibn Ṭumlūs, who silences Averroes and emphasises al-Ghazali's logic. We have, therefore, a new coincidence between the late Almohadism and Ramon Llull, although it is necessary to carefully study its significance. At present, when the impact of Almohadism on European scholastic knowledge is being considered (Fletcher, 2005), we must look directly into this question and, above all, examine the "home-made" Almohadism that Llull could have assimilated almost without realising it.

If we concentrate on the Arab production in scientific disciplines (Forcada, 2004), the re-

sults are even less hopeful because we hardly find in Majorca any minimally distinguished wise man in the 11th and 12th centuries. In the late 12th century and early 13th century, the only centre of active cultivation of these matters and of philosophy relatively close to Llull that could be detected is found in the area of Murcia and, as far as we know, its historical continuity is oriented towards the kingdom of Granada and the Maghreb. More within reach is the well-stocked library of the last Minorcan leader, Abū ‘Uthmān Sa‘īd ibn ‘Abd al-Ḥakam (d. 1281), which we know included books on medicine and many other subjects, but it is impossible to establish any physical or intellectual connection between it and Llull.

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The poverty of this close Majorcan atmosphere where Llull was trained with the help of an Arabic slave is one of the reasons that explains the fact that, with reference to sciences, Lullian production is of low quality and radically contrasts with the progress achieved in al-Andalus in the late 12th century. Nevertheless, Ramon Llull is an intuitive and restless wise man who harmonises with the equally restless spirit of his time. What is more, he can go further than most of his contemporaries because he is capable of not limiting himself and looking at all sides. Thus, we can accept the hypothesis that, in the Majorca that for some years had been under the influence of the Almohad world, Llull gathered together some second or third hand ideas characteristic of that time and incorporated them in order to transform them.

Let us see what the history of al-Andalusian science can give us for a better understanding of the Lullian phenomenon.

Evaluation of al-Andalusian Science (1): The 11th Century

After a relatively long period of acclimatisation (9th and 10th centuries), around the end of the Omeya period, al-Andalus yielded the first mature fruits that we can personify in two major names: the mathematician and astronomer Maslama al-Majrī and the physician Abū l-Qāsim al-Zahrāwī. Their followers and disciples would give way to an era of real splendour sustained by the diverse Taifa kingdoms that wanted to recall the splendour of Cordoba. Throughout the Iberian geography, the science inherited from the Greeks would be cultivated with diverse levels of quality, but three towns and three dynasties would stand out: Toledo, with the Banū Dī l-Nūn and the collaboration of the private patronage of the *cadi* Ṣā‘īd; the Seville of the Banū ‘Abbād; and the Saragossa of the Banū Hūd. The most remarkable results of these centres are the following (Samsó, 1992):

- Continuation of the medical, and especially, pharmacological studies started in Cordoba in the previous period, in which two authors stand out: on the one hand, Ibn Wāfīd, from Toledo, the author of a treatise of simples (of which several translations would be made, including one into Catalan); on the other, a pharmacological treatise from the late 11th century, the *‘Umdat al-Ṭabīb*, attributed to Abū l-Khayr from Seville, in which we find a precise system of classification of species that prefigures that of Cuvier and which is adapted to the logical categories conceived by Aristotle and Porphyry.



Ramon Llull learning Arabic
(*Breviculum III*, Ediciones Casariego).

- Birth of the al-Andalusian agronomy, a truly original discipline that goes beyond Greek-Roman knowledge insofar as it structures a very empirical knowledge using the categories of medical disciplines to make it a science.
- The astronomical activity promoted by *cadi* Ṣa‘id in Toledo, and whose main exponent is the famous Azarquiel. Its goals were: fostering astronomical observation, although there

are doubts about its real scope; production of astronomical tables; design of models of planetary movement different from those of Ptolemy (solar and lunar models of Azarquiel, the first of which incorporated his discovery of the movement of the solar apogee) and invention of universal astronomical instruments (Azarquiel and ‘Alī ibn Khalaf).

- Cultivation of theoretical mathematics, from which stand out, on the one hand, geometry (the *K. al-Istikmāl* written by the Saragossa king al-Mu’taman, and the partly known work of Ibn Sayyid, from Valencia; on the other, the adoption of the new trigonometry created by the Arabs in the Islamic East from the 10th century, by Ibn Mu‘ādh from Jaén, the author, moreover, of important astronomical tables).

Most of the works mentioned mean progress with respect to what had been received, which sometimes was the result of the combination of the work of empirical research with the capacity of broadening the theoretical framework inherited but without exceeding it: this is the case of Azarquiel’s astronomy, *‘Umda*’s pharmacology, and agronomy (perhaps the most important goal of all those mentioned). However, the empirical side applied to science predominates over the theoretical and speculative, except in the case of al Mu’taman’s *K. al-Istikmāl*. As we will see next, it is not by chance.

Evaluation of al-Andalusian Science (2): The Manifestation of the “Ideology of Science”

In the 11th century, a qualitative change took place in the course of al-Andalusian science, as a result of the development of philosophy. This change was gestated in the Saragossa of the Banū Hūd where, from the beginning of that century, we find evidence of a serious

cultivation of philosophy. In fact, in this court “the ideal of the wise man” conceived by the Greeks and interpreted by Arab philosophers, especially al-Fārābī, imposed itself, we could say without exaggerating, almost as a model of life.

What does it involve? The transmission of science and Greek philosophy to the Arabic civilization took place essentially in Bagdad from the mid-8th century, in a very complex religious and ideological framework which is altered by the reception of the new knowledge. The Arabic philosophy, strongly neoplatonized, evolves until the 10th century, when the great philosopher al-Fārābī emerged. He showed a special interest in concordance between Plato and Aristotle, as well as in political philosophy and ethics. In relation to these issues, he is interested in the structuring of knowledge in order to achieve an ideal beatitude (Fakhry, 2002). He had wide influence on the al-Andalusian authors of the late 11th century and early 12th century, and, in particular, Avempace. To a great extent, he oriented the perception of all of them about what knowledge is and what it is for, by summarising Aristotle and Plato, the *Nicomachean Ethics* and the *Republic*. What does supreme happiness consist of? Of contemplative life and of the cultivation of the virtues, starting with the theoretical virtues that must lead us to a knowledge of the truth close to that possessed by God. And when the human who is capable and self-sacrificing enough reaches the highest level of theoretical knowledge, the union with the agent intellect will await him to become, in some way, divine. The ideal of the “ideal” consists of the fact that the latter takes place within an equally perfect and harmonious society in accordance with the Platonic canons. The moral virtues, practical and political, are, therefore, an unavoidable complement of the path that leads to supreme happiness. As a parallel and, to a certain ex-

tent, complementary, path there is religion. Al-Fārābī and his follower, Avicenna, however careful they are in coordinating it with the rational path, elevate science to the epistemological rank of religion, even higher. Theoretical knowledge is, therefore, configured as a universal path towards truth which is, at the same time, a kind of mystic and secular regulatory system. We can provisionally call this an “ideology of science”, insofar as it orients the life of certain people and it even inspires governors. The trivium and the quadrivium that structures the acquisition of knowledge in the Christian world, and that in the Islamic world are manifested in the “classifications of the sciences”, cannot be conceived by Islamic philosophy from the perspective that sciences are the “servant of theology” but rather “the mistress of our lives”. A reaction would come in the 11th century from al-Gazālī, who would try to put philosophers and reason in their place proclaiming the superiority of revealed knowledge over intellectual reason. Nevertheless, he recognised the utility of and the need for reason and intellectual speculation. Averroes disputed with him in the 12th century and the debate between both postures marked, to a certain extent, the course of the Almohad world until its end.

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We have enough data to presume with an easy spirit that this “ideology of science” triumphed within the Saragossa of the Banū Hūd, at least during the brief reign of al-Muḥtaman, the philosopher and mathematician king (and perhaps during the longest of the predecessor, al-Muqtadir, and the successor, al-Muʿtadid).

Around the court of al-Muʿtaman, science and philosophy flourished, and different sources coincide in considering him a scientist who left us the most important mathematical treatise ever written in al-Andalus. This “Farabian-Saragossan” spirit was theorised by Avempace. His indirect disciples, Ibn Ṭufayl and Averroes, tried to implant it within the Almohad court, which needed intellectuals with a powerful speculative capacity, with varying success. But from this spirit, along with Almohadism, a broad movement of religious, philosophical and scientific reform was born which, from the point of view of interrelation between faith and reason crystallizes in the famous *Faṣl al-Maqāl* of Averroes, the “definitive treatise on establishment of the harmony between religion and philosophy” (Puig Montada, 1998). The final thesis is that there is only a truth understandable by rational means. Religion invites us to discover this truth and cannot contradict the result of this rational research. For this reason the sacred text must be interpreted to reach concord. Although all this activity would not radically change the course of the history of ideas, it did not leave it unchanged. One of the many rivers that would end in the sea of the Renaissance emerged. Let us next look at the colour of its scientific waters.

Evaluation of al-Andalusian Science (3): Science with Philosophy

During the 12th century, al-Andalusian science, on the one hand, would continue with the tasks of the previous century and, very especially, in the fields of medicine (the work of the Banū Zuhr), agronomy and botany (al-Ṭighnārī, Ibn al-ʿAwwām and Ibn al-Bayṭār), and astronomy (the extensive mathematical revision made by Jābir ibn Aflaḥ of the *Almagest*). But this was also the century of the wise man trained un-

der the “ideology of science” (Forcada, 2005), which means that it was necessary to follow the course outlined by Plato and consecrated, for Islamic culture, in the classification of al-Fārābī’s sciences (Forcada, 2006). This meant that he must have studied several disciplines (mathematics, logic, natural philosophy, metaphysics and, finally, ethics and politics); that he had many opportunities to become a physician, as the teaching of this profession involved, for the student, the necessary contact with many of these disciplines; and, above all, a way of finding in science a means of earning his living, in a moment when the professional possibilities of the talented scientist had diminished. The results of these wise men, who had received an integral training and were moved by an ideal of always going further, are important and sometimes surprising.

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In the first place, we see a notable increase in the cultivation of theoretical mathematics that we find significantly linked to the masters of Avempace and his disciples and their future disciples: on the one hand, Ibn Sayyī, and, on the other, Abd Allāh ibn Muḥammad ibn Sahl al-Ḍarīr, ʿAbd al-Ḥaqq ibn Ṭāhir and, finally and without any apparent direct but rather an indirect connection, Ibn Munʿim. What must be stressed about all these mathematicians is that they quite often made, or we suppose they made in certain cases, a “mathematics for mathematics” without any practical purpose, within the framework of a broader training within which the mathematical sciences were an early propedeutic stage. Equally important is the fact that other philosophers also studied mathematics in some depth (we know as well that Averroes had a good knowledge in mathematics).

At a higher and more ambitious level, this kind of wise man tried to ensure that all scientific knowledge could be harmoniously fitted within the framework of frameworks made up by Aristotelian works. The operation progressed in three ways that were simultaneously developed:

- The attentive and, to a certain point, critical commentaries of Aristotle's work in order to precisely know the scope of that framework (Avempace and Averroes).
- The subjection to the Aristotelian scientific method emphasising the process of searching for valid premises on which to structure the demonstrative syllogism that grants the "certificate of scientificity" to scientific reasoning. Obviously, it is an eminently deductive but also empirical science as this prior search for premises involves an inductive (and dialectic) scrutiny of reality. To an almost insignificant level, this science embraces experimentation but this was already present.
- The critical evaluation of the science based on the two previous keys. This means the contraposition of Galen, Ptolemy and others with Aristotle.

The second is the central point when thinking of Lullian science: from Avempace, and perhaps from before, the method was essential for these scientists because it is the true asphalt on the wise man's path and, at the same time, Ariadne's thread that guarantees us that we do not lose the way towards the highest knowledge. The method and its premises are the firm basis without which the correct deduction and, therefore, edification of the house of science would not be possible. Under al-Fārābī's influence, Avempace devoted many pages to emphasising the importance of all this and communicated his concern to Averroes with the mediation of Ibn Ṭufayl. Averroes mainly de-

voted himself to inquiring about the premises, even in the religious sphere, and, consequently, to refund in a time of political and religious refunding (second half of the 12th century). At least, he wanted to lay the foundations of new buildings that, in certain cases, because of the size of the enterprise, would remain half made or would not be solid enough. But what interests us is not so much the result as the process itself that belies the commonplace of an Averroes cloistered between Aristotelian walls. The path is gradual and sinuous, alive and self-critical, and while following it the scientists call each other and, when necessary, confess their shortcomings and failures that they justify with the Hippocratic maxim *ars longa, vita brevis*. All this for almost one century, the 12th, especially the second half, the Almohad period.

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In short, what most interests us in relation to Llull is the faith of those wise men in reason and its capacity to take possession of the world by itself, provided it is in direct contact with the things in the world, and uses the proper demonstrative method. The difference between them and Ramon Llull is the fact that those wise men behaved more cautiously, as they knew they were before a work which had to be made gradually. Thus, we can see in their task the grace of the unfinished art work left to suggest other new works. Ramon Llull, more ignorant and crazy, is not aware of the difficulty and the dangers of the tasks and undertakes some of them without reflecting, but this is the danger that all the converts to a new religion have: the catechism has more weight than the holy text.

The most important scientific results of this science can be summarised as follows, but we must never forget that there are other results in different spheres:

- Emergence of speculation about physics in al-Andalus, based on Aristotle. We will find the assumption of non-Aristotelian ideas of neoplatonic origin (Joan Filopó), such as a different theory of movement (impetus), the admission of the possibility of movement in the void or the application of the rules that govern movement in a sub-lunar world to the physics of the supra-lunar world (actors: Avempace, al-Biṭrūjī). Some of these ideas would be projected in the physics of the Renaissance.
- Emergence of biological speculation also based on Aristotle's commentaries made by Avempace and by Averroes. Still poorly known, it presents a critical re-assessment of Aristotle in certain aspects (for instance, the sexuality of plants sustained by Avempace).
- A new approach to medicine, which would be set out by Averroes in the *Kitāb al-Kulliyāt* based on Aristotelian principles of matter, form, efficient and final cause: anatomy becomes independent of physiology and allows European physicians to start focussing their attention on it: it is a clear antecedent of the medicine that would directly study the human body through dissection. His conception of medicine as an "art based on true principles", which has a clear precedent in Avempace and al-Fārābī, would help to change the mentality of European physicians in terms of the value of empirical knowledge.
- Criticism of Ptolemy's astronomy to describe the planetary movements with circles which do not have the Earth as the centre. It would be a long process in which Avempace, Ibn Ṭufayl and Averroes intervened, who

started out from the basis that astronomy, like other sciences, must be based on true premises provided by physical theory and observations. Finally, it would be culminated by al-Biṭrūjī with homocentric models that seem to adjust very well to Greek pre-Ptolemaic astronomy. This work would be known by Europeans and even Copernicus would cite it but, in the end, it would have little success because the models are not as efficient as those of Ptolemy and contain several gaps.

Ramon Llull and al-Andalusian Science and Thought

It does not seem that Ramon Llull's scientific work was influenced by the advances that al-Andalus developed in the 11th and 12th centuries, as Vernet (1979) pointed out, in addition to Samsó (1983), Badia (2004) and others. As previously mentioned, it is very doubtful that any Majorcan Muslim wise man from the 12th century had a detailed knowledge of the progress described above and, less so, that there was someone in the 13th century capable of informing and training Ramon Llull with the necessary precision. What we can imagine is that the guidelines, the ideas that circulated among everyone in a determined moment, could have been heard by Ramon Llull in his training period second or third hand. The dialectics between reason and faith that presided over the very animated intellectual debates in the second half of the 12th al-Andalusian century and which, moreover, put science and philosophy in the eye of the storm, must have interested a very broad circle of thinkers, insofar as it was very clearly related to the discourse that emanated from power. Although Majorca was only Almohad between 1203 and 1228, the impact must have been profound because, as

Maribel Fierro emphasises, the Almohads arrived accompanied by very active “missionaries”, whose mission was the indoctrination of the population in Almohadism. A generation is enough to alter the course of people’s beliefs and, moreover, we must bear in mind that Almohadism must have been very alive when Christians arrived, without any intermediate period which had other al-Andalusian areas: Majorca passed directly from the Almohads to the Christians. Almohadism did not leave any part of the 12th century al-Andalusian and Maghrebian spirit indifferent, including the scientific-philosophical, the theological, the legal, the mystical or any religion with which they were in contact. And it continued in the 13th century. Certainly the echoes had to resonate in one way or another between the 13th and 14th centuries on the island, as they were still heard in the Maghreb and, in another way, in the European universities.

Llull, a man of indisputable good will, was convinced that, speaking the language of science and philosophy, he would persuade everyone capable of understanding this language of the goodness of the Christian message

Thus, it is not surprising that in Lullian thought we can trace back the “ideology of science” previously described, beginning with the fact that Ramon Llull conceived science as a kind of universal language, in the same way that Arab scientists and philosophers did. As for them, science is a parallel path capable of finding a universal truth which, finally, can only be the divine. Within the context of missionary expansion in which Ramon Llull lived, and given his peculiar idiosyncrasy, the “ideology” is put at the service of other purposes, although it does not alter its substance: “rational faith”. Thus, Llull, a man of indisputable good will, was convinced that,

speaking the language of science and philosophy, he would persuade everyone capable of understanding this language of the goodness of the Christian message.

Like the Muslim scientists-philosophers, Llull would understand knowledge as a way of life and as a source of joy although, at the same time, he would heed the warnings of al-Ghazali and would not go as far as Averroes and would criticise him.

Like Muslim wise men in general, Llull would understand knowledge as a personal transmission open to everybody who has the good will to follow a difficult path; this is why he would try to democratise it as much as possible within a society that had a much more rigid structure than Islamic societies and had reserved to science a drawer that tends to close more than open. An aspect of this democratisation is the writing in Catalan, which he used to facilitate the dissemination of knowledge. It is clear that very diverse factors can be influential when opting for a vernacular language, beginning with Ramon Llull’s deficient understanding of Latin. But we cannot approach this question without having in mind the propagandistic side of Almohadism and the fact that, for this reason, doctrinal texts were translated into Amazigh.

Like Muslim scientists-philosophers, Llull would understand knowledge as a complete system that reflects life itself and this is why he would include in the core of his Art and in his classifications and descriptions of sciences all kinds of knowledge, both theoretical and practical, and in the latter matters he would go further than any Islamic philosopher.

Finally, like Muslim wise men, and very especially the 12th century al-Andalusian, he would understand science and philosophy as a self-sufficient discourse channelled by an exact language, that of logic, which can be introduced in a “machine of thinking” that would indefectibly “find truth”.

Ramon Llull learnt of this in a decidedly random and unofficial manner, to use contemporary terminology. For this reason, he drew on unexpected sources for a typical wise man, both from the Christian and Arab side. Some proof of his freedom of mind and his almost morbid curiosity can be found in the fact that one of the possible precedents of his Art, still not refuted today, is the *zajirja*, a speculative method fashionable at the time in the al-Andalusian and Maghrebian mystic and occultist circles; or that one of his contributions to the history of science was that of providing one of the rare descriptions that we have of a *nocurlabe*, an instrument used by sailors to tell the time at night and that, as it was a professional tool, did not enter in the catalogue of the instruments that were usually handled by scientists. The cross-over and interdisciplinary nature that characterises his thought can be considered as one of Llull's most innovative and fruitful contributions, but we must not forget that these same features are also found in Muslim al-Andalusian wise men (and not only scientists and philosophers), especially in those from the 12th century, although at the service of a defined epistemological framework. In the hands of a mind as free as Llull's, these tools of the intellect produce things that only today can be valued as they deserve.

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Figure S de l'*Ars demonstrativa* (manuscrit VI 200, Biblioteca Marciana di Venezia).