Hrvatski filozofi I: Herman Dalmatin (1110–1154)

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ABSTRACT: The article includes a short biography of Hermann of Dalmatia and gives an account of his translations and philosophical and scientific work. In order to have a better understanding of Hermann's philosophy, a reminder of Greek and Arabic philosophy of nature, on which he relies in his interpretation of the world picture, needs to be presented. Cosmological models by Plato, Aristotle, Eudoxus, Heraclides of Pont, Apollonius of Perga, Hipparchus, Ptolemy, and the Arab scientist Abu Ma'shar, are presented. The main focus of interest is on Hermann's translations. The immense importance of his translations from Greek and Arabic into Latin is due to the fact that some of the seminal Greek and Arabic works became known in Western Europe in the middle of the twelfth century. Hermann is also important as the author of the original work *De essentiis*, which presented a blend of Platonian and Aristotelian as well as Western European and Arab traditions.

KEY WORDS: Hermann of Dalmatia, Greek and Arabic philosophy of nature, translation and mediation between Arabic and Western tradition, essence, soul, cause, motion, middle (*medium*), astrology, God, Sun, music.

1. Biography

Hermann of Dalmatia is one of the pioneers of European science and the first renowned Croatian scholar. He was born around 1110 somewhere in central Istria. In literature he is also known as Hermannus Dalmata, Hermannus Sclavus, Hermannus Secundus, Hermannus de Carinthia and by some other names. He probably began his education in one of the Benedictine monastic schools, where students were taught Latin grammar, classical literature, logic, rhetoric, poetry, music, and astronomy/astrology. He continued his studies in Chartres and in Paris (1130–1135) under the guidance of Thierry of Chartres, his teacher from whom he acquired the knowledge of philosophy, natural science and astronomy. He became friend with his schoolmate learned Robert of Ketton (England) with whom he embarked

on a journey to the Orient (1135–1138). They traveled through France, Italy, Southern Croatia, Greece, and finally arrived at Constantinople and Damascus. There they discovered Arabic science. Around 1138 they returned to Toledo (Spain), where a famous translation school had been established. In Spain, he was engaged in the studies of astronomy/astrology based on Arabic texts. In 1142 he met there Peter the Venerable (Petrus Venerabilis), the abbot of a well-known Benedictine monastery Cluny (France).

Hermann began translating scientific works from Arabic into Latin as early as 1138. Between the years 1138 and 1143, he translated, interpreted, or authored, around fifteen works that are of vital importance for the systematic study and advancement of natural science in the West. His original work of exceptional significance is *De esentiis* (1143) in which he offered an original synthesis of Arabic Aristotelianism and Platonism of the Chartres school of philosophy. He translated Euclid's *Elements*, Ptolemy's *Planisphere*, Abu Ma'Shar's *A General Introduction to Astronomy*, *Koran*, and some other Islamic religious manuscripts. In 1143, Hermann spent some time in Toulouse and Béziers (France). After this point the records of his life became unreliable. He probably died in 1154.

2. Hermann's doctrine

2.1. *Introduction*

Hermann of Dalmatia was active throughout a period of great cultural changes in Europe. In the seventh, and especially in the eighth century when Arabs conquered North Africa, Southern Italy and Spain, certain political and cultural ties between Europe and Islamic world were established, which proved to be significant for the further development of philosophy and science in medieval Europe. These ties which were strengthened in the eleventh, and especially in the first half of the twelfth century, became a foundation for a new science, that is, for the synthesis of Western European and Arabic sciences.

This period of history demonstrates how the learned people of the Latin-Christian West, who were looking for answers to questions which couldn't be found in ancient philosophy, reached for other cultures and civilizations. Islamic and Arabic philosophy and science of that time possessed scientific and everyday knowledge which became the focus of their interest.

Arabs acquired the knowledge of mathematics, physics, and astronomy, from two sources: old Greece, its philosophy and science having a greater influence, and the Orient. They had translated almost every major work of Greek culture (Plato, Aristotle, Euclid, Ptolemy, and others) as well as Indian astronomical and astrological treatises. Even though astrology had been known in ancient Greece, the Orient, and especially the Indians, considered astronomy to be a practical science, which served to foretell events

on Earth by observing the movement of the stars. Arabic astrologers developed an astrological theory by marking the so-called heavenly houses (the division of the zodiac into twelve houses) and the transfer of astrological influences from heavenly region to Earth.

The philosophy of nature, however, did not provide astrology with a fully scientific explanation. It was gained by integrating the Indian astrological insights with Aristotelian philosophy of nature, which had been done by Abu Ma'shar (Latin form of his name being Albumasar), who considered astrology to be the highest science that refers to nature and whose source is found in the principles of philosophy of nature.

2.2. *Greek and Arabic philosophy of nature*

In order to understand Hermann's scientific and philosophical work, we should take a closer look at the tradition on which he based his own views, that is on Greek and Arabic philosophy of nature.

Although nearly every Arabic author accepted Aristotelian philosophy of nature, they still offered some critical comments on it. Aristotle adopted many of Plato's views which he then modified to fit his own philosophy.

Plato's philosophy of nature rests on the distinction between the World of the Intellect, the so-called World of Forms and the Sensible World which is only an imperfect image of the intellectual world, the realm of Forms. The true, genuine, and complete Being belongs exclusively to Forms because they "simply are", while the Sensible World "never is", but is constantly disappearing and being created. The changing phenomenal world which can only be observed through the senses cannot be known because there is no true knowledge about Non-Being. Only the unchanging Forms or pure abstract concepts can be the objects of true knowledge and inquiry. According to Plato, science that studies Forms is dialectic. Between the World of Forms and the Sensible World stand, as intermediaries, mathematical objects (geometrical shapes and numbers). Plato maintains that mathematical thinking is a preparation and introduction to philosophy.

For Aristotle, however, Forms are not transcendental causes of things but are immanent to them. Universal does not exist outside or above particular things, but in them. According to him, mathematical terms are nothing but abstractions of things that exist in experience. Knowledge about Being belongs to first philosophy (*próte philosophía*) or metaphysics, but certain aspects of Being are explored by other sciences. Second philosophy (physics, natural science) studies nature whose cause or principle of motion is contained in it, and which is always concerned with the thing, i.e. natural beings are movable and dependent (i.e. connected to the matter). Immovable and dependent beings (for example, numbers) are the subject matter of mathematics or third philosophy. Furthermore, numbers do not exist on their own nor are they abstracted from the matter, but are as if in the matter.

The importance of mathematics in Plato can easily be seen if we examine his view of how the universe is organized. According to him, God the Creator (*Demiurg*) created the world after the pattern of Forms. First he created space which can take in itself all the shapes. Plato's space-matter (*hora*) is not created but is eternal, without order and harmony, dead and senseless, imperfect and limitless (*chaos*). It is a chaotic mass that fills the space. Forms can create order and harmony in space-matter; they give it shape, purpose and life. Changes of the Sensible World, creation and decay, occur in the space. Last elements of the Sensible World are the constructions of the mind, that is simple geometrical solids, regular polyhedrons (so called Platonic shapes): *cube, icosahedron, octahedron, tetrahedron, dodecahedron*. Plato puts special emphasis on the shape of the body, and not on the matter out of which bodies are made. Plato assigns one geometrical solid to each of the four elements that he takes over from Greek tradition: *cube* to *earth*, *icosahedron* to *water*, *octahedron* to *air*, *tetrahedron* to *fire*. The fifth geometrical solid is assigned to the heavenly matter (ether or fifth essence). The elements water, air and fire, are positioned concentrically, while earth occupies the center of the universe.

Aristotle adopted Plato's views of four elements and modified it to a certain extent. Elements are not explained by regular geometrical solids, but they originate from the first matter (*materia prima, próte hyle*). By putting these elements together and their combining, natural beings which constitute the earthly changeable and imperfect world are created. The cause of imperfection lies in the motion of elements. Plato also thought that the elements occupy certain places that are likely to them because of their tendency toward the like. Aristotle calls these places the natural places of elements and the attraction of elements toward themselves (i.e. earth to earth, water to water etc.) he calls the natural motion of elements. The motion of elements occurs in an upward-downward linear motion depending on elements' heaviness. Earth is the heaviest, so its motion is downwards (i.e. toward the center of the universe), fire is absolutely light and moves upwards (i.e. moves away from the center of the universe). Water is also heavy though not as much as earth, and air is light but less so than water. This is how Aristotle introduced the terms of absolute and relative weight and lightness.

Plato's assignment of dodecahedron to the universe as a whole seemed to be inadequate to his students, so they started looking for a new fifth element to which they would assign this geometrical solid. This is ether or fifth essence (quintessence) which is positioned between air and fire.

Already Pythagoreans and Plato acknowledged the duality of the world. They differentiated between the imperfect (Earthly) or Sublunary and the perfect Heavenly or Supralunary region. According to Plato, fire belonged to the heavens while Aristotle put it on earth. Plato's students thought ether to be placed between air and fire, and Aristotle placed it in the Earthly re-

gion. Therefore, its movement is circular. For Greeks, circular motion was the most perfect motion. As circular motion always implies perpetual returning, heavenly bodies, which move uniformly along circular paths, are therefore eternal and perfect. They move at different distance from the stationary Earth that is at the center of the universe. The farthest is the sphere of the fixed Stars or the First Sky.

Plato thought that the constellation of the heavenly spheres is as follows: the Moon, the Sun, Mercury, Venus, Mars, Jupiter, and Saturn. If the concentric spheres which correspond to elements are taken into account, and the farthest sphere of the fixed Stars, then there are twelve spheres of different thickness. Universe is, for Plato, one, spherical, moving uniformly from East to West around the axis that passes through the center of the Earth. Points where this axis intersects another sphere are called North and South Celestial Poles. The fixed stars move along circles on the spheres because of their revolution. The time of one revolution is around twenty-four hours and that is the so called daily revolution of the heavenly sphere. Plato calls this revolution "the circle of the same", and its axis is vertical on the plane which is called the plane of the equator. The spheres of seven heavenly bodies lie concentrically with the outer sphere the fixed Stars. These bodies, apart from moving along their own spheres, move in yet another circular motion on the planes which are parallel to the so called plane of ecliptic which is tilted by 23.5 degrees to the plane of the equator. The axis vertical to the plane of the ecliptic Plato calls the axis of "the circle of the different". The resulting movement of each of the seven heavenly bodies is not circular, but spiral. However, his explanation was not sufficient enough to explain such a complex movement of the heavenly bodies.

Plato's student Eudoxus of Cnidus (408–355 or 400–347), in order to match the theory with his observations, i.e. in order to "save the phenomena", introduced additional spheres. The need for the introduction of the spheres had for its purpose explaining the movement of the heavenly bodies as this movement was observed. It was observed that there were some retrograde motions, i.e. as if the heavenly bodies were making some kind of a knot. On the other hand, there were principles in the context of which they sought a solution to the movement of the heavenly bodies. These are: the Earth at the center of the universe, movement of other heavenly bodies that is carried on circular paths and uniform motion. How could then retrograde movement be explained by accepting these principles? Eudoxus, while still having supported these principles, attempted to solve this problem by introducing a system of concentric spheres that stood one in another and that were interconnected. They revolve at different speeds around different axes. Eudoxus introduced three spheres each for the Moon and the Sun, four spheres for the rest of the planets, and he left only one sphere for the sphere of the fixed Stars. In total, there were twenty seven spheres. Spheres that

belonged to the same heavenly bodies were interconnected, and those that belonged to different heavenly bodies were not.

Since it was once observed that Mercury and Venus were at one time closer, and at other farther from the Earth than the Sun was, Plato's student Heraclides of Pont (ca. 388–315) thought that Mercury and Venus revolve around Sun, while they all together revolved around Earth.

In this manner he was able to explain the position of Mars and Venus. Furthermore, Heraclides claimed that Earth revolved around its own axis, and that the stars in the sky are still. His system had not been accepted in ancient Greece, but was endorsed in the Middle Ages by Hermann of Dalmatia, and generalized by Tycho Brahe in the sixteenth century. Aristotle supplemented Eudoxus' model of the heavenly region by claiming that even the spheres of different heavenly bodies are interconnected and that the cause of each sphere's motion is the sphere which is above it. The farthest sphere the fixed Stars movement is being moved because of the Prime Mover. The number of spheres rose to fifty six spheres in Aristotle. If the Prime Mover did not exist, i.e. the force that borders with the Moon's sphere and acts from the outside of the earthly region, then there would be no changes in the Sublunary region, because the elements would occupy their natural places. The outside force does exist and is transferred from the Prime Mover to the Moon's sphere, which then in turn moves and pushes the layer of fire and therefore the mixing of elements occurs in the Sublunary region. There are two types of motion in the Earthly region. These are: natural motions, seen as a tendency toward proper place, and induced motions whose source is found in the heavenly region. Every motion occurs only by touching. Therefore, there is no empty space.

Aristotle's world also is divided into the Sublunary and Supralunary region. The elements earth, water, air, and fire make up the Earthly region, while the Heavenly region is made up of the Moon, Mercury, Venus, Sun, Mars, Jupiter, and Saturn. Stationary Earth is at the center of the universe.

After Aristotle, new mathematical models, by means of which sensory observations could be more accurately described, were being proposed. Still, some basic Aristotelian views on natural philosophic picture of the world remained valid (i.e. the central position of Earth in the universe and uniform circular motion of the heavenly bodies around the Earth). The main problem was how to explain retrograde movement of the planets. Eudoxus attempted to solve it by introducing homocentrical spheres. An opposite approach was proposed by Apollonius of Perga (262–290), who introduced the so-called *epicycles*. The Earth is at the center of the universe and at the same time at the center of a circle called *deferent*. A center of another circle called *epicycle* moves along this circle, while a planet moves along epicycle. By looking at certain speeds of motion and certain half-measures of the epicycle and deferent, we can find a resulting retrograde movement of the planets.

Model of the epicycle does not necessarily lead to retrograde movement. This is how Hipparchus (194–120) explained the motion of the Sun around the Earth. The resulting movement is described by an ellipsis.

Ptolemaic geocentrical system represents the peak of ancient Greek astronomy. Ptolemy (ca. 100–170) introduced the so called equant in order to explain the Sun's motion. At the center of Earth is also the center of the Sun's deferent. If the Sun moved uniformly along deferent, then its distance from the Earth would always be the same. However, the observation showed that Sun was at one time closest to the Earth and then it appeared the biggest (this position is called perigee), and at other time the farthest from the Earth and appeared smallest (apogee). In order to preserve the basic principle of uniform motion, Ptolemy hypothesized that the motion of the Sun is uniform, but in regard to a certain point E (equant), while when looked from the Earth it is not uniform. Ptolemaic geocentrical system is considered to be the highest scientific achievement of the ancient times. It represents a mathematical foundation for Aristotelian philosophy of nature. On the other hand, Aristotle's peripatetic philosophy of nature gives natural philosophical justification for geocentrical system.

Arabic scientists and philosophers endorsed Aristotelian philosophy of nature and by uniting it with Indian astrological thinking founded astrology as the highest science about nature. An Arabic scientist who did made this synthesis was Abu Ma'shar. He explored the motion of the heavenly bodies by referring to Ptolemy's work *Almagest*. The title *Almagest* is derived from the title of Ptolemy's work *Megale mathematike syntaxis* which was then shortened to *Megiste syntaxis*, and finally to *Al-megiste*. Latin form of it is *Almagestum*. He took special interest in the nature of the heavenly bodies and their influence on events in the Sublunary world.

2.3. *Hermann of Dalmatia as a translator and intermediary between Islamic and Arabic cultural tradition and the West*

Philosophical and scientific centers where Plato's philosophy of nature was studied existed in the Middle Ages in Western Europe. Mathematics was taught according to Boetius' (480–524) works. With the arrival of Arabs to Europe, Arabic numerals and positional decimal system were introduced. Other areas also felt a strong influence of Arabic spirit. Philosophical and scientific works were starting to be translated from Arabic into Latin, whether they were original Arabic works or Arabic translations of old Greek philosophical and scientific works.

The importance of translating into Latin for the further development of philosophy and science in Europe can be seen from the fact that Euclid's *Elements* hadn't been known until 1130 when Abelard of Bath translated them into Latin. Even Aristotle's philosophy of nature became known to Western Europe mostly through Arabic writings and commentaries, espe-

cially those of Abu Ma'shar. That was important for the discovery of the authentic, original Aristotelian teaching which had, as it was thought, distanced itself from original Aristotle through scholastic philosophy of the Western Latin Christianity.

However, Western European philosophers and scientists held to their philosophical and scientific tradition (Platonism and astronomic concepts) but they also enriched them with insights from Arabs and hence created a new science. One of the most important intermediaries in this uniting of different traditions was Hermann of Dalmatia, who gained his prominence as much with his translations, as with original contribution, to this new European medieval science.

At the time when Christian Europe and the rest of the Christian world were afraid of aggressive Islam, several humanistically oriented intellectuals strove to take part in a peaceful dialogue with Islam. Closely related to it was an interest to study Islam both in the fields of theology and apologetics as well as in philosophy and science.

First advocate of Islamic studies in Europe was the abbot of the Benedictine monastery in Chuny, Peter Venerabilis, who gathered some of the most eminent European intellectuals of that time in order to seriously and impartially study Islam and then offer this knowledge to Christian world. Among Peter Venerabilis' associates a prominent place is occupied by Hermann of Dalmatia, who with his friend from England Robert of Ketton, thoroughly searched Mauri libraries in Spain and thus gained insight into the secrets of Arabic knowledge.

Having a perfect knowledge of Arab and Latin languages, Hermann had translated and interpreted around fifteen works important for education, and even more for the general advancement of philosophy and science, before the first European universities had been founded. These are Islamic texts translated from Arabic. Of religious texts the most famous is his translation of *Koran* (done together with three other authors), and texts about the founder of Islam, Muhammad and his teachings: *De generatione Mahumet* (1142), and *Doctrina Mahumet* (1142).

The translation of philosophical and scientific texts began in 1138 in Toledo when Hermann translated Sahl ibn Bishr's treatise (ninth century) *Fatidica*, which included interpretations of the effect of the heavenly bodies on the changes in the world and on man. Furthermore, it included a way of forecasting weather based on the movements of the planets and mutual position of the Moon and the Earth. Of all the heavenly bodies the Sun is the major controller of actions in heavens and also on Earth. Apart by the Sun, the Earth is also being affected by other planets so that the various parts of Earth are being exposed to influence of different planets. At certain periods, the influence of one planet is dominant and it is called the Master of the Year. Each year, different planet becomes the master of the year. There are "good" and "bad" planets. Good ones are the Sun, the Moon, Mercury, Ve-

nus, Jupiter, while the bad ones are Mars and Saturn. Ibn Bishr also considered the planets to be heavenly bodies and he foretold the events on Earth based on their movement and position. For Aristotle comets were phenomena in the region of fire, that is, they belong to the Earthly region.

At the beginning, Hermann was influenced by Sahl ibn Bishr's astrological ideas, but later on he adopted astrological teachings of an Arabic scientist from Baghdad, Abu Ma'shar (ninth century) whose work titled *Introductorium in astronomiam* (1140) Hermann translated into Latin. This work and *Fatidica* were first translated into Latin by Juan (John) from Seville in 1133. This work deals with the questions which were commonly found in Greek philosophy, Arabic astronomy and Oriental astrology. It emphasizes the influence of the Sun, the Moon, and other planets, on the changes on Earth (for example, changes of winds, high and low tides of the sea, changes with plants and animals etc.) Abu Ma'shar interpreted astrology completely in the context of Aristotelian philosophy of nature, which provided astrology with its philosophical foundation. Translating *Introductorium in astronomiam*, Hermann adopted Aristotle's philosophy of nature, which was important for his further scientific work. On the other hand, the translations of *Introductorium* brought Aristotelian philosophy of nature, little of which had been heard or known about until the twelfth century, closer to Latin-Christian West.

Some of his other translations include *Elements* (1140?) by a Greek mathematician Euclid (ca. 330–275), *Astronomic Tables* (1140/1143) by an Arabic mathematician of Persian origin Muhammad ibn Musâ al-Khwârizmi (ninth century), Abu Ma'shar's astrological treatise *De revolutionibus nativitatum* which deals with predicting of the influence of the heavenly region on the individual, and *Planisphearium* (1143) by an Alexandrian astronomer, mathematician, and geographer, Claudius Ptolemy (ca. 90–168). With this translation, Hermann helped Western Europe to get familiar with this work that was important for later European science because it provided a theoretical basis for the construction of *astrolabe*. With his translations Hermann became one of the very few scientists who, in the mid twelfth century, not only cleared the way for Aristotelian philosophy, but also for a systematic approach to sciences.

4. Hermann's philosophical and scientific work

Hermann's translations had a profound influence on his own natural philosophical and scientific stance. On the other hand, he was educated in the Western Christian spirit where Platonism, passed through Saint Augustine (354–430) and Greek and Latin clergy, was a dominant teaching. His system, therefore, has two sources: Western European philosophical and scientific tradition and Abu Ma'shar interpretation of Aristotelian philosophy of nature. The synthesis of these two traditions was expounded in Hermann's ma-

jor work *De essentiis* (*On Essences*). Thus Hermann of Dalmatia became one of the most important scholars of the first half of the twelfth century because he marked a turning point in the development of European science by merging these two traditions.

The fusion of both traditions can be seen in other Hermann's works, although not as clearly as in his major work. While translating *Fatidica* and *Introductorium*, Hermann came across many paragraphs of the text in which, based on the position and movement of the stars and planets, the weather is foretold. Later on, he studied Indian, Persian and Arab astrological writings on his own and wrote a treatise *Liber Imbrium* (ca. 1140) in which he presents basic rules of forecasting the weather based on the position of the heavenly bodies. The idea that the heavenly bodies can influence even human life is presented in his compilation treatise known by two titles *De indagatione Cordis* and *De occultis* (ca. 1140).

Hermann's most important astrological-cosmological treatise *De essentiis* which was transcribed during the Middle Ages reveals the real significance and his role in the intellectual revival of the West in the twelfth and thirteenth century. It is the best source for getting to know Hermann's philosophical and scientific teaching.

As neither Oriental nor Western thought hadn't, according to Hermann, gained a clear insight into the totality of reality, Hermann set on his own, different way of exploring. Plato with his teaching about Forms came to that which is *extreme* (*extremum*) and gave only a part instead of a whole. Aristotle, however, included both the totality and extremes, but did not pay attention to that which is *middle* (*medium*), and which mediates between the extremes. What is most important for Hermann is this *medium* as a bridge to the totality of the world and this was a defining characteristic of his exploration.

At the beginning of the treatise *De esentiis*, and even later on in the work, Hermann closely defines *being* (*esse*), *substance* (*substantia*) and *essence* (*essentia*). "We really do call being that which, of simple substance and same nature, since the unchangeable never endures anything foreign nor anything else… Since that it is like it is, it is named by its proper name, essence." Then he continues by telling something about substance as a simple being of things. According to Hermann, there are many essences, but they can be classified into five categories of essence: cause (*causa*), motion (*motus*), place (*locus*), time (*tempus*) and relation (*habitudo*) [*De essentiis*, no. 6].

There are three causes of everything that exists. First is why the thing is, i.e. efficient cause (*causa efficiens*). Second is what defines the thing, i.e. formal cause (*causa formalis*). Third is the matter out of which a thing is made, i.e. material cause (*causa materialis*). Along these three, Aristotle lists "for what" the thing is or its "purpose", final cause (*causa finalis*) [no. 7, 52].

God is the first and efficient cause. Creator out of *nothing* (*ex nihilo*) who creates first principles out of his own will: matter and form. This crea-

tion is the first being. Creator, God or Prime Mover is necessarily *one, eternal, immovable*; he is *pure wisdom*, *pure good* and *the only divinity* (no. 13).

Matter is by itself shapeless and unorganized *dough (massa)*. If there were no matter, form could not appear in anything. Form therefore enters the matter and shapes it and this first motion is creation of all things. This is second being. Thus, there are two types of motion of the first cause: *creation* (*creatio*) out of nothing and *generation* (*generatio*) out of already existing causes (no. 15). Other types of motion belong to the second cause which is an additional cause and submits to the will of first cause. Second cause is heavenly spirits.

Everything that is created necessarily moves. Motion is therefore a condition of the existence of the world. If there were not motion, there would be no world. Every motion, however, has to have its beginning (has to start from somewhere). This "to start" is a characteristic of time which is also moving, and therefore cannot be eternal (no. 11, 57). Thus Hermann concludes that the world and time came to existence simultaneously.

As far as *space* is concerned it is necessary that everything that is created (bodily and nonbodily) should have limits (no. 56). As every body is in a certain place, it follows that every body's limit is spatial. Place is the center of every limited substance, i.e. contained within limited space. The world's space is spatial if it can be limited; the world however is not in a certain place nor at every place.

Hermann, like Plato and Aristotle, differentiates between the upper or heavenly (*supralunary*), eternal and unchangeable region, and lower or earthly (*sublunary*), ever-changing region. Earthly region consists of four elements (*earth*, *water*, *air*, *fire*), while heavenly region consists of *eight spheres*, final one being the sphere of the fixed Stars. Between the lowest extreme (*Earth*) and the highest (*sphere of the fixed Stars*) there are seven intermediaries and these are the spheres of *the Moon*, *Mercury*, *Venus*, *Sun*, *Mars*, *Jupiter*, *and Saturn*. This is what constitutes the *middle* (*medium*), which is pivotal for Hermann of Dalmatia (no. 49). This middle isn't the same as either of the extremes, but is neither completely different. It has dual nature because it differs from the extremities, but is also similar to them, therefore that *middle* is of *mixed nature*.

In the very middle of the intermediaries (heavenly bodies) God put the Sun which shines on everything. If it were in a lower position, Sun would burn the earthly part, and if it were in a higher position it would not have a proper effect on lower earthly part. While the *extremes* (Earth and the sphere of the fixed Stars) are *stationary*, that middle is in constant motion. None of the heavenly bodies moves in the same way. Fastest are those bodies which are higher and are by nature lighter. However, observation showed that Mercury and Venus are sometimes closer to Earth than the Sun is, and sometimes farther. Hermann accepted hypothesis of Plato's student Heraclides of Pont, that Mercury and Venus move around the Sun, and they to-

gether move around the Earth, thus distancing himself from Abu Ma'shar's system. However, he did not totally endorse Heraclides' system which proposes Earth's rotation. On the contrary, Hermann claims that the Earth is stationary.

On the whole, Hermann's system wasn't accepted during the Middle Ages, but his idea still remained, so that many astronomers in the fifteenth and sixteenth centuries considered Hermann's system to be valid. Thus, at the end of the sixteenth century, Tycho Brahe (1546–1601) extended Hermann's system by claiming that Mercury, Venus, Mars, Jupiter, and Saturn, move around the Sun, and all of them together move around the Earth. This is the well-known Tycho Brahe's geocentrical system.

Hermann associates the movement of the heavenly bodies with *music* as a co-relation of sounds (no. 48). However, he does not apply the term music (*musica*) to the circular movement of the heavenly bodies, which are based on the ideas of *harmony* and *proportion*, as it had often been called by the names world music (*musica mundana*), heavenly music (*musica coelestis*), natural music (*musica naturalis*).

The Sun has an extraordinary role because its light enables life on Earth. Hermann wonders whether any other heavenly body has its own light. He says that Moon does not shine with its own light, while Venus does.

Heavenly bodies have other characteristics too. *Sun's* characteristics are honor, victory, and benevolence. *Venus* has characteristics of lust, jealousy and pleasure. *Mars*, that of anger, malice, and cruelty, *Jupiter* of peace, equality and humanity, and *Saturn* of envy, slyness, obstinacy, and villainy (no. 61). Hermann, as does Abu Ma'shar, thinks that there is an astrological influence of the planets on the Earthly region. *Astrology* is, therefore, not only a science based on the principles of philosophy of nature, but is the highest science that relates to nature. Astrological law is the fundamental law in the medieval science of the twelfth to fifteenth century. Hermann was the first to give such a prominent role of astrology in the Western European tradition.

Out of this stems his interpretation of the changes in the lower world. There are three classes of decaying beings: animals, plants, metals (no. 65). Metal, a nonsensory nonanimated body, is the lowest species of the Sensible world, and its form is created by mixing the elements of earth and water. A plant is an animated sensory body whose form is created by mixing earth, water and air (no. 82). Animal is an animated sensory body. It gets its form by mixing all four elements (no. 83).

Similarly, there are *three classes of soul*. One class animates, second class animates and feels, and the third one animates, feels and thinks.

Thus by mixing the elements particular things on Earth are created. All of this happens under the influence of the heavenly bodies. Metals are being born in the very center of the Earth and are developed from the lowest forms toward gold, which is the most precious, most perfect form. That is

the natural transmutation of metals. Hermann questioned the possibility of artificial transmutation.

The most precious metal (gold) is associated with the most important heavenly body (Sun). Other metals are being associated with other heavenly bodies: silver to Moon, mercury to Mercury, copper (or brass) to Venus, iron to Mars, tin to Jupiter, and lead to Saturn (no. 86, 87).

Hermann's blend of Western European and Arabic philosophical and scientific tradition opened a way for a new science. Raised on Platonic and Aristotelian tradition, Hermann tried to unite both traditions which was especially evident in the sixteenth century, and Hermann can be considered a predecessor of this century.

Drawing of Euclid (left) and Hermann of Dalmatia (holding an astrolabe in his hand) by English historian Mathew Paris (ca. 1200–1259)

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Hrvatski filozofi I:
Herman Dalmatin (1110–1154)

SAžETAK: U radu se donosi kratki životopis Hermana Dalmatina i prikaz njegova prevoditeljskog te filozofijsko-znanstvenog rada. Da bi se bolje razumjela Hermanova filozofija prirode trebalo je podsjetiti na grčku i arapsku filozofiju prirode na koje se Herman oslanja u svom tumačenju slike svijeta. Prikazuju se kozmološki modeli Platona, Aristotela, Eudoksa, Heraklida iz Ponta, Apolonija iz Perge, Hiparha, Ptolemeja te arapskog znanstvenika Abu Ma'shara. Posebno se ističe Hermanov prevoditeljski rad. Njegovi prijevodi s grčkog i arapskog na latinski bili su važni po tome što su najvažnija grčka i arapska djela postala poznata u Zapadnoj Europi sredinom 12. stoljeća. Herman je važan i kao pisac izvornog djela *De essentiis* koje predstavlja spoj platonovske i aristotelovske, a isto tako i zapadnoeuropske i arapske tradicije.

KLJUČNE RIJEČI: Herman Dalmatin, grčka i arapska filozofija prirode, prevođenje i posredovanje između arapske i zapadne tradicije, bit, duša, uzrok, kretanje, srednje (*medium*), astrologija, Bog, Sunce, glazba.