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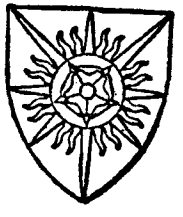

Versio Anglica

VOLVMINIS VII

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THE MEDIAEVAL ACADEMY OF AMERICA
Cambridge, Massachusetts
1961

AVERROES

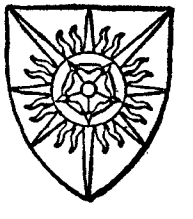
EPITOME
OF
PARVA NATURALIA

TRANSLATED FROM THE ORIGINAL ARABIC
AND THE HEBREW AND LATIN VERSIONS

WITH NOTES AND INTRODUCTION

by

HARRY BLUMBERG



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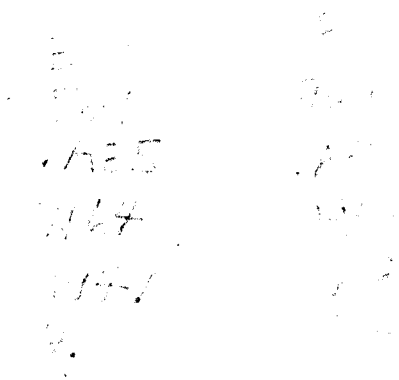

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In 1931 the Mediaeval Academy of America undertook the publication of Averroes' Commentaries on Aristotle in accordance with a "Plan for the Publication of a *Corpus Commentariorum Averrois in Aristotelem*" presented in SPECULUM VI (1931), 412-427. The Plan provides that, besides the required introductions, critical apparatuses, glossaries, and indexes, editors of texts may also add notes and studies and translations into English.

The present volume contains an English translation, with notes and introduction, of Averroes' Epitome of Aristotle's Parva Naturalia, made by Dr. Harry Blumberg from the original Arabic and the Hebrew and Latin versions. The Latin version, edited by Emily L. Shields and Harry Blumberg, appeared in 1949. The Hebrew version, edited by Dr. Blumberg, was published in 1954.

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PREFACE

The present translation of Averroes' Epitome of Aristotle's *Parva Naturalia* has been made from the original Arabic text, established upon the basis of a collation of the three extant Arabic MSS: Paris, Bibliothèque Nationale 1009; Modena, Biblioteca Estense, I.D. 10; and Istanbul, Yeni Çami 1179. In order to fill certain gaps left in the Arabic text as a result of copyists' omissions and in order to correct scribal errors, I consulted Moses ibn Tibbon's Hebrew version of the Epitome, which I had edited for the Mediaeval Academy of America in 1954 on the basis of a collation of eight Hebrew manuscripts. I also made use of Michael Scot's Latin version of the Epitome, done directly from the Arabic (thirteenth century) and edited for the Mediaeval Academy by Professor Emily L. Shields and myself in 1949 on the basis of a collation of eight Latin manuscripts.

Because of the paucity of extant Arabic MSS of Averroes' work, Ibn Tibbon's very faithful and literal translation proved to be extremely helpful in determining the correct meaning of the Arabic text in numerous passages where such meaning was in doubt because of the variations or corruptions in the readings of the three Arabic MSS, or because of apparent omissions. In the latter case, the Hebrew reading was adopted only where it was certain that the omission in the Arabic was one of error. Gersonides' Hebrew supercommentary on the Epitome was likewise used to advantage in clarifying certain obscure passages in the original Arabic.

In this translation, we followed the pattern set some seven hundred years ago by the distinguished scion of the famous family of Hebrew translators, Moses ibn Tibbon, insofar as we strove to render a literal and faithful translation of the original. At the same time, we made a serious attempt to convey the rhythm and tone of the underlying Arabic text without sacrificing any of the requirements of good English usage. Where the text was too laconic or elliptical and therefore subject to misinterpretation, we allowed ourselves the liberty of supplying a few explanatory words in brackets. Some very long sentences in the original,

which were loosely strung together by numerous clauses, were broken up into shorter sentences for the sake of clarity.

The translation has been supplied with adequate explanatory notes and with references to the Greek, Hebrew and scholastic literature in an effort to make the translation more intelligible to the reader and to enable the serious student to probe the subject more deeply. A complete index of references in Averroes' Epitome to Aristotle's works and to those of other writers has been compiled at the end of this book. We have likewise furnished a bibliography of works referred to in the notes and an index of subjects and names dealt with in the text and in the notes.

The publication of this volume would hardly have been possible without the aid received from a number of individuals and institutions, and I should therefore like to avail myself of this opportunity of thanking them. In the first place, I am deeply indebted to the editor-in-chief of the C.C.A.A., my former teacher, Professor H. A. Wolfson of Harvard University, who first conceived of the plan of the Corpus, nurtured this monumental scholarly undertaking with exemplary devotion and fortitude and then brought it to successful fruition. To him I am very thankful for his warm and stimulating encouragement, for his meticulous reading of my entire manuscript and for his very helpful suggestions. I am likewise grateful to the late Professor Francis H. Fobes of Amherst College and to Professor Emily L. Shields of Smith College, with whom I had the pleasure of collaborating in the preparation of the Latin edition of Averroes' Epitome which appeared in 1949.

Furthermore, I should like to extend my thanks and appreciation to the Mediaeval Academy of America, which made possible the publication of this text and to its Executive Secretary, Dr. Charles R. D. Miller, for his unstinting cooperation and interest in this scholarly project; also to Dr. Van Courtlandt Elliott, Associate Secretary of the Academy, for his generous help in administrative matters in connection with the publication of this volume and in proofreading the Greek terms in the notes.

I am likewise grateful to Dr. Nahum Sarna, head of the Jewish Theological Seminary Library in New York, who made available to me the copy of Gersonides' supercommentary to Averroes' Epitome in possession of the Seminary Library, and to The Lucius N. Littauer Foundation of New York which made possible the publication of this volume.

H. B.

INTRODUCTION

Abu'l Walid ibn Rushd (Averroes) of Cordova, Spain (1126–1198 A. D.), wrote commentaries on most of Aristotle's works.[1] These commentaries were of three kinds: (1) long, (2) middle and (3) short, or better known as epitomes. On some works of Aristotle we find all three kinds of commentaries, on others only two or one.

On the *Kitab al-Ḥiss wal-Maḥsus* (*Parva Naturalia*) there is only an epitome. In Bekker's published Greek edition of the *Parva Naturalia*, we find nine treatises: (1) De Sensu et Sensibili; (2) De Memoria et Reminiscentia; (3) De Somno et Vigilia; (4) De Somniis; (5) De Divinatione per Somniis; (6) De Longitudine et Brevitate Vitae; (7) De Juventute et Senectute; (8) De Vitae et Morte; (9) De Respiratione.[2] The earliest of Arab bibliographers, Muḥammad ibn Isḥak, mentions the *Kitab al-Ḥiss wal-Maḥsus* in his *Fihrist* (*ca.* 975 A. D.) but lists only two treatises.[3] According to Wenrich, these two treatises were translated by Ḥunain ibn Isḥak in the ninth century together with a number of other Aristotelian works which were done from the Greek into Syriac and from Syriac into Arabic.[4] By the middle of the twelfth century, however, there is no doubt that three treatises of the *Parva Naturalia* were available in Spain in Arabic translation, for Averroes was able to complete his com-

[1] For the complete list of Averroes' commentaries on Aristotle's works, on Porphyry's *Isagoge* and on Plato's *Republic*, cf. H. A. Wolfson, "Plan for the Publication of a Corpus Commentariorum Averrois in Aristotelem", *Speculum*, 6 (1931), 412–427. Wolfson's list is based upon the findings of M. Steinschneider and P. Bouyges regarding the number of MSS of Averroes that are extant in the libraries of Europe and the Near East. In Istanbul, Bouyges discovered a number of Arabic MSS of Averroes' works that were unknown to Steinschneider. Cf. Steinschneider, *Hebr. Übers.*, 227–249 and also Bouyges, "Notes sur les Philosophes Arabes connus des Latins au Moyen Age", *Mélanges de l'Université de St. Joseph*, VIII (1922), 3–54.

[2] See *Aristotelis Opera*, ed. Bekker, 436–480. The title "Parva Naturalia" is not found in scholastic writings until the sixteenth century. Cf. Freudenthal, "Zur Kritik und Exegese von Aristoteles' Parva Naturalia", *Rheinisches Museum für Philologie*, 24 (1869), 82.

[3] Cf. *Fihrist*, ed. Flügel, p. 251.

[4] Cf. Wenrich, *De auctorum graecorum versionibus*, Leipzig, 1846, p. 276.

mentary to these three treatises in the year 565 of the hegira (1170 A. D.). Furthermore, we have Averroes' own statement in the introduction to his commentary that there were three treatises, and only three, of the *Parva Naturalia* available in Spain at the time he wrote the commentary.[5]

It is to be noted that there is no Hebrew translation that has come down to us of Ḥunain's Arabic version of Aristotle's *Parva Naturalia*, which served as the source for Averroes' epitome, although there are numerous copies extant of Moses ibn Tibbon's Hebrew translation of Averroes' *Epitome of the Parva Naturalia*. We do find, however, an extant Hebrew translation of Ḥunain's Arabic version of Aristotle's *De Anima*, which was done by Zeraḥiah ben Isaac in the twelfth century (London, Bet ha-Midrash 42). Since the text of the *Parva Naturalia* immediately follows that of the *De Anima* in the MSS and is closely associated with it, it is very possible that the same Zeraḥiah may have likewise done the hitherto missing Hebrew translation of Ḥunain's Arabic version of the *Parva Naturalia*.

Averroes' *Epitome of the Parva Naturalia*

The colophons of the Paris and Modena Arabic MSS record the exact date and place of the completion of this epitome: the 13 of Rabi'a II, heg. 565 (Jan. 1170) in Seville, Spain.[6] The Hebrew translation of Averroes' *Epitome of the Parva Naturalia*, was completed by Moses ibn Tibbon in 1254 in Montpellier, France. The degree of popularity of the Hebrew translation is indicated by the twenty-five or more copies of it extant today and distributed in fourteen different European libraries and in the library of the Jewish Theological Seminary of America in New York City.[7] Averroes' epitome was also translated from the

[5] See Averroes, *Epitome of Parva Naturalia*, Heb. ed. H. Blumberg, Mediaeval Academy of America, Cambridge, 1954, p. 2. The Arab bibliographers who follow Averroes likewise know of only three treatises. Cf. Ibn Abi. Uṣaibiah, *Tarīkh al-Ḥukamā'*, p. 41 and Ḥāji Ḥalifah, 75, no. 10,054. For bibliographical information concerning the *Parva Naturalia* in Arabic literature, see Steinschneider, "Die Parva Naturalia bei den Arabern", *ZDMG*, 37 (1883), 485 ff.

[6] Cf. colophon of Bibliothèque Nationale, Cod. Heb. 1009 and that of Biblioteca Estense, Cod. Arab. I.D. 10.

[7] Cf. Steinschneider, *Hebr. Übers.*, pp. 153, 154. The copy of the Epitome in the Jew. Theol. Seminary library was unknown to Steinschneider and therefore omitted from his list. Cf. Jew. Theol. Sem., New York, Elkan Adler, MS. 1853.

original Arabic into Latin towards the middle of the thirteenth century by the same scholar who is known to have translated a number of other Aristotelian works into Latin, Michael Scot. It is this Latin version that appeared for the first time in print in the Juntine Venice edition of 1550.[8]

Supercommentaries on Averroes' Epitome

Owing to the change in the political and cultural climate of Muslim Spain after the advent of the Almohades and the disappearance there of the study of philosophy, the cultivation of the commentaries of Averroes became the task of Jews and Christians. Thus Jewish and Christian students of philosophy diligently pursued their Aristotelian studies with the aid of Averroes' lucid commentaries which had been translated into Hebrew and Latin not long after the death of the commentator in 1198. Within a century thereafter, numerous supercommentaries appeared in Hebrew which assured the continuity of Aristotelian studies, helped to clarify difficult passages in Averroes' commentaries and aided in the establishment of more accurate Hebrew versions of these commentaries. The Hebrew translation of the *Epitome of the Parva Naturalia* produced two such Hebrew supercommentaries, one by Gersonides and the other of doubtful origin. Steinschneider states that the latter supercommentary has erroneously been ascribed to R. Vital but that it is probably the work of Moses Narboni.[9]

Method of the Epitome

As in the case of all of Averroes' epitomes, the one of the *Parva Naturalia* is not a commentary in the usual sense of the word,

[8] The Latin version used in the preparation of our translation is that of Michael Scot in the critical edition prepared by Professor Emily Shields: *Averrois Cordubensis Compendia Librorum Aristotelis Qui Parva Naturalia Vocantur*, adiuvante Henrico Blumberg, Med. Acad. of America, Cambridge, 1949.

[9] See Steinschneider, *op. cit.*, p. 156. There are three extant copies of Gersonides' supercommentary: Berlin 110; Bodleian, Oppenheimer 38; Jew. Theol. Seminary, New York, Elkan Adler 1744. In the preparation of our translation and notes, we have made frequent use of the Seminary copy of Gersonides' supercommentary, which we found to be very legible although somewhat incomplete owing to a missing page or two in three different places which we discovered upon scrutinizing the MS: (1) between fol. 164v and 165r in the first book on "Sense and its Objects" (2) between fol. 178v and 179r in Book II on "Sleep and Waking"; (3) at the end of Book III on fol. 186v on "Length and Shortness of Life".

that is, an explanation of the Aristotelian text, passage by passage or word by word. Averroes' epitomes bear the stamp of originality insofar as they are not limited to the Aristotelian sequence or arrangement of topics or to a verbatim reproduction of the detailed arguments given by Aristotle for his theories or views.

Averroes' aim in the epitomes was to summarize Aristotle's conclusions on a given topic as clearly and concisely as possible, to arrange these topics in a systematic and logical manner, departing from the original Aristotelian order wherever necessary, eliminating the unessential details of argumentation, drawing upon Greek commentaries on Aristotle translated into Arabic as well as upon the works of earlier Arabic philosophers for further elucidation or corroboration of the text, and stating his own interpretation or conclusion on a given topic where Aristotle's text is vague or inconclusive. Thus at the very beginning of the book on Sense and its Objects, in commenting upon Aristotle's brief statement as to the contents of the work, Averroes elaborates upon it and gives a detailed and orderly classification of the topics of the book under four headings.[10] Or in discussing the manner in which the faculties perceive their sense-objects, Averroes takes the two theories of the ancient philosophers that are mentioned by Aristotle, expands them into four and proceeds to expound them with clarity and precision.[11] Or in his comment on Aristotle's mention of common sense, imagination and memory, Averroes increases these three inner senses to five, drawing upon the views of Galen, Alexander Aphrodisias, Alfarabi and Avicenna.[12] Or in his comment upon Aristotle's statement about the cognition of future events in dreams, he elucidates the topic by drawing upon numerous related topics from various other works of Aristotle.[13]

As it has been stated in the preface, for the purpose of rendering a more accurate translation of the text and of explaining difficult passages, we have repeatedly made use of Ibn Tibbon's literal Hebrew translation and of Gersonides' supercommentary. For our notes we have also drawn upon other Hebrew works in which the treatises of the *Parva Naturalia* are discussed. These Hebrew works are of different kinds. First of all, there are the

[10] See beginning of Bk. I, p. 5.
[11] Cf. Bk. I, pp. 14–18.
[12] See Bk. II, ch. 1, pp. 24–27.
[13] Cf. Bk. II, ch. 3, pp. 42–52.

encyclopaedic compilations on philosophy, of which we have used the following: the still unedited *De'ot ha-Pilosofim* (Parma, MS. Heb. 3156), erroneously ascribed to Samuel ibn Tibbon, but actually completed in the middle of the thirteenth century by Shem Tob Falaquera[14]; Simon Duran's *Magen Abot*, Gershon ben Solomon's *Sha'ar ha-Shamayim*, and Aldabi's *Shebile Emunah*. Then there are the independent Hebrew philosophical works, of which we consulted the *Tagmule ha-Nefesh* of Hillel of Verona, the *Milḥamot Adonai* of Gersonides and the Or Adonai of Crescas.[15] Finally we made use of a few smaller philosophical works of Falaquera: his commentary on Maimonides' *Guide*, the *Moreh ha-Moreh*; his *Sefer ha-Nefesh* and his *Sefer ha-Mebakkesh*.

[14] Falaquera's Hebrew style is clearer and more grammatically correct than that of Moses ibn Tibbon and his paraphrase of Averroes' *Parva Naturalia* helped to illuminate a number of obscure passages in the Ibn Tibbon text.

[15] Cf. Hillel of Verona, *Tagmule ha-Nefesh*, ed. Lyck, 1874, p. 7, where Averroes' fivefold classification of the inner senses is quoted (see Epitome Bk. II, ch. 1, pp. 26, 27); Gersonides, *Sefer Milḥamot Adonai*, ed. Leipzig, 1866, Bk. II, ch. 1; and Crescas, *Or Adonai*, ed. Ferrara, 1555, Bk. III, sec. 6.

SYNOPSIS OF THE EPITOME

Introduction. Purpose of the work: discussion of the particular faculties of animals. Work divided into three books: (1) sense and its objects; (2) memory and recollection; sleep and waking, dreams; (3) length and shortness of life.

Book One

Sense and its Objects (pp. 5–21)

Outline of topics in this book: (1) nature of the faculties of the soul; (2) nature of the sense-organs and media; (3) nature of the sense-objects; (4) how faculties perceive their objects.

Necessary senses and senses that only add excellence to the animal. Functioning of sight, hearing and smell through media. Why the eye is clear and translucent. Impairment of vision. Function of eyelids. Organs of the remaining senses. The four elements and the flesh. The sense of touch and intelligence. Impairment of taste in the tongue. The relationship of sight, hearing and smell to the elements. Proofs for the necessity of media in sight, hearing and smell.

Light and the medium of sight. Light and the inner coats of the eye. Proof of the penetration of light in the eye.

Objects of the five senses. Formation of colors. Colors of the rainbow. Light and translucency in the formation of colors. Formation of colors through intermixture of the elements. Pythagorean view of light. Infinity of colors in nature. Relationship of art to nature.

Relationship of taste to heat and moisture. Moisture as a cause of taste. Sweetness in relationship to heat and moisture; bitterness to heat and dryness.

Material composition of odor. Relationship of odors to dryness and heat. Proof that odor has the same property as smoke.

Four theories concerning sense-perception.

Aristotle's refutation of the first two of these theories. Arguments in support of third theory. Theory of efflux of rays in vision. Aristotle's refutation of the efflux theory. Galen's erroneous theory of light.

Media of the sense-faculties. Media of sight. Tunics of the eye. Vitreous humor and crystalline lens. Forms of sense-objects in sense, common sense and imagination. Stages of the forms as illustrated in a two-sided mirror. Air as medium of odor.

Differences among animals in their power of sense-perception. Man compared to other animals. Reactions of man to colors, sounds, flavors, odors and tangible objects. Odors and flavors in the promotion of health. Learning through the sense of hearing. The intellect and comprehension of words. Man's senses and axiomatic truths.

Book Two

Chapter 1: Memory and Recollection (pp. 22–31)

Definition of memory and recollection. Man and recollection. Difference between retention and memory. Two functions of the memorative faculty. Memory and the perception of particulars. Sense and imagination in memory. Difference between memory and imagination. Judgment in memory: use of intellect in man and Wahm (intuitive faculty) in animals. Functioning of memory through combination or separation of faculties. Four faculties involved in functioning of memory. Three head-regions of these faculties. The effect of disease upon these regions. Five stages of forms from corporeal to spiritual stage.

How man recollects. Impairment of higher faculties caused by lower ones and not vice versa. Possibility of forming images without previous sense-perception. Joining of inner faculties during sleep. Faculties in epileptic fits. Difference in presentation through recollection and presentation through retention. Forgetting and recalling of universals as well as particulars. Ease of recalling corporeal forms. Two problems in connection with memory: (1) why pleasure or pain is experienced in the recall of things not existing in actuality; (2) who is endowed with good memory and quick understanding? Good memory and balanced complexions. Youth and excellence of memory. Forgetting in the very young and old. The reason for good memory of things perceived in youth.

Chapter 2: Sleep and Waking (pp. 31–39)

Three topics dealt with in this chapter. Definitions of sleep and waking. True dreams in sleep and predictions of future

events. Single substrate of sleep and waking. Sleep and waking and the common sense. Causes of sleep and waking. Cessation and continuity of motion during sleep and waking. Exercise of cogitative faculty and sleep. Tying and loosening of the faculties during sleep and waking. Sleep in those lacking one or more senses. Sleep brought on by the weakening of the perceptive faculties or the over-exercise of the intellect. An illustration. Perception of spiritual things during sleep. Common sense as the substrate of sleep and waking. Aristotle's advice with regard to sleep and waking.

Limbs or organs in which sleep occurs. Heart and brain. Material cause of sleep. Contraction and expansion of natural heat. Contraction of natural heat through cold and moisture. Moist and cold foods as evidence. Two causes of natural sleep. Process by which sleep occurs as a result of these two causes. Contraction of natural heat during digestion. Diminution of heat and coldness through fatigue. Why celestial bodies do not require sleep.

Chapter 3: Dreams (pp. 39–53)

Divination, prophecy and dreams. Reasons for different names for dreams.

Seven topics of the chapter.

Functioning of imaginative faculty in true and false dreams. How man can perceive with his senses during sleep without the presence of sense-objects. Activity of imagination during waking in case of frightened or sick person. Excessive activity of imagination during sleep and release of cogitative faculty.

Causes of true dreams. Difference between knowledge produced by dreams and that produced by logical propositions. Two kinds of cognition: active and preparatory. Cognition during sleep. Comparison of cognition acquired through dreams and the acquisition of the primary propositions. The intellect *in actu* as the active agent in both. Difference between the agency of the intellect *in actu* in theoretical knowledge and its agency in dreams. Dreams, theoretical things and future events. Knowledge of dreams and the divine principle.

Prophecy and divinity. Socrates' remarks to people of Athens regarding prophecy. The problem as to how the Active Intellect can endow the particular form when it cannot comprehend

particulars. Two more problems regarding this subject. Their solutions.

The coming-to-be of things in general: individuals of simple or compound substances; natural or voluntary accidental individuals. Particulars of substance and the delimitation of causes that bring the particulars into effect. The motions of the celestial bodies and of the homoeomerous bodies. Individuals of plants and animals with determinate existence and causes. Causes of those that have the power of reproduction and those that have not. Nature of individuals of substances and of the spiritual forms. Accidental individuals that are comprehended by us. Coming-to-be of individuals through volition and free will. Predictions of astrology regarding the coming-to-be of individuals.

The separate intelligence and the endowment of the imaginative faculty with universals. The faculty's receiving them as particulars. Endowment of the final perfection as a universal. Its reception by the individual soul as a particular. Prediction of physician as to what will happen universally and particularly. Endowment of the universal and particular in the prediction of future events. Reason for a person's perceiving particulars that are peculiar to his era, place, etc. Reason for the perception of the dream-image on the part of the imagination and not the true object. Reason for the greater spirituality of the dream-image. Reason for perception of future events during sleep. Activity of one class of faculties and the weakening of another class. Activity of inner faculties during quiescence of outer faculties. Proof that inner faculties function more completely when external faculties are quiescent. Prophecy compared to condition of epilepsy. Under what conditions future events may be perceived during waking. Story of Omar.

Teleological cause of dreams. Pharaoh's dreams and Joseph's interpretation.

The nature of the interpreter. The interpreter's knowledge of dream-images. Differences among peoples in matters of dream-images, opinions and beliefs. The proper habits for the interpreter. The interpretation of one dream through another. King Hercules' dreams. Forgetting and recalling of dreams during waking.

Cause of the superiority of certain people in frequency of dreams. Those of melancholic, cold and dry constitutions.

Suitability of melancholic humor for sleep. When the imaginative faculty functions poorly and when it functions well. The effect of cold and dryness upon the motion of the form and its preservation.

Predictions of dreams concerning past, present and future events. Perception of future things through the particular faculties of cogitation. Predictions of future things in the practical arts but not in theoretical sciences. Comprehension of theoretical sciences by means of primary propositions. Predictions of dreams with regard to theoretical sciences only accidental. Proof that theoretical sciences cannot be acquired without previous discipline.

Causes of false dreams: (1) activity of imaginative faculty in combination with impressions stored in memory and intellect; (2) the soul's natural objects of appetite and desire. An example of the latter. Dreams as an indication of the predominance of certain humors in the body. Interpretation of dreams of fire and water. Difference between false forms in sleep and true forms.

Book Three

Length and Shortness of Life (pp. 54–61)

Natural causes of length and shortness of life. Changes in the bodies of animals due to the four elemental qualities. Various ways of comparing length and shortness of life in animals. Which qualities predominate in each of these two accidents.

Illustrations of comparisons of length and shortness of life according to genus, species, group and individual.

Coming-to-be and the predominance of the active powers over the passive. Passing-away and the predominance of the passive powers over the active. Prevention of putrefaction through preservation of natural heat and its dominance over moisture. Passing-away and the impairment of the natural ratio between the active and passive powers. Length of life and the dominance of water and fire over earth and air. Excessive changes from without after the lapse of time and the impairment of the natural ratio between the active and passive powers.

Two major causes of length of life: (1) dominance of heat and moisture in the body; (2) dominance of the active powers over the passive. Decay and the impairment in one or both of these

relationships. Superiority in length of life of groups and of their individuals dependent upon the foregoing two causes.

Natural and accidental causes of passing-away. How this occurs in either case. Factors upon which life depends. An illustration. Premature death of persons whose constitution is strong. Proof that the two above-mentioned causes determine length and shortness of life. Body-composition of youth and old age. Length of life in eunuchs, corpulent people, mules, females, inhabitants of warm and moist regions, animals and reptiles that inhabit moist and warm maritime regions, people that inhabit maritime regions and sea-animals.

External causes of the conservation of the life of an animal. Cause of unnatural death. Unnatural death notwithstanding the proper regimen. Errors of physicians in determining the causes of diseases. Difficulty of determining the two internal conditions for length of life. Two genera of causes for length of life: internal and external. Third cause in case of plants. Length and shortness of life explained by the ancients as due to accidental causes. Lower rate of mortality due to the paucity of putrefaction. Relationship of size of body and copious blood supply to the abundance of heat and moisture. Conclusion.

AVERROES' EPITOME OF *PARVA NATURALIA*

EPITOME OF ARISTOTLE'S *PARVA NATURALIA*

Inasmuch as Aristotle has treated of the organs of animals and of their accidents in the *Historia Animalium*[1] and then discussed the soul and its general parts in the *De Anima*,[2] he now proceeds[3] to discuss in this book the particular faculties of some of these parts of the soul with a view to distinguishing those faculties that are common to all animals[4] from those that are peculiar to certain animals.

In general, in this work he inquires into those faculties which exist in animals insofar as they possess a soul. These faculties are of two kinds: first, those that are attributed to the body of an animal by virtue of the existence of the soul in it, as for instance, sense-perception and motion[5]; second, those that are attributed to the soul by virtue of the body [in which it exists]. The faculties of the second kind constitute genera, such as sleep and waking,[5a] youth and old age, death and life, inhalation and exhalation, health and disease, and length and shortness of life.[6] Inasmuch as he has already dealt with the first kind of faculties in the *De Anima* in a general way, in this work he enters upon a detailed discussion thereof, that is to say, he enumerates the differentiae of the faculties of the soul that are common to all animals and those that are peculiar to each species. He then continues to the end of the treatise with a discussion of what remained to be dealt with concerning the causes of these faculties. Thus, in the *De Anima*, with reference to the faculty that causes an animal to move in space, he has already discussed what that faculty is and how it causes locomotion.[7] Here, therefore, it remains for him to discuss the nature of the limbs and organs by which the soul brings into effect such motion.

Following this, he treats of the second kind of faculties.[8] This kind is necessary for the existence of animals, for every faculty of this kind of faculties includes many other faculties of the soul [such as the sense of touch and the sense of taste, which are necessary for the existence of the animal] to which other faculties every faculty of this kind is related as a genus.[9] It is for this reason that this second kind is more necessary than the first.

Such, for instance, are sleep and waking, for sleep means that all the senses are at rest and waking that they are all in motion[10]; and so is the case of death and life, youth and old age, and health and disease.

As for the topics which, in his opening remarks of the group of books constituting this work, Aristotle has promised to deal with, we in this country[11] have only those contained in three books.

Book One is that which deals with the particular functions of senses and sense-objects. The entire work takes its name from this book.[12]

Book Two is that which deals with memory and cogitation,[13] sleep and waking, and dreams.

Book Three is that which deals with length and shortness of life.

It is with the three books available to us at present that we shall for the time being deal in our usual manner, and, if God prolongs our life, we shall then take up the topics contained in the other books[14] [whenever they become available].

BOOK ONE

We shall now begin the book on sense and sense-objects. The discussion in a general way in this book falls into four parts: first, a knowledge of the essence of these faculties and of the essence of each of their parts; second, a knowledge of the organs through which the actions of these faculties are effected; third, a knowledge of the objects of perception of these faculties, which are the sense-objects; fourth, a knowledge of the manner in which these faculties perceive their sense-objects.

All of the foregoing topics have already been discussed in a general way in the *De Anima*.[15] Here he aims to complete the work with a discussion of particular phases pertaining to these faculties, then of the properties by which these faculties themselves are distinguished and of those that are peculiar to each animal, and finally of the properties that are common to all the faculties. He also aims to furnish further information with regard to that which remains for him to discuss concerning the nature of sense-objects, for this topic has been dealt with by him in the *De Anima* only in a most general way.[16]

We say that of the sense-faculties as a whole, some are necessary for the existence of animals and others exist in animals as an addition of excellence.[17] All of these, furthermore, vary according to strength or weakness in different animals. Those faculties which exist in animals because they are necessary are the sense of touch and the sense of taste. Those that exist as an addition of excellence are the sense of hearing, the sense of sight and the sense of smell. Indeed, the senses of taste and touch are necessary for the preservation of the animal, for by means of these two senses it can distinguish the things that enter the body from without into the interior thereof. Thus, by means of the sense of taste, it can distinguish food which is suitable from that which is unsuitable[18]; and by means of the sense of touch, it can distinguish those things which may destroy the body from without and those things which may preserve it and become assimilated to it.[19] As for the other senses, however, it is not part of their function to distinguish that which ordinarily enters into the

body from without. Hence, they are not necessary for the existence of the animal.[20]

The faculties have this in common that they cannot fulfill their functions except by means of an organ.[21] It is the peculiar characteristic of the faculties of touch and taste that they are in no need of a medium for the performance of their action, while it is peculiarly characteristic of the remaining three faculties that they are in need of a medium [for such performance].[22]

As for the organ of the faculty of sight, it is the eye. This organ is distinguished by the fact that the predominant element in its composition is water, which is the lustrous, transparent substance.[23] The organ of the faculty of sight is of this description in order that the forms of the sense-objects may be imprinted upon it just as forms are imprinted upon a mirror. Therefore the gelid part of the organ is exceedingly clear and white. That the faculty of sight has need of this organ in order to perceive, is self-evident. This organ will perform its function only when it is in its natural complexion without anything untoward happening to it that would blur or agitate it.[24] Consequently, he whose anger is aroused and whose eyes redden and whose heat ascends to his head will have his vision impaired and may possibly see a thing double because of the agitation which the visual pneuma[25] undergoes in a state of anger. The reason for this is that the part of the eye which receives the form when the eye is in an agitated state causes one to receive the form double, for when one part is moved from its place and another part comes in its stead, the form is imprinted upon the second part while the image is not yet effaced from the first part, so that the one form appears there as two forms; in the same way as the image of the sun appears double when it is reflected in flowing water.

Inasmuch as this organ, that is, the eye, can only perform its function when it has a balanced complexion,[26] it may happen that, when it is chilled by external objects to an unusual degree, its vision will weaken. Consequently, the eye will dim in places in which there is much snow or water. It is for this reason that maritime regions appear blurred and scant of light and the same is true of places with snow.[26a] However, that which preserves the nature of the humors of the eye in their proper condition is the external air, for between the eye and the air there exists a natural relationship. When the heat of the eye is aroused more

than is necessary or the eye is chilled to a greater degree than necessary, its vision will weaken. This particular reaction of the eye is due only to the aqueous cold part of the eye, for the balanced complexion of this part is the cause of perfect vision.[27] For this reason, eyes that can see well have been furnished with eyelids, that is to say, for the purpose of preserving their balanced complexion against the changes in external conditions and against the blurring of the eyes, just as the sheath protects the sword. Consequently, one whose eyelids are thick will have keener vision for distant objects, for thickness of eyelids will prevent any change in the humors caused by external heat and will prevent the congealing or thickening of the humors caused by external cold. It is for this reason that many animals have the capacity to see objects at a greater distance than man, that is to say, because of the thickness of their eyelids.[28]

As for the organ of hearing, that which is peculiar to it is the air that is distributed in the ear. The more rare this air is and the more quiescent it is, the more perfect will its functioning be.[29] Similarly the organ of smell is the air that is distributed in the nose.[30] As for the organ of taste, it is the tongue, and as for the organ of touch, it is the flesh.[31] All of the sense-organs are distinguished by the fact that they have in actuality none of the properties of the objects they perceive, except for the organ of touch, for this organ is composed of the qualities it perceives.[32] Therefore it can perceive the excesses of these qualities and this, by virtue of its even balance.[33] Consequently, the more evenly balanced the flesh is, the more readily will it perceive the simple qualities, namely, heat, cold, moisture and dryness.[34] It is for this reason that man is more perfect than any other animal in perceiving through this sense of touch, and especially through the flesh of his hand, that is to say, by means of the flesh of his palm, and more especially through the fingers of the flesh of his palm.[35] This is a sign of intelligence in man, that is, having a good sense of touch.[36]

The tongue, indeed, has no taste in actuality; hence, when there is a mingling of certain humors on it during illnesses, its taste becomes impaired,[37] and the same is true of the organs of the other senses, the reason for this condition having been given in the *De Anima*.[38] The organs of the three faculties, that is, hearing, sight and smell, are distinguished by the fact that they are associated with the simple elements[39]: the eye with water;

hearing with air; and smell with the smoke-like part of fire.[40] Therefore objects of smell will refresh the brain, that is to say, because of the natural coldness of the brain and the warmth of the smoke-like part of the object of smell.[41]

We have just discussed the properties of the organs of these senses and now we shall take up the media which the three senses require, the properties of these media and their necessary effects.[42] The medium through which these faculties function is either air for terrestrial animals or water for aquatic animals. The proof that these three senses need a medium is the fact that, when sense objects are placed upon the senses, the senses will not perceive them.[43] The same is true when there stand between the objects and the senses, thick bodies, such as are not appropriate to serve as media. In general, it is apparent that these senses need the media for their functioning because of the fact that, when the medium is impaired, their functioning is impaired.[44] For this reason, the medium is distinguished by the fact that it belongs to the same genus as the organs that are appropriate for the medium, that is to say, the medium receives the impressions of the sense-objects in the same specific manner in which the organs receive them.[45] The reason for this will become apparent when an explanation is given of the nature of the senses that are distinguished by media.[46]

Of these three faculties, the faculty of sight is distinguished by the fact that, in addition to the medium, it has need of light.[47] The proof of this is that it cannot see in the dark[48] and when smoke or vapor arises in the air to prevent the light from entering the eye, the sight weakens. It is for this reason that, when a person becomes angry and heat is stimulated in his eyes, his sight becomes dim, i.e., because of the vapor; and oftentimes, one object, as we have said above, will appear double. Furthermore, light is not a substance that exists in the eye by its very nature but is rather something that penetrates it from without,[49] for if it were of the essence of its nature, the eye would be able to see objects in the dark.[50] Therefore it occurs in the case of one who shuts his eyes that, when he opens them again, he does not see the object as it really is until after the light has penetrated his eyes.[51] Sometimes it will happen in the case of the faculty of sight that it will see an object by an internal sense before it actually sees it externally in the condition in which it really is. We shall explain the reason for this later on.[52] This kind of seeing will occur to a

person endowed with sight, in most cases, when it is dark and when the faculty is in a state of rest. One of the properties of this kind of perception is that it is effective only in a medium light and not in one that is too strong or not strong enough.[53] It is therefore clear from the foregoing that the three senses are distinguished by the fact that they perceive their objects through a medium and that sight has the peculiarity that, in addition to the existence of a medium, there also is present a luminous body.[54] As for light and those objects that receive light and translucency and those objects that are translucent, these topics have already been discussed in the *De Anima*.[55]

The innermost of the coats of the eye[56] must necessarily receive the light from the humors of the eye, just as the humors receive the light from the air. However, inasmuch as the perceptive faculty resides in the region of this coat of the eye, in the part which is connected with the cranium[57] and not in the part facing the air, these coats, that is to say, the curtains of the eye,[58] therefore protect the faculty of the sense by virtue of the fact that they are situated in the middle between the faculty and the air. Furthermore, that for seeing it is necessary that light be transmitted to these coats, can be proved by the fact that, when a person is struck on the eyelid, his eye suddenly becomes dim and the light which was in his eye is extinguished just as a candle is, and then he can see nothing.[59] Moreover, these topics will be made clear when we explain the manner in which these senses perceive, for then there will become apparent the causes which require these three senses to have external objects [serve as media]. Since the properties of these faculties have been explained as they function through organs and media, we shall now discuss the sense-objects that are peculiar to these faculties. These sense-objects have already been dealt with in the *De Anima* in a general way.[60] The discussion in this book with regard to the sense-objects will have to be more particular, as Aristotle says.

We say that it has already been stated in the *De Anima* that the sense-objects that are peculiar to sight are colors, to hearing—sounds, to smell—different kinds of odor, to taste—flavors and to touch—tangible objects. All that remains to be dealt with concerning these objects is to give a definition of their natures.[61]

We say that inasmuch as the elements, such as air and water, vary in the greater or smaller degree of their translucency,[62] and inasmuch as it is the nature of the translucent body to receive

light and to be brought into completion by it,[63] when the translucent body does receive the light and is united with it, different colors will be generated thereby, according as the light is strong or weak and the translucency greater or less. This fact is apparent in the different colors that are produced by the joining of the sunlight and clouds, for it is clear that these same colors can only be produced by the whiteness of the light and the blackness of the cloud,[64] as in the case of colors that are produced in the rainbow[65] and in other things. Therefore it follows that color can only be produced by the mixture of the luminous body with the translucent. Since all composite things are actually derived from the four elements,[66] the translucent of the elements being water and air, and the luminous element being fire alone, even when in combination with another element,[67] it therefore follows that colors must be composed of these two properties of the elements, that is, the property of translucency and the property of luminousness, and that which causes their diversity is the difference of these two properties in quantity and quality.

The color white arises from the mixture of pure fire with the element which is most translucent and that is air.[68] The color black arises from impure fire which is mixed with the element that is least translucent and that is earth.[69] The colors that are intermediate to white and black are derived in accordance with the smaller or greater degree of difference of these two properties, that is to say, the difference of the luminous body and the difference of the translucent body.[70] The colours white and black are therefore regarded as the primary elements of colors.[71]

Since the aforementioned properties are apparent with regard to color, and color will appear only on the surface of a determinate body,[72] in which respect color differs from light, [it follows that] light is the actualization of the translucent, which is indeterminate. Color is not a thing that can be produced in a composite body by the juxtaposition of translucent atoms[73] of the elements, as some people believe, for nothing can be produced from the elements by mere juxtaposition as it has been explained in the *De Generatione et Corruptione*.[74] Whatever is produced from the elements can only be produced by intermixture.[75]

Inasmuch as light could only be seen in a translucent body, the Pythagorean school thought that the production of light could not occur in luminous bodies *per se*, but only when light is united with another body, as in the case of fire; for fire cannot illumine

except when it is united with another body. The difference between fire and the celestial bodies in this respect is clear.[76]

From what has been said concerning the essence of color, it is clear that color is first received by the air and then is conveyed by it to the organ of sight by virtue of the fact that air is translucent and luminous. The proof that air is impressed by color and receives it is [to be found in] that which can be seen when a single object by itself takes on many colors according as luminous clouds pass over it. Frequently walls and other individual objects will be illumined by the colors of objects over which clouds have passed; for example, when clouds pass over green shrubs, oftentimes the walls and the ground will assume the color of those shrubs. It is now clear from the foregoing that colors are produced only by the mixture of fire with translucent bodies, and that light is not the cause of the transmission of colors to the sight but is the cause of their very existence.[77] I say, furthermore, that just as the color white, which is produced by mixture, is inferior to the color of light,[78] because it is derived from the latter, so the remaining colors are inferior to the colors white and black, because they are derived from the latter.

Since the remaining colors are derived from white and black, and their mixture is diversified more or less into infinite species as far as their matter is concerned, it follows that colors are of an infinite variety in nature[79]; for any kind of mixture of colors that the inner sense[80] can conceive of, nature can bring into effect, even though the external sense[81] is so constituted that it cannot express the magnitude of that mixture of colors. In this respect, therefore, art, as Aristotle says, is inferior to nature, for art can bring into effect only such magnitudes of colors conceived by the inner sense as the outer sense can express. But as for nature, it can bring into effect anything that the spiritual inner sense can conceive of, and nature, therefore, is more noble than art; and the excellence of the artist lies in his skill in imitating nature as far as it is possible.[82] Furthermore, the spiritual [inner] sense, through which nature performs its functions and brings into effect its objects, possesses no property which can prevent nature from comprehending that with which the spiritual inner sense endows it, as is the case of the spiritual inner sense through which the artist functions; for the animal soul existent in all animals does not exclude the actions of nature. On the contrary, it rejoices and takes delight in perceiving such colors and sounds as nature

brings into effect, for these colors and sounds likewise exist in the animal soul in potentiality[83]; and when nature brings them into effect, the animal soul rejoices in them and delights in perceiving them. But as for the spiritual inner sense through which art functions, the animal soul may prevent it from having such perceptions, and therefore the artist will comprehend, of the perceptions that the spiritual [inner] sense conveys to him, merely impressions and accidents, which are remote from those perceptions that are conveyed to nature. Consequently, those things that are first cognized by the artist only later come into existence, the opposite of which is true in the case of nature. Furthermore, the artist is external to the object perceived, while nature is within the object.[84] The foregoing are the characteristics in which art differs from nature. It is for this reason that colors and hues, which the outer sense can describe, are finite, while colors and hues that are perceived by the inner sense may be infinite. Nature, therefore, displays some colors and hues, the properties of which dyers strive in vain to discover. This is so for the reason that art, in imitating nature and proceeding from the lower stages of nature to the higher, can only comprehend a few of those stages that exist in nature,[85] that is to say, those that are far apart from each other; for, between these stages, there exist in nature many other stages. It is therefore clear now why certain colors exist in nature which do not exist in art.

As for the topic of sounds, it has already been adequately dealt with in the *De Anima*.[86]

As for the objects of smell, which are the various kinds of odors and flavors, it is necessary for us to discuss them separately.[87] We say that it is apparent that none of the elements possesses flavor or odor[88] and that flavor and odor will exist in something mixed of the four elements insofar as it is something mixed of the four elements.[89] Since the form of anything mixed of the four elements is relative to the preponderance in it of two dominant qualities of the four,[90] we must therefore inquire concerning which of the qualities we ought to attribute flavor to, in a body possessing flavor. We say that since that which is an object of taste is food for the animal, and food is naturally assimilated by the body of the animal, and since the existence of the body of the animal is relative to the predominance of heat and moisture, it follows that taste must likewise be relative to heat and moisture.[91] This is so, moreover, because the nature of the moist, which is water, is

more suitable to the animal than the nature of earth. It can indeed be proved that moisture is the cause of flavor in something mixed of the four elements by the fact that some of the objects of taste are gustable in potentiality and some are gustable in actuality, but those that are gustable in actuality are the things that are moist in actuality. As for those things that are dry in actuality, they are the ones that are gustable in potentiality; they will only become gustable in actuality when they become moist in actuality[92] as in the case of salt and the like, for salt is not gustable until it dissolves and becomes moist. Since the foregoing is true, it follows that flavor will necessarily be produced by the admixture of the dry part and the moist, when they are slightly decocted by the heat.[93]

The various kinds of flavor will indeed differ according as these two causes differ to a smaller or greater degree.[94] Sweetness is attributed to heat and moisture, while bitterness is attributed to heat and dryness, the dryness being in proportion to the moisture of the sweetness[95]; those that are intermediate to these two flavors are produced from these two flavors, just as colors are produced from white and black.[96]

As for the various kinds of odor, it is apparent from their nature that their material composition is the flavor that is produced by the mixture of dryness with moisture[97]; for it can be seen upon investigation that anything that has odor has flavor, but inasmuch as the different kinds of odor belong to the genus of smoke-like vapors,[98] and by virtue of this quality the air is a substrate for them, they are therefore attributed to dryness and heat, which in turn are produced by dryness mingled with moisture possessing flavor, by virtue of the fact that the moisture possesses flavor. Now it can be proved that the nature of things possessing odor is the same as that of smoke by the fact that many things possessing no odor, when brought near fire, acquire an odor,[99] and in this respect man possesses a special property of being able to perceive the odors of objects by rubbing the objects with his hands. This is so because this organ of the hand, by virtue of its heat and dryness can naturally stimulate the odorous substance of the thing possessing flavor. Therefore it would seem that man is better able to perceive the differences in objects of smell than other animals,[100] and yet many other animals are more capable of perceiving odors at a distance than man.[101] We have already treated of the properties of the organs of these

senses and have completed the discussion of the nature of their sense-objects. We must now complete the discussion of the manner in which they perceive their sense-objects, for this topic has been dealt with in the *De Anima* only in general terms.[102]

We note that there were four different views that the ancient philosophers had concerning the manner in which the soul perceives its sense-objects. First is the view of those who hold that the forms of the sense-objects exist within the soul in actuality and that the soul does not acquire them from without,[103] but that the external forms merely stimulate and cause the recollection of similar forms within. The latter is the view of Plato or close to it.[104] The second is the view of those who hold that the soul possesses none of the sense-objects in actuality and that it acquires them from without. The latter are divided into two groups. One group [i.e., the third view] is of the opinion that its acquiring of external forms and its being actualized through these forms is a corporeal acquisition and not a spiritual one,[105] which means that the existence of these forms in the soul must be in the same state as they are outside the soul.[106] The other group is of the opinion that its perceiving of external objects and its acquiring them is in the form of a spiritual acquisition. The latter group are further divided into two classes. One class holds that the soul does not need a medium to perceive its objects, but that the soul perceives its external sense-objects by moving itself towards them and by reaching them. The latter class are those who hold the view that vision is produced by means of rays emanating from the eye and extending to the visible object.[107] The second class [i.e., the fourth view] are of the opinion that the soul can only receive its sense-objects by the same means through which the media receive them. This occurs when the media receive the sense-objects first[108] and then convey them to the common sense,[109] irrespective of whether the medium be an organ or an external body.

As for those who maintain that the soul does not need a medium, Aristotle recounts two of their arguments. First, if the soul did receive the sense-objects through a medium and did not itself move towards the sense-objects, the soul would not require any strenuous motion or effort in perceiving sense-objects. Second, if the forms were conveyed to the soul through media, the soul could receive these forms only in the magnitude in which the media conveyed them to it.[110]

As for those who hold that rays emanate from the eye,[111] they have sufficiently persuasive arguments, the strongest of which is that which has been posited by the adept in the science of aspects, namely, that the causes of vision and its accidents are the straight, broken or curved lines, and his further assumption that vision can only be effected in a cone-shaped figure through lines emanating from the eye and ending at the visible objects.[112] The view of this group is that these lines and figures that are imprinted in vision cannot be described except as that of a body issuing from the eye, namely, the ray. We maintain indeed that the opinion, that the giving of the causes of vision and the accidents attached to it cannot be completely explained except by conceiving such lines and conical figures, is correct; however, we further maintain that in the case of such extended lines, neither [the eye which is] the substrate nor [the ray] which is borne by the substrate can be anything else but the medium, which is the translucent body; for it is the nature of this body to receive light and color in such a manner.[113]

We shall now enumerate some of the absurdities which Aristotle mentions as necessarily resulting from this view and then we shall return to our previous discussion. We say indeed that as for the view of those who hold that the forms of the sense-objects exist in the soul in actuality and that these forms require external sense-objects only for the purpose of recall and stimulation,[114] the absurdity of this view will be demonstrated [by the following facts]. If these forms existed in the soul in actuality, the soul would not require external forms in order to obtain a knowledge of them, but the soul would acquire a knowledge of its sense-objects even before it perceived external objects, so that when the soul desired to perceive its sense-objects, it would merely have to project its rays upon the sense-object by means of its essence and then perceive it. Furthermore, if the above theory of rays were true, the various organs would be in vain and useless, but nature does not do anything that is in vain.[115] As for those who are of the opinion that the forms of sense-objects are imprinted upon the soul in a corporeal manner, the absurdity of their view can be demonstrated by the fact that the soul can receive the forms of contraries at the same time, whereas if they were bodies, this would be impossible. This will occur not only in the case of the soul but also in the case of media, for it is apparent that in the same space of air, the organ of sight can receive two contrary

colors at the same time, as when it regards two individual things, one white and the other black. Furthermore, the fact that large bodies can be perceived by the sight through the pupil of the eye, despite its being small, so that it can perceive the hemisphere of the world, is proof that colors and whatever is connected with them are not conveyed to the sight materially but rather spiritually.[116] We say, therefore, that these senses perceive the properties of sense-objects only apart from matter. Thus, the sense will perceive the property of color apart from matter[117] and in the same manner will it also perceive the property of that which has odor and that which has flavor and the properties of the remaining sense-objects.

Since it has been proved that the above kind of perception is spiritual, we can say to one who denies that sense-perception is effected through a medium, as follows: of the objects that the soul perceives spiritually, some are universals, namely, the intelligible concepts[118]; and others are particulars, namely, the sensible objects. Now these two classes of things cannot help being perceived by the soul either in the same spiritual manner or in two different manners. If the objects were perceived in the same manner, both universals and particulars would be the same, which is absurd. Since this is so, the soul must therefore perceive universals in one manner and particulars in a different manner. As for universals, it will perceive them completely dissociated from matter,[119] and therefore, in their case, the soul will not need a medium; but as for particulars, it will perceive them through objects that are associated with particulars, namely, the media. Indeed, without the latter, the objects that could be perceived would be only universals and not particulars. The existence of forms in media is of a kind intermediate between the spiritual and the corporeal. This is true for the reason that the existence of forms outside the soul is completely corporeal, whereas their existence within the soul is completely spiritual; consequently, their existence in the medium is in an intermediate stage between the spiritual and the corporeal. By "medium" he here means the sense-organs and the external objects in the case of those senses that need a medium. As for organs in general, the senses have need of them because their perceiving is of the spiritual particular kind, whereas the spiritual universal kind will have no need of these organs.

It is therefore clear from the above discussion that the fact that

these forms in the soul are spiritual particulars must be the cause that requires such perceptions to be brought into effect through a medium. Indeed, it must be so, for it is customary for nature, in passing from one kind of existence to an opposite kind, to proceed at first through a medium, and therefore it cannot perceive the spiritual from the corporeal except through a medium. It is for this reason that the more subtle these media are, the more perfect and excellent the perception of the senses will be. As for the view of those who hold that if the soul perceived through a medium, it would have to receive the object from the medium in the same magnitude as the mediatory body, that is to say, if the body were small, it would have to receive it small, and if it were big, it would have to receive it big, such a view would follow only if perception were corporeal, not spiritual.

Aristotle refutes the view of those who hold that the faculty of sight extends from the eye until it reaches the visible object,[120] by means of various arguments. First, according to this theory, it would have to follow that man could see objects in the dark just as he can see them in the light[121]; for, according to those who maintain the theory of the efflux of rays, sight would have no need of a medium nor of light.[122] Second, if it were the faculty of the soul, that is, the common sense, which was the faculty that extended itself to objects until it perceived them, it would have no need of the coats of the eye, that is to say, the curtains[123]; and it would not have to follow that this faculty must become impaired when one of its curtains is injured. Third, if the soul had to extend itself until it reached the sense-object, its perceptive power for all visible objects would be the same both for distant ones and near ones.[124] In general, those who hold the theory that rays issue from the eye cannot possibly assume anything else than one of two things: either they assume that these rays are bodies or they assume that these are rays of light and not bodies. If they assume that they are bodies, it must follow, according to this view, that the perception of objects will occur in time, particularly when the visible object is at a distance; for it has already been demonstrated that every movable object must move in time.[125] Furthermore, to conceive of a body issuing from the pupil of the eye and then extending itself until it connects with a similar body on the hemisphere, is absurd.[126] Besides, the faculty of sight would have to be attached to this

body, but there is no body in animals which is the substrate of the soul except the natural heat,[127] and if the latter were to part from the eye even for a short span, it would cool off[128] and disappear.

If that which issued from the eye, however, were light and not a body, we could not say that the faculty of the soul was attached to that light, for the substrate of the faculty of the soul must be a substance and not an accident. Therefore, the soul cannot have that light as its substrate, but has its substrate within the eye. This being so, in what manner then will the faculty perceive its sense-objects when it does not touch them, for all action and passion[129] will occur through contact, and the medium that moves the final movable object does so by contact? It must necessarily follow that, when it happens that the organ of this faculty perceives its sense-object, one must be the mover and the other, the moved. Now if we assume that that which issues from the eye is light and not a body, we cannot help admitting that it must occur through a medium, for if not, the movement from the sense-object will not necessarily reach the sense; and thus there will not necessarily be any difference between this view and our view that vision can only be brought into effect through a medium and light, except that according to our view, light is not of the substance of the eye but is external to it. The latter view they will not admit, for if they did, it would follow that they should be able to see in the dark.[130] Their error, however, lies in the fact that they regarded this pneuma through which vision is brought into effect as associated with something, and they thought that this thing [with which it was associated] was light, believing at the same time that light was a body. As for Galen, his error concerning this matter reached the point where he actually believed that the air was sentient.[131]

Now that it has been explained in a general way how the soul perceives, we shall next consider how this kind of perception is arranged in each and every medium of the three senses which perceive through media.[132] We maintain that the air, by means of light, receives the forms of objects first and then conveys them to the external coat of the eye, and the external coat conveys them to the remaining coats,[133] until the movement reaches the innermost coat behind which the common sense is located, and the latter perceives the form of the object.[134] In the middle of these coats lies the crystalline coat,[135] which is like a mirror,

partaking equally of the nature of air and of the nature of water. This coat, therefore, receives the forms from the air, since it is like a mirror, and it conveys them to the water, because its nature partakes equally of the two properties of air and water. As for the water, which Aristotle says, lies behind the crystalline humor, that is the one which Galen calls the vitreous humor, as I believe.[136] This is the innermost of all the curtains of the eye[137]; and through it, the common sense can perceive the form. After the common sense perceives it, it conveys it to the *informans*, which is the imaginative faculty.[138] The *informans* receives the object in a more spiritual form and this form would belong to the third stage of spiritual things, for the form will have three stages: the first stage is corporeal; following this is the stage of the form in the common sense, which is spiritual; and then the third, which is that of the form in the imaginative faculty, and this is more spiritual.[139] Inasmuch as the form in the latter faculty is more spiritual than it is in the common sense, the imaginative faculty will not require the presence of the external sense-object in presenting its form, the opposite of which is true in the case of the faculty of sense. The *informans* will behold that form and abstract its idea and image after much quietude and contemplation. The stages of these forms in the various faculties and their moving from one stage to a more subtle stage can be likened, as Aristotle says, to the case of a man who holds a two-sided mirror and looks into one side, while setting the other side of the mirror to face the water, the mirror being fine, translucent and clear. Now what will happen to the one who is looking is that his form will first be imprinted in the mirror, and then from the mirror, it will be imprinted upon the water. If another person were to look at the other side of the mirror, that is to say, at the side that is facing the water, he would see the very same form imprinted a third time, this time from the water upon the mirror. Now the form of the man that is looking is like the sense-object, the mirror is like the intermediate air, and the water is like the eye, and the impression on the other side of the mirror is like the perceptive faculty, and the man who perceives them is like the imaginative faculty. If the one looking into the mirror should cease looking, the form would be effaced from the mirror and from the water, and the one looking at the other face of the mirror would remain contemplating the form. This is the course the imaginative faculty takes in connection with the form in the

common sense; for, when the sense-object disappears, its form likewise disappears from the common sense, and the imaginative faculty is left in the act of imagining it.[140]

It is therefore clear from the foregoing that the imprint of the form will be seen by the common sense through the medium of the eye, and the eye will see through the medium of the air, and it will see the form within the watery humor of the eye by means of the crystalline lens, which is situated between the water of the eye and the external air. This watery humor is the one which Galen calls the vitreous humor.[141] It has therefore been made clear from the foregoing just how sight is produced through media.

As for the manner in which odor is produced through the medium of air and water, this is brought about by virtue of the fact that the air is adapted to receiving the smoke-like substance, which is the object of odor,[142] and also by the fact that water is adapted to it. The reason for this is that it is natural for these elements to transmit to each other the vapors that are produced by each of them, because of the relationship that exists between the elements.[143] Thus, earth will transmit dry vapor to water and water will receive it because of its likeness to earth with respect to cold. Water will transmit moist vapor to air and air will receive it because they have the quality of moisture in common. Air will transmit the vapor to fire because they share in common the quality of heat.

As for the manner in which air transmits sound, this topic has already been discussed in the *De Anima*.[144]

With reference to the properties of perception in these five faculties of animals, they are not the same in all animals; for in man, the faculties perceive the differences in objects and the particular ideas represented by them, and these would be, with reference to the object of sense, as the fruit inside is to the rind. In other animals, however, the faculties perceive only external properties, and with reference to the object of sense their relationship is that of the rind to the fruit inside.[145] The proof of this can be seen in the fact that animals are not moved by these senses as man is moved by them, for man will be stirred by the sound of melodies, while animals will not be stirred, unless we use the term "stirred" with regard to them in an equivocal sense. Similarly, man is moved by the sight of colors and figures in a manner in which animals are not moved. The same is true of the

different kinds of things possessing flavors and things possessing odors, although animals have more in common with the latter sense-objects because of their corporeality. The same is true of the faculty of touch, for the hand of man in this regard has a special property not possessed by anyone else. Man can infer by means of odor as to whether the flavor will be pleasant or harmful,[146] and he can be healed by things possessing odor[147] as well as he can be healed by things possessing flavor. Indeed, things possessing odor can bring into effect a healthy state, free from headaches, because the head is cold and moist, and that which possesses odor is mostly warm and dry.

Hearing in man is the road that leads to learning, for learning is effected through speech[148] and speech is conveyed to man by means of hearing[149]; however, the comprehension of the meanings of words is not due to hearing but rather to the intelligence. Any one of these senses in man can lead to the primary notions[150] that he acquires within the class of perceptions of the particular sense, especially the senses of hearing and sight. Aristotle asserts, therefore, that those people who do not lack these two senses are more intelligent and quick-witted.[151]

The foregoing are the most important of the topics taken up in this book as briefly as we could present them. As for his mentioning at the end of this book about his giving the causes of good and poor memories, the appropriate place for him to discuss these topics will be in the second book, which deals with the faculty of memory.

BOOK TWO

CHAPTER ONE

MEMORY AND RECOLLECTION

He begins with an inquiry into memory and recollection in this book. First of all, he will seek to discover the description[1] by which this perception is differentiated from the remaining perceptions of the soul. Then he will seek to discover to which one of the faculties of the soul these perceptions belong, and in conjunction with which other faculty they function in a living being endowed with memory. After this, he will explain how memory and recollection occur, what position among the various stages of the faculties of the soul is to be assigned to this faculty, why some people who are good at recalling things are poor in retaining them, while others are just the opposite, and finally [he will explain] the remaining things that will necessarily follow from the functioning of these faculties and those things that will occur to them by way of accident.[2]

We say, of things that are perceived by us, that they are either perceived instantaneously and at a present time, such as objects of sense, or that they will come into existence at a future time, as in the case of things conjectured, or that they were already perceived in a past time. It is apparent that memory belongs only to the last class of perceptions, for we cannot use the term "memory" for something that we acquire a knowledge of at present or for something that has not yet come into existence.[3] Man can indeed remember only that which he has had a knowledge of previously at some time in the past. Recollection is the search for the thing by volition, after a person has forgotten it, and reinstating it after it has disappeared, by cogitating upon it.[4] It is apparent, therefore, that recollection will be peculiar to man alone. As for memory, it will occur generally in all animals endowed with imagination, for he is of the opinion that many classes of animals, such as crustaceans and worms, do not possess imagination.[5]

The difference between recall and retention is that retention is applied to that which has not ceased existing in the soul from the

time it was perceived in the past until the present moment. As for recall, it is applied to that which has already been forgotten; hence, recall is a discontinued retention,[6] while retention is a continuous recall.[7] This faculty, then, is one in substrate but two in aspect.[8] Memory, in general, is the cognition of something already known, after the knowledge thereof has been discontinued.[9] Recollection is the search for this knowledge when it is not present and the exercising of the cogitative faculty in order to reinstate it.[10] It is apparent that this action must belong to a faculty that is neither sense nor imagination[11] and this is what is called the memorative faculty.

We shall investigate what this faculty is, to what stage it belongs among the faculties of the soul, and with which of the faculties it is associated. It is apparent from its nature that it belongs to those faculties that perceive particular, individual objects,[12] for memory will occur in connection with an object only after one has perceived it and has formed an image of it, and this will occur by virtue of the fact that it is an object of sense, and an object of imagination. But the nature of quantity as a universal, for example, which can be comprehended by the intellect,[13] cannot be apprehended by the memorative faculty. The latter can only apprehend a determinate quantity which it has already perceived and of which it has formed an image. As for the question how it can recall the universal, we shall discuss this [later on].

Since it is apparent from the nature of this faculty that it is particular and that it requires for its functioning the prior functioning of two other faculties, namely, the faculty of sense and the faculty of imagination, we shall therefore investigate the question as to how this faculty is distinguished from the faculty of imagination, for it is apparent from its nature that, though it is not identical with imagination, it is nevertheless associated with imagination in its action.[14] We say that it is clear that although each act of memory and recollection will occur only in conjunction with an image, nevertheless, the object of memory is different from the object of imagination,[15] and that the actions of these two faculties are different from each other. This is so for the reason that the function of memory is the treatment of an object of imagination as still present even after it has disappeared, and the passing of judgment upon it presently to the effect that it is the very same thing it had previously perceived and of which

it had formed an image. There are, therefore, four things involved: the image; the object of that image; the treatment of that object as still present; and the passing of judgment to the effect that that object of the image is the same thing as the previous object of sense. The function of conceiving [the object of] the image as still present must belong to a faculty which is different from the faculty which perceives that object.[16] This latter faculty has two aspects: first, if its perception is continuous, it is called the retentive faculty; second, if it is discontinued, it is called the memorative faculty. As for the passing of judgment to the effect that a certain object belongs to a certain image, in man such action belongs to the intellect, because it is the latter that passes judgment about the matter either affirmatively or negatively,[17] while in animals endowed with memory, it is an action which belongs to something similar to the intellect[18]; for this faculty functions in man through reasoning and deliberation, and therefore man can recollect, whereas in other animals it is a nature, and therefore the animal will be able to remember but not to recollect. This faculty in animals has no name and this is the faculty which Avicenna calls *Wahm*, "estimation".[19] By means of this faculty, a living being will naturally avoid that which is harmful,[20] even though he has never perceived it before, just as many harmless birds avoid birds of prey, even though they have never seen them before.[21]

There are, therefore, three actions which belong to three different faculties, two of which actions constitute the component parts from a combination of which the composite image is formed. One of these actions is that which forms the image of the object [of sense when the latter is still present] and the other is that which retains the image of the object [of sense after it has disappeared]; and then the third faculty will combine these two component parts with each other[22]; for in the imagined form, one thing will serve as the substrate[23] and that is the outline or figure, and another thing will serve as the form and that is the object represented by the figure. This is so for the reason that, since the individual object outside of the soul is composite,[24] it will therefore occur with respect to this object that its existence in the soul will be of the same kind and that the receiving of the two parts of which the object is composed will be due to two different faculties and the combining of the two parts will be due to a third faculty. It is therefore clear from the previous discussion that there are [three actions of] three faculties involved: that of the faculty that forms the image of the object of sense when the latter is still present; that of the faculty that retains the image of the object of sense after the latter has disappeared; and that of the faculty that combines that object of sense after it has disappeared with the image retained thereof. Consequently, recollection can be brought about only by the aid of these three faculties and by each one presenting the object which is peculiar to it.[25]

Aristotle explicitly holds the view that this faculty, that is, the memorative faculty, is different from the informant faculty and that they are two different things in essence and substrate[26]; for we frequently apprehend the object of the imagined form apart from the imagined form itself, and at times we apprehend the form without abstracting from it the object of the form. It is for this reason that it is possible for us to retain the memory of many objects at the same time, whereas it is impossible for us to imagine them at the same time.[27] We have already stated that the faculties of retention and memory are one in substrate but two in aspect; for that which the imaginative faculty apprehends with regard to a certain individual Zaid is only that which a painter can describe of him in his imagination, but that which the memorative faculty can apprehend is indeed the object of that description.[28] Therefore, the image retained in the memorative faculty is more spiritual than it is in the imaginative faculty.

Inasmuch as the action of these faculties with reference to the forms of the sense-objects is brought about in one of two ways, either in combination with other faculties or apart from them, in the case where the faculty restores the form it had previously perceived, its action will be by means of combination with other faculties.[29] This will occur, as we have stated, when each of these two faculties presents the simple object which is its peculiar characteristic to present, and the third faculty combines these two objects. But as for its action in a state of apartness or separation, it will occur while it is perceiving the sense-object and as long as it continues to perceive it. This will take place when the sense first perceives the object outside of the soul and then the imaginative faculty forms an image of it and afterwards the estimative faculty[30] abstracts the object of the image from its description and finally the retentive faculty receives that which the estimative faculty has abstracted. But when the

sense-objects are gone, the restoration of these objects will take place by means of combination.

Inasmuch as the actions of these faculties differ from each other, their locations in the head will be in different regions. Since the sense perceives the object first, and then the imaginative faculty forms an image of it, and after that the estimative faculty abstracts the object of the image, and finally the retentive faculty receives it, it follows necessarily that the imaginative faculty must be located in the sensory region of the brain; then joining it will be found the cogitative faculty, that is to say, the estimative faculty,[31] and this will be located in the middle region; and then adjacent to the cogitative faculty will be found the memorative and retentive faculties, the latter being located in the back part of the brain.[32] The foregoing, according to the consensus of opinion, are the regions of these faculties. Now it can readily be known by the sense that the regions of these faculties are the very regions [mentioned before], when injuries occur to any of these faculties, in which case a certain region of the aforementioned regions will become impaired.[33] Thus, when the composition of the front part of the brain alone is injured, the imagination of the man will become impaired, but neither his cogitative faculty nor his memory will be affected; and when the middle part of the brain is injured, his cogitative faculty will be affected, and when the back part of the brain is injured, his memory and faculty of retention will be affected, all of which facts are well-known to physicians.

There are therefore five stages in this process. The first is a corporeal stage with many rinds[34] and it is that of the form of the sense-object outside of the soul. The second stage is that of the existence of this form in the common sense and this is the first of the spiritual stages. The third stage is that of the existence of the form in the imaginative faculty and this is more spiritual than the previous stage. The fourth stage is that of the existence of the form in the estimative faculty. The fifth stage is that of the existence of the form in the memorative faculty and this stage is the most spiritual of all of them, for the latter receives the fruit which the three previous faculties have abstracted and cleansed of its rind.[35] It is therefore clear from the foregoing discussion as to what kind of existence this faculty has, what its substance is and that it is different from the imaginative faculty and from the estimative faculty and that its action can only be brought

about in conjunction with the estimative and imaginative faculties, either by means of a combination or separation of the faculties. It is also clear that retention is nothing but the continuous existence of the object of sense-perception in this faculty and this, without interruption, while forgetting is the cessation of its existence, and that memory is the return of the object after it has been forgotten, while recollection is the restoration of that object and that the latter is peculiar to man.[36]

We must therefore investigate how one can recollect what one has perceived and forgotten. We say that the process by which a person recollects a thing he has already forgotten will necessarily consist of reinstating the object of that thing.[37] When the faculty of memory reinstates the object, the imaginative faculty will present the image of that thing and the estimative faculty will combine with it the object it has abstracted and separated, for with the same objects from which the image has been separated the image may be combined, since the faculty that combines is the same faculty that separates.[38] The object of the image is presented by the memory, its description is presented by the imaginative faculty and the combining of the object with its description is effected by the estimative faculty. Praised be the Wise and the Knowing! By the joining of these three faculties, the forgotten thing can be reinstated by means of recollection.

If the reinstating of an object is difficult for a person, it is due only to some weakness or impairment that has affected one of these faculties, so that the remaining faculties have likewise been impaired by the impairment of this one faculty.[39] The impairment that may affect one of the faculties by means of another will usually be transmitted to a higher faculty by means of a lower one. Thus, the imaginative faculty will suffer and become impaired when the sense is impaired and it will become blurred when the sense is blurred, but the sense will not suffer when the imaginative faculty suffers. Similarly, the estimative faculty will suffer when the imaginative faculty suffers, but the imaginative faculty will not suffer when the estimative faculty does. The memorative faculty will suffer when the estimative faculty suffers, but the estimative faculty will not suffer when the memorative does. The foregoing is so for the reason that the spiritual will suffer when the corporeal suffers, but the corporeal will not suffer when the spiritual suffers.[40] Likewise, the more spiritual of the faculties will suffer when the less spiritual suffers,

but the less spiritual will not suffer when the more spiritual suffers.

As a result of the joining of these faculties and their helping each other, there will not be merely the presentation of the object which one has already perceived and forgotten, but frequently, in certain people, as a result of the joining of the faculties, there will be presented the forms of the sense-objects, without their first having perceived them; only the attributes of the objects will have been conveyed to them.[41] Thus, Aristotle relates of a certain one of the ancients that he would form the image of things conveyed to him by hearing, without his ever having seen them, and when those forms were examined in actuality, they were found to be exactly as they had appeared to the person. In this manner it is possible for a person to form the image of an elephant without his ever having perceived one. The latter process will occur in man only through the joining of these three faculties. The joining of these faculties is due to the rational soul,[42] that is to say, because the faculties are subservient to it, in the same manner as the separation of the faculties will be due to the animal soul.[43] The joining of the faculties is exceedingly difficult for man because it involves the use of the intellect, while the state of ease of the animal soul is due to the separation of the faculties.[44] This joining of the faculties, therefore, will occur only in the case of those who exercise their minds in solitude and remove from themselves the distractions that affect the senses, so that the common sense may once again be of assistance to these faculties. For this reason, these faculties will at times unite during sleep[45] and will behold the wonders of the world, and also in conditions resembling sleep, such as epilepsy,[46] which occurs to those who are said to be ill in spirit. At times, it may happen, as Aristotle says, that these faculties will not need the aid of one another in presenting the object they should present, but at times they will present the object they should present without the aid of another faculty,[47] and at other times, it will be impossible for them to present the object except by the aid of one another.

The difference between the motion of the soul over the parts of an object and the presentation of the object by means of recollection, and the motion of the soul over the parts of an object and the presentation of the object by means of retention, is that its motion over the parts of objects to be recalled is an interrupted motion, but it occurs by means of passing from unknown things to the parts of objects to be recalled,[48] for the reason that people

recall an object by means of a similar object or by the same pattern of an object,[49] whereas the process of retaining an object does not require this. The equable motion over the parts of an object to be presented is retention, while the motion in the process of recollection over the parts of the object to be recalled is not equable, for in this process, one passes from things related to the object to the object itself. The action of retention, therefore, is more noble than the action of recalling, for an equable motion is more noble than an interrupted and changing one.

The retentive faculty in general will present parts of the object to be retained, continuously and uninterruptedly.[50] When it has presented them, the estimative faculty will have combined them with each other, the imaginative faculty will have described them and the memorative faculty will have presented the parts of the object by means of an interrupted and non-continuous motion. When the existence of the parts of an object appears through these three perceptive faculties and these parts are of few rinds as far as the estimative and imaginative faculties are concerned, the recollection of the object will be easier; but if the parts have many rinds as far as the estimative and imaginative faculties are concerned, the recollection of the object will be difficult.[51] As for universal concepts, they can indeed be recalled by virtue of things imagined that are related to them.[52] Therefore forgetting will occur in the case of universals just as it occurs in the case of particulars. Remembering will occur in connection with forms that are easy to recover, while recollection will occur in connection with forms that are difficult to recover. The forms that are easy to recover are those which, in the imaginative faculty and in the common sense, are abundant in corporeality and scanty in spirituality. The forms that are difficult to recover are those that are of abundant spirituality and of scant corporeality. This is so only for the reason that in the case of forms that are abundant in corporeality, the action of the common sense will take longer to abstract the spirituality in them from their corporeality. Thus it will come about that the form will last longer in the common sense, particularly when it receives the form which is scant of rind.[53] It is therefore clear from the foregoing how recollecting and remembering will occur and what the difference is between these two and retention.

With reference to the accidents that befall this faculty, which

are mentioned by Aristotle, there now remain two topics of inquiry: first, why it is that he who recollects, experiences pain or pleasure when the object of the pleasure is not existent in actuality? The second topic is why it is that some people are good at recalling things and poor in retaining them, while others combine good recall with good retention? [54]

We say that the one who recollects will indeed experience pleasure in recalling things that are not existent in actuality, by means of other things which are conveyed to him who recollects, namely, by means of things that are existent in actuality and are necessarily related to the things to be recalled. Since that which is to be recalled is similar to the thing comprehended by him in actuality, the one who recollects will experience the same pleasure or pain in this situation, which he would experience were the thing existing in actuality.[55] It is as if he brought the thing to be recalled into effect, and as if such action in the soul were within the realm of possibility; that is to say, when that which is similar to the object to be recalled has existence, the object itself can likewise have existence.[56] When the soul recalls a thing by means of a sense-object related to the thing it had previously perceived, the intelligence informs it [57] that the sense-object is of the same species as the object previously perceived by the sense, but now only existing in potentiality, and that the object may be brought into actuality, just as the thing resembling it and stimulating it has been brought into actuality. Accordingly pain can occur in connection with a thing to be recalled or pleasure too, in the same way as it would occur, were the thing existing in actuality.

As for good memory in man, it is the delayed motion that continues to exist in the soul, of sense-objects that have been perceived by a person. Such person is the one whose complexion of the back of his brain can contain the apprehended form. This is the case where the complexion of that region is dominated by dryness rather than by moisture, for dryness has the quality of receiving forms with difficulty; but once it has received the form, it has the quality of grasping it and holding it for a long time, the opposite of which is true in the case of moisture. Therefore, people whose complexion of the brain is of this nature will be good at remembering, for good memory is due to the preservation of the description of the form which is imprinted in the imaginative faculty. Where this region in people is dominated by

moisture, they will not be able to remember things on account of the shortness of time in which forms exist in moisture; but they will be quick to grasp things that are retained on account of the ease with which moisture receives the form. Consequently, one who is excessive in dryness will be short in understanding but long in remembering; one who is excessive in moisture will be quick in grasping that which he retains, fast in forgetting and slow in remembering. Those whose complexion is a medium [between these extremes] will combine within them good power of grasping that which is retained and good power of memory. Good power of memory, therefore, is relative to the period of youth by nature.[58] Forgetting will occur [more frequently] in the case of the very young and the old; in the case of the very young, because of their natural moisture, and in the case of the old because of their accidental moisture.[59] Indeed, some old people will be found to have good memories when their natural complexion is not dominated by this accidental complexion, for the natural complexion of the old is that of dryness. The old, therefore, are frequently found to be good at remembering but not quick at grasping that which is retained.

As for the very young, they are found to be quicker at grasping things that are retained than they are at remembering them; but as for youth, they are found to possess both powers at the same time, that is to say, the power of grasping that which is retained and the power of remembering. Moreover, a person will well remember a good deal of what he has perceived in his youth, because, during his youth he has a strong eagerness for forms that come to him and is very desirous of receiving them, and he will therefore retain them a long time and represent them accurately so that they are hard to remove from his memory.

Chapter Two

SLEEP AND WAKING

Since we have completed the discussion of this faculty [i.e., of memory and recollection] and of its accidents, we shall now take up the topic of sleep and waking. The inquiry concerning these faculties will cover at the outset the following questions: first, whether these faculties are peculiar to the soul or to the body,[1] or whether they are common [2] to both soul and body; second, if

they are common to both soul and body, to which of the parts[3] of the soul these faculties are related, and to which of the members of the body they belong; and third, if there exists in an animal one of these two faculties, whether the other will also be found to exist in it?

We say that sleep and waking may be described in opposite terms. First, with regard to sleep, it is a sense in potentiality, that is, it belongs to those things which exist in potentiality[4]; for it is apparent that a sleeping person can see himself eating, drinking and perceiving with all of his five senses.[5] [Second,] with regard to waking, it is a sense in actuality.[6] From these two [opposite] descriptions it is evident that sleep is the privation of waking,[7] for that which exists in potentiality is the privation of that which exists in actuality. It is possible for sense in potentiality during sleep to be brought into actuality, and this will occur in true dreams and in the predictions of extraordinary things.[8] In such cases, sense in potentiality will be more noble than sense in actuality; but that which is false with regard to sense in potentiality is less noble, and that which is false in actuality is more noble than it. It is apparent that the situation is, as Aristotle says, that sense in actuality is corporeal and sense in potentiality is spiritual.[9] The corporeal is more noble in the case of the corporeal faculty of sense, whereas the spiritual is more noble in the case of the spiritual faculty of comprehension.[10] The spiritual is not more noble than the corporeal in the case of the corporeal sense of perception, and the corporeal is not more noble than the spiritual in the case of the spiritual faculty of comprehension. As for that which is absolutely spiritual,[11] it is more noble than that which is corporeal. Spiritual sense does not exist in sleep alone, but at times it also exists in waking, as when the three faculties, imagination, memory and estimation, join and are united, as we have previously stated.[12] From the foregoing two descriptions[13] it is evident that the two faculties, sleep and waking, are the same in substrate but two different things in essence and definition,[14] that their substrate is the perceptive, comprehending faculty, that both faculties are common to soul and body,[15] and that the action of the perceptive soul is with reference to things that are common to both soul and body, for these faculties function only through organs.

It will become apparent from what I shall say later on that these two faculties are related to the faculty of the common

sense. This is so for the reason that it is impossible that they be related to the nutritive faculty, for plants do not have the faculty of sleep, since they do not have the power of perception.[16] Inasmuch as they cannot be related to a soul which has no perception, they must necessarily be related to a soul which has perception, and that perceptive soul does not necessarily have to be rational, for animals that are non-rational are also endowed with sleep.[17] Since the animal endowed with sleep does not lack, during his sleep, any part of the organs of sense or the organs of motion, and yet it does not perceive nor is it moved, and sense-objects pass by it and it does not notice them, we therefore know that the cause of sleep is that the faculty that perceives sense-objects has withdrawn from these organs into the interior of the body.[18] Now inasmuch as it has already been explained in the *De Anima* that there is a perceptive faculty that is common to all of the five senses and that is the faculty which has the power of judgment to differentiate sense-objects, and to show their contrariness to each other and hence their plurality,[19] we therefore know that that which withdraws from these organs is the common sense, and that the essential nature of sleep is the sinking of this common, perceptive faculty into the interior of the body,[20] and that waking is the movement of this perceptive faculty to its organs which are on the outside of the body. Sleep will therefore frequently be described as the cessation of the motion, and waking as the continuity of the motion. The latter descriptive statement is more indicative of the essential nature of sleep than the former statement above. The proof that sleep is the sinking of the common sense into the interior of the body is the fact that a similar thing can occur to a person who is awake, that is to say, sense-objects will pass by him and he will not perceive them, and this will happen when one is absorbed in thought on a certain subject; for then the organs of the perceptive soul are idle and the common sense will advance toward the interior of the body to aid the cogitative faculty, for the cogitative faculty will become vigorous when the other senses are at rest. Man, therefore, will be able to perceive future events during sleep, whereas he will not be able to perceive them during waking.[21] As for the aid that this faculty renders the cogitative faculty, it will consist of presenting whatever description it has of the object perceived and [following that] the imaginative faculty will cleanse it and the cogitative faculty will be able to represent it. This is so for the

reason that the thing that can be comprehended by the cogitative faculty is spiritual and it requires the aid of the information furnished by these other faculties in order to comprehend that which is peculiar to it, [i.e., to the cogitative faculty].[22] This kind of comprehension will occur in none of the animals except man,[23] for animals do not possess an intellectual faculty. They will perceive with reference to sense-objects only the descriptions of these objects and their rinds.[24] The proof of this is the fact that, at times, they happen to go by that which is harmful to them and do not avoid it, and they happen to go by that which is beneficial to them, and they do not move toward it.

Sleep can likewise be described as the binding of the faculties and their strengthening, and waking as the loosening of the faculties and their weakening.[25] This is true for the reason that, since waking is the period in which the senses are exercised[26] through their organs, a loosening of these senses from their organs can occur to these senses because of weakness or fatigue; while sleep, being the state of rest of these faculties, will therefore serve as the occasion for a binding of these faculties, for during sleep they will acquire alertness and vigor. Since this weakness will occur to the organs only because of affections that penetrate them from without, such as fatigue, toil and other conditions,[27] these affections may likewise be introduced as something pertaining to the description of sleep.

Since the foregoing description is apparent with reference to the condition of sleep, it follows that any one of the animals that have the faculty of waking will have the faculty of sleeping,[28] for weakness will of necessity come upon the animal, but this need not follow in all animals in the same manner and in the same way. This is so for the reason that there are animals that possess the five senses, and in these, the faculties of sleep and waking will be found in a complete state; and they will also be found to have joy, sorrow and appetite completely, for they will be found to have a complete common sense.[29] There are other animals that have only four senses or three senses, and such an animal will possess the faculty of sleep but not in all of the five senses, for it does not possess the faculty of waking in all of the five senses. There can be no doubt that complete sleep, joy and happiness will only be found where the common sense is complete, and that can only occur in the case of an animal that has all of the five senses; for we find that many animals that have lost some of these senses,

nevertheless, have the power of sleeping, such as the blind, the deaf and those devoid of smell, for each one of these defects is only accidental and not natural,[30] and furthermore, these animals do not lack the common sense,[31] but they do lack the organs through which the common sense dominates[32] the sense-objects. Some people have described sleep as something which comes into being as a result of the weakening of the perceptive faculties,[33] but not every state of sleep arises as the result of the weakening of the perceptive faculties; for, sometimes, it will arise as the result of cogitative effort and reflection upon a thing, where the common sense will sink inwardly to aid the cogitative faculty and not because of any weakness that overtakes the faculty. On the contrary, its action in conjunction with the remaining faculties is then more powerful than it is during waking. The proof that the perceptive faculties are drawn together during sleep lies in the fact that when a certain subject becomes difficult for a person and he reflects upon it, oftentimes sleep will overtake that person. Now this situation in certain people will reach such a point where they will experience a condition similar to death, that is to say, a condition in which their external faculties will weaken because of the action of the internal spiritual faculties, and they will comprehend noble things and behold[34] spiritual things that exist in the world such as the angels, the heavens, etc. People in such condition are said to be ill in their spirit.[35]

Since the common sense is, in one respect, single and, in another respect, multiple,[36] the aspect in which it is single is that by which it perceives all of the objects of the five senses, and as for the multiple aspect, it is that by which it possesses the several organs, that is to say, by virtue of the fact that it has an eye, an ear and a nose. This sense, therefore, is the substrate of sleep and waking and it includes many of the faculties of animals.[37] It is in this connection that Aristotle says that man ought to seek the mean between these two faculties and ought not to incline more to one than to the other; for if we incline excessively toward sleep, the soul will become dull and likewise the physical organs through which it functions.[38] If we incline towards waking, the faculties become impaired and likewise the physical organs that are peculiar to them. Thus it is apparent from the foregoing to which of the faculties of the soul sleep and waking belong.

Since it is impossible for this faculty to exist without a substrate that is peculiar to it, and this is the member of the body in which

this faculty resides, it is therefore necessary for us to inquire with reference to this member, as to which member of the body it is, and if it exists in more than one member, in which one it exists first, and in which one of them it exists second, and by what cause it exists and how it exists.[39]

We say that it has already been explained above that the origin of the common sense is in the heart and that the brain is one of the organs that complete this action by virtue of the even complexion it possesses.[40] Since this is so, and sleep is the sinking of the common sense into the interior of the body, it is therefore clear that the origin of this motion during waking is in the heart and its termination is in the brain. During sleep, however, its origin is in the brain and its termination is in the heart[41]; and as a matter of truth, its origin in both sleep and waking is in the heart, but the brain is the cause during sleep, in a certain respect, to a greater degree than it is during waking.[42] In general, each one of these two is a cause thereof, but the heart is the first cause and the brain the second cause. Since this is true, these two organs, therefore, are the ones that are common to these two faculties; but as for the reason that it occurs in these two organs, it will become apparent from that which I am going to say. Since it has been posited that the cause of any accident occurring to an animal is heat, cold, moisture, dryness or a composite of these qualities, and since we have posited that sleep is the sinking of the common sense inwardly to the organ which is its origin, and the substrate of the common sense is the natural heat,[43] it is therefore clear that sleep will occur only when the natural heat recedes and contracts and returns to its origin which is the heart. Since motion will occur in connection with a body by virtue of the fact that it is motion, the faculties will therefore be moved only by virtue of their substrates.[44] Since this has been made clear and the contraction of the natural heat into the interior of the body will occur to it only because of the contrary qualities, which are cold and moisture, in the same manner as its expansion and movement to the exterior will occur to it only because of heat and dryness, this accident [of the contraction of the natural heat] will therefore necessarily occur to it during sleep because of the cold and moisture that predominate in the brain; and waking will occur in it only because of the heat and dryness that predominate in the complexion of the heart.[45]

As for the manner in which this contraction will occur as a

result of the cold and moisture, it will become apparent from that which I am going to say. Indeed it is of the nature of moisture to stop up the channels of the natural heat in the veins and in the nerves and it will obstruct the pneuma and hinder it from reaching the organs that are peculiar to it, just as a cloud will obstruct the sun, and thus, this pneuma will not reach the exterior when the moisture therein increases. But as for cold, its nature is to move the natural heat to its source[46] by virtue of the fact that it is the contrary of heat; for if not, the natural heat would be destroyed, since cold also has the nature of compressing a body so that it is reduced to a smaller quantity. The cold element is therefore smaller in quantity than the warm element. The evidence that cold and moisture produce sleep can be found in the frequent occurrence of sleep when one eats moist and cold things. This accident [of contraction and expansion] will occur to the pneuma through a natural process for two reasons: first, the decoction and digestion of food in the brain and in the heart; second, the fatigue that overtakes the sense-organs and the natural heat.[47]

The manner in which this occurs to the natural pneuma for the two foregoing reasons is as I shall explain. When the food changes to blood and the pure part of the blood reverts to the heart, and following that, to each and every member of the body in accordance with what is suitable to it and appropriate to its nature, some of the blood that is appropriate to it likewise goes to the brain and that is the cold and moist part. It is the nature of the members of the body, when food is conveyed to them, to become colder and moister than they were, especially the member of the body which is by nature cold and moist [such as the brain]. This continues so long as the food is in the process of digestion. This is so for the reason that the natural heat will also be affected by food just as food will be affected by the natural heat, and it will become moister than it was and likewise colder, for food in one respect is similar to it and in another respect not similar. There will likewise arise thick vapors in the members of the body as a result of decoction and, because of these vapors, the natural pneuma becomes turbid and heavy and it is moved in the process of contraction towards its origin, which is the heart, and thus sleep will of necessity ensue.[48]

Inasmuch as the brain is cold and moist and each member will become impaired, in most cases only on account of the element

that predominates in it,[49] the controlling factor in the occurrence of this accident, namely, sleep, will therefore be the brain together with the factor that the heat of the heart at that time, that is, at the time of nutrition, will also frequently cool off. When it does cool off, its action is thereby weakened in the brain and in the other members of the body. Sleep will thus necessarily occur because of this weakness in the brain and the weakness of the heart. Either of these two organs may be a cause of weakness in the other, although the brain may be a more potent cause thereof because of its complexion. The causes of the weakness of both organs alike are the digestion and decoction of food. The animal will, therefore, of necessity fall asleep while the process of digestion is continuing and it will awaken when decoction is completed and the food is assimilated by the body, for then the natural heat will have been purified of its vapors and moisture, and it will move through the arteries and nerves to the exterior of the sense [organs] and then a state of waking will of necessity arise.[50]

For the contraction of the natural heat from the sense-organs during the decoction of food there is also another reason and that is that, since the soul is single in one respect and multiple in another, there will be some withdrawal [of heat] [50a] in all of these faculties. When a certain activity of the soul becomes too difficult for it, it causes the organs that are engaged in some other activity to be deflected so that it may concentrate more vigorously upon the desired activity. The natural heat is therefore withdrawn during the period of the digestion of food for the sake of the activity of the nutritive faculty, and this will occur in the region where the nutritive faculty functions, that is, in the interior of the body. This is one of the reasons for the occurrence of sleep resulting from fatigue, for there are two reasons for its occurrence. One of these two belongs to the latter class of activities, for when the natural heat cools off and diminishes because of motion, that is, locomotion and motion of perception, that is, of sense-perception, the soul thereupon moves into the interior of the body in order to perform its activity there, with the remains of the last feeding, so that the heat can augment its substance and have it take the place of that which has been dissolved during motion. The second reason is that when the natural heat cools, the motion cools, diminishes and becomes heavy due to the cold, and it is affected and contracts toward its origin in order to repel the cold complexion that has overtaken it.

Sleep in general will occur because of the change in the natural heat both in quantity and quality. As for sleep which arises as a result of food, it will be due to the moisture and cold which the food may have; but as for that which will arise as a result of fatigue, this will be due to the diminution and cooling off of the natural heat.[51] As for the reason that this accident occurs in animals, it is due to necessity; for, inasmuch as these bodies are necessarily subject to fatigue and toil due to motion and nutrition, they are in need of sleep for the sake of the resultant quiet and the necessity of being nourished,[52] the opposite of which is true in the case of celestial bodies; for, inasmuch as they are not subject to dissolution,[53] and they do not have to be nourished, they are in no need of sleep. It is therefore clear now from the foregoing discussion what sleep is, to which one of the parts of the soul it is related, to which one of the members of the body it belongs, how it occurs and why it occurs.[54]

Chapter Three

DREAMS

It is appropriate, after explaining the nature of sleep, that we explain the nature of dreams and of those divine perceptions which are of the same class as dreams but are not related to the acquisition of man nor to his endeavor. We say that of these perceptions there are some that are called dreams, others that are called divination, and still others that are called prophecy.[1] Many people have denied the existence of this class of perceptions and have attributed to chance the existence of any such perception as may appear. Other people have affirmed such perceptions and still others have affirmed some but have denied others. To reject their existence is tantamount to rejecting the existence of sense-objects,[2] and especially, the existence of true dreams; for there is not a person who has not at times had dreams that warn him of that which will happen to him in the future.[3] When a person examines the recurrence of such perceptions to himself, such examination will reveal to him that the information acquired by such perceptions was acquired essentially, being of a nature presupposing an agent, and was not acquired accidentally. The other kind of perceptions, even though we have not seen them,

are exceedingly well-known, and that which is well-known[4] to all people is regarded as true either *in toto* or in part, for it is impossible for that which is well-known to be false *in toto*. The discussion of true and false dreams is of one and the same genus.

As for the discussion concerning the nature of dreams, it will suffice to state concerning these dreams that they differ to a greater or less degree, that is to say, their causes do. Indeed the names of these perceptions differ only because of the difference in the opinions of people regarding the causes of these perceptions. The latter is a well-known fact, for people think that dreams come from angels, divination from demons and prophecy from God, praised be He, either without any intermediary or through a special intermediary. Furthermore, prophecy is distinguished [from dreams and divination], in the opinion of these people, by the fact that it aims to convey information concerning matters of knowledge, such as information concerning the nature of happiness and information concerning those things by which one can attain happiness.[5] As for dreams and divination, information by means of them is obtained only with regard to matters that are generated. Of these latter kinds of matters Aristotle treats only in connection with dreams.

We shall therefore treat of these things and say that dreams are of two kinds: false and true.[6] We must first inquire as to which of the parts of the soul each one of these two kinds of dreams is related; which is the cause that produces each of these two kinds of dreams, that is, the true and the false; why true dreams occur; how they may occur; how many different kinds there are; under which class of knowledge they come; why they are peculiar to the period of sleep; why some people are superior to others in the matter of dreams, for some see true dreams for the greater part, while others see false dreams; why some people can interpret dreams while others cannot interpret them. The foregoing are the fundamental questions that we desire to answer concerning this class of perceptions.

We say that, since the sleeping person can sense as though he is seeing or hearing or smelling or tasting or feeling, without the presence of external sense-objects, it necessarily follows that the beginning of this movement in sleep must be where it ends during waking.[7] Furthermore, since this movement during waking begins with the external sense-objects and ends with the faculty of memory, which is the fifth stage [of perceptions],[8] it necessarily

follows that it must originate from this faculty; but since the faculties of cogitation and memory do not function in sleep,[9] [it must be attributed to] that which does function in sleep, namely, the imaginative faculty. The latter faculty, indeed, is always in motion and in continuous activity in the formation of images and resemblances and in moving from image to image. Sometimes it does this with the objects in the memorative faculty, and sometimes it does this with the impressions[10] in the common sense, and sometimes it comes across the object of the thing of which it had formed an image, from some external origin, as we shall explain. This can occur in one of two ways: either it meets with the object itself, or it meets in place of it, with something that resembles it or is a copy of it.[11] It is therefore manifest from all the foregoing discussion that of all the faculties of the soul, it is the imaginative faculty[12] that dreams are primarily related to, whether the dreams be true or false.

But as to the question how it can happen during sleep with reference to this faculty that a person will behold as though he is perceiving with his five senses without the presence of sense-objects outside of the soul [the answer is that] this will occur with reference to this faculty through a motion which is contrary to the one existing between this faculty and the sense-objects during waking. This is so for the reason that during waking it is the external sense-objects that will move the senses, and then the common sense will move the imaginative faculty. But here [during sleep], after the imaginative faculty has formed an image of the object, which it has received either externally or from the memorative faculty, it, in turn, will move the common sense and the common sense, in turn, will move its particular faculties. Thus it occurs that a person is able to apprehend sense-objects even though they are not present externally, because the objects of these senses have already taken form in the sense-organs, and it makes no difference whether these objects come from without [as during waking], or whether they come from within [as during sleep]. Sometimes, a similar condition will occur during waking, to one who is frightened or sick,[13] and this as a result of the excessive activity of the imaginative faculty on such occasions; for, when its activity is intense, it, in turn, will move that by which it was moved, namely, the common sense.[14] Indeed, the movement of the imaginative faculty will be excessive during sleep because it is released from the bond of the cogitative faculty and is no

longer subject to its control. It is because of the weakness of this faculty, that is, the cogitative faculty,[15] in the case of the frightened and sick person, that a similar condition will occur to them. It has now been made clear from this discussion that dreams, whether they be true or false, are to be related to the faculty of imagination.

We shall now inquire into the causes which produce these two kinds of dreams. We say that, since true dreams indicate the knowledge of the existence of an object, the existence of which was by nature unknown to us before the acquisition of that knowledge and, at the time of that knowledge, the object was in most cases not present, this true affirmation which we acquire subsequently to our ignorance thereof, is not acquired through a previous knowledge we had and which produced it, nor is it the result of thinking and reflection in the manner in which true, conceptual knowledge is acquired by us through propositions; for it has already been demonstrated in the *Analytica Posteriora* that two kinds of knowledge naturally precede true conceptual knowledge, the actual and the preparatory.[16] But as for this knowledge which is acquired during sleep, it is apparent that it is not preceded by the actual kind; but whether it is preceded by the preparatory kind of knowledge is a question that is subject to investigation. Since this knowledge is acquired by us following our ignorance thereof and is present in actuality following its state of potentiality, and since we do not possess a previous knowledge which produces the present knowledge, it is therefore apparent that the acquisition of this knowledge by us is effected in the same manner as the acquisition of the primary propositions.[17] Since this is true, the agent producing both of them must be the same and must belong to the same genus.

Inasmuch as it has already been explained in general treatises that anything which undergoes a transition from potentiality to actuality must have an agent or cause of the transition which necessarily belongs to the genus of the thing which passes from potentiality to actuality, it therefore follows that the agent producing this kind of knowledge must be the intellect in actuality,[18] and it is this intellect in itself which endows [one] with universal principles in theoretical things, the existence of which has been explained in the *De Anima*,[19] for both endowments [namely, that in theoretical kinds of knowledge and that in dreams] are of the same genus. The difference between the two of them lies in the

fact that in theoretical kinds of knowledge, it endows one with the universal principles[20] which produce the knowledge that was unknown, and this knowledge previously unknown, it endows without any intermediary.[21] In this kind of endowment, therefore, there is room for wonder and much scrutiny. For, inasmuch as this endowment makes it possible for man to know things previously unknown to him, the question is whether this is possible for him with reference to all kinds of knowledge previously unknown to him, that is to say, with reference to all kinds of existing things; or whether this is possible for him only with reference to some kinds of things but impossible with reference to other kinds of things. As for dreams, it is manifest from their nature that they cannot possibly deal with any of the theoretical things.[22] They only deal with future things. Be that as it may, generally, this kind of endowment is very noble and is attributed to a principle that is higher and more noble than the principle of free choice. Indeed it is through the divine element and full solicitude concerning man that man acquires this kind of knowledge of many things.

Since the essential nature of prophecy comes under the latter kind of endowment, prophecy has been attributed to God and the divine beings, namely, the angels. It is on this account that Socrates states, in arguing with the people of Athens, "O people of Athens, I do not say that this divine wisdom of yours is false, but I do say that the wisdom I possess is human wisdom."[23] We shall therefore inquire into this matter later on as far as our strength and ability will permit us and now we shall return to our previous discussion.

We say that since it has been made clear that the endower of this knowledge is intelligence devoid of matter,[24] and since it has been made clear in metaphysical discussions that these separate intelligences[25] can only comprehend universal natures and can only endow with that which is similar to their own substances, it will therefore be utterly impossible for them to endow any particular, for it is not their nature to comprehend the particular. However, the universal form is individuated into particulars through matter, that is, by virtue of the fact that it can only exist in matter.[26] If the separate intelligences could comprehend particulars, they would necessarily have to be material and then they could only function through active and passive contact.[27] Since these intelligences do not comprehend particulars, would

that I knew how the Active Intellect[28] could endow the particular form that is peculiar to a certain time, a certain place, a certain class of men or a certain individual in that class! We indeed see that man can comprehend such things and, during sleep, he can have a foreknowledge of future occurrences such as are peculiar to his body, his soul, his relatives, the people of his city or nation, or in general to those with whom he is already acquainted.[29] In this connection, a question arises with regard to two points: first, how can particulars be acquired by man from a universal nature[30]; second, how did the knowledge of these peculiarly particular things happen to be bestowed upon this peculiarly particular man? Now the discussion concerning these matters, even though it be very difficult for human comprehension, must nevertheless be undertaken to the limit of one's natural capacity for comprehension, for the essence of happiness is nothing more than this very thing.

We say that, of the things that come into being, some are individuals of substances and some are individuals of accidents; and of the individuals of substances, some are individuals of simple substances,[31] namely, the parts of the elements, and others are individuals of compound substances, and the latter are of two kinds: animate individuals, such as plants[32] and animals, and inanimate things, such as minerals and the like. As for individuals of accidents, some of them are accidents that exist in individuals of simple substances and others are accidents that arise in individuals of compound substances. The latter are of two kinds: accidents that exist in animate individuals or accidents that exist in inanimate things. Each one of these two kinds of accidents exists either by nature or by volition.

As for individuals of substance, they all have determinate efficient causes,[33] as it has been explained in physical science, for an individual of substance cannot exist by chance; for it has already been demonstrated in the *De Generatione et Corruptione* that the coming-into-being of the parts of the elements and the transmutation of one into the other are arranged, preserved and directed by the motions of the celestial bodies,[34] and for this reason it is possible for generation or corruption to occur in equal proportion to their parts and yet for them to remain continuously in tact as a whole. It has likewise been demonstrated in the very same book that bodies that have similar parts[35] that first come into being from the elements, are likewise determinate with

reference to their existence and limited with reference to their causes, and this by reason of the motions of the celestial bodies [which are circular] and by reason of the motions of the elements [which are rectilinear][36]; for the celestial bodies are remote causes for bodies that have similar parts, and the forms of the elements are proximate causes. It has likewise been explained in the *De Partibus Animalium* that individuals of plants and animals are determinate of existence and limited of causes, and this in the case of those that have the capacity of reproduction, by reason of the semen and the Active Intellect,[37] and in the case of those that lack the capacity of reproduction, by reason of the elements, the celestial bodies and the Active Intellect. Since these individuals are determinate of existence, their nature must necessarily be comprehended through the immaterial form, which has the same relation to the individuals as the form in the mind of the artisan has to the finished work.[38]

As for accidental individuals, some exist through natural causes and others exist through voluntary causes, and still others exist by chance. The latter may exist in both kinds of things, that is to say, in voluntary things and in natural things. As for that which belongs to those things which exist by accident, it has no nature which can be comprehended by the intellect because it has no determinate causes. It is therefore impossible for man to have a knowledge of that which may arise from these accidental things,[39] except in an accidental manner. But as for the second class of accidents that have determinate causes, they necessarily have a universal intelligible nature, which is the Primary Cause of their existence; and it necessarily follows that the knowledge of which is encompassed essentially, must have causes existing essentially, and when there are causes existing essentially, they must necessarily be comprehended by the universal nature [which, as said before, is the Prime Cause of their existence], and this, whether we ourselves can comprehend them or not.[40] But as for these individuals that come into being, the knowledge of their coming into being cannot be known by us through reasoning, that is, with regard to those things that are far removed from us in time, since their causes have no determinate existence for us, although they do have determinate existence in themselves. We ourselves can only comprehend the more noble of these causes and the comprehensive generalities. Among the grades and classes thereof that we ourselves can comprehend and which are

determinate through the intelligible nature which assimilates that which these things possess of a sensible nature and which is moved by this sensible nature just as instruments are moved by the forms of art—among these grades and classes there are other grades which are so fine that they may be infinite in number.[41] Therefore that which is apparent is that none of the individuals can come into being essentially in nature except through a previous knowledge, for the instrument of the artisan, as Aristotle says, can only be moved according to the degree of knowledge of the artisan.[42] As for those things that come into being through volition and free choice, there are those that essentially have determinate causes in themselves, though they are not determinate to us, and these causes which are determinate in themselves are the results either of ingrained natural characteristics, or of a characteristic that develops through habit and men's opinions, for these two kinds of characteristics must also be determinate in nature, even though they are unknown to us.

Astrology furnishes beforehand the knowledge of the generation of individuals according to the opinion of some people who think that such foreknowledge is attained by them from the peculiar dispositions of the celestial bodies at the time of the generation of the individual in any of the species.[43] Those who maintain the theory of circular motion,[44] therefore, are of the opinion that the perceptible individuals must return to what they were before, because they believe that the dispositions of celestial bodies themselves have determinate existence, so that each disposition of these bodies, which can be pointed out as such at any instant, must, according to their opinion, return to what it was before.

If all of the foregoing is ascertained,[45] it cannot be denied that the separate intelligence endows the imaginative soul with the universal nature that the individual that comes into being possesses, that is to say, with a comprehension of its causes,[46] and the imaginative soul will receive it as a particular by virtue of the fact that it is in matter.[47] It may receive the individual of that which has been comprehended, in reality, or it may receive something similar to it. Just as the intelligence endows one with the universal perfections of the soul and matter receives them as particulars, so here too the intelligence endows the imaginative soul with the final perfection as a universal, and the soul receives it as a particular.[47a]

It has therefore been made clear that the Active Intellect endows only the primary perfections of the particular faculties of the soul, that is, of the five senses and of the imaginative faculty, for that which endows them with the final perfections are the sense-objects. But in that spiritual perception which occurs during sleep or the like, it will endow the imaginative soul with the final perfection.[48] Just as the skilled physician among us can predict what will arise in the body of Zaid and in his soul at a determinate time by two premisses: one, a universal intelligible premiss, and the other a particular sensible premiss, so it is with this prediction. The knowledge thereof is completed through the universal, which is endowed by the intelligence, and through the particular thing that is conveyed to the imaginative soul and is related to that universal object.

The reason that man comprehends of such particular things only that which is peculiar to his own time, his own place, his own body and his own people and not those other particular things that are common to them through their universal nature, is undoubtedly the fact that man will have in this kind of perception one of the classes of knowledge which precede verification and that is the knowledge which is preparatory to verification, namely, the knowledge of the concept which is prior to the verification. But man can acquire this kind of knowledge or this kind of cognition only with respect to individuals he has previously known, and in particular, with respect to those for whom he has great concern.[49] But with respect to those individuals unknown to him, it is impossible for man to acquire a knowledge of that which will arise in any of those individuals, for this is a kind of verification. Even though it is not a condition for the existence of that knowledge to be preceded by an actual knowledge on the part of man, it cannot but be a condition for its existence that it should be preceded by a prior preparatory knowledge.

As to the question why the imaginative faculty does not present in most cases the true individual object which comes under the universal endowed by the intellect, but presents only an object similar to it, the answer is that this will occur because the sense-object has two forms: a spiritual form, which is the form that is similar to it; and a corporeal form, which is the form of the sense-object itself, not the form that is similar to it. The form that is similar to it is indeed more spiritual because it is closer to the nature of the universal than the form of the real object. The

imaginative soul will therefore receive the thing conceived by the intellect with the greatest perfection possible in its nature to receive, from among the spiritual forms. Sometimes, however, it will receive it in a corporeal form, and then the person who sees during sleep will behold the very form itself and not something similar to it.[49a]

As to the question why this kind of perception is peculiar to sleep, the reason is the fact that, since the soul is single in subject and multiple in faculties,[50] therefore when it uses one class of faculties, it will be weaker in the use of another class of faculties. Thus, when it uses external perception, it will be weaker for the use of internal perception[51]; and when it uses any class of motor faculties, it will become weaker for the use of perceptive faculties. Likewise, when it uses some of the internal faculties, it becomes weaker for the use of other faculties, as in the case where the faculty of imagination becomes weaker when the cogitative faculty is in use, or vice versa, when the faculty of imagination is active, the cogitative faculty becomes weaker. When, in the soul, a certain genus of these faculties or a certain species thereof ceases functioning and becomes impaired, the remaining [genus or] species becomes vigorous. Sometimes the effect of the soul's preoccupation in the use of one particular faculty is not limited to the cessation of the functioning of some of the other faculties; it may also extend to the cessation of the functioning of that organ through which the idled faculty previously functioned, as an organ of that idled faculty, but may employ it as an organ of the faculty in the use of which it is to continue to be preoccupied. This kind of activity of the soul will be similar to the combining of the three inner faculties of the soul[52] in presenting the image of the object[53] which has not been conveyed through the sense.

Since all of the foregoing is as we have related, it follows that the action of the imaginative faculty of the soul during sleep will be more perfect and more spiritual, for the soul during sleep will have rendered idle the external senses and their organs[54] and will have withdrawn from them to the inner sense. The proof that the activity of the inner faculties is more perfect when the external faculties are at rest, is the fact that those who do a great deal of cogitating will bend their sensory faculties toward the interior of the body so that they seem to be in a sleeping trance and they aim to set the external senses at rest in order to improve their cogitation. It is for this reason that those who are born lacking the sense of sight or the sense of hearing will have more perfect activity in their inner faculties; and therefore prophecy will occur in a condition similar to epilepsy,[55] for the reason that when these inner faculties are moved very forcefully, the external faculty contracts, so that frequently a condition resembling a trance results therefrom, as will occur in the case of those who are said to be ill in spirit.[56]

From the foregoing it is now clear why this kind of perception will occur during sleep and will not occur during waking. It is not far-fetched to find a person who can perceive during waking that which an individual perceives during sleep, and indeed he will frequently see the very form of the object conveyed to him, not its likeness, as was the case that was related of Omar, may Allah be gracious to him, when he said, "O column of the mountain".[57]

As for the question why dreams occur, they take place because of [nature's] full solicitude for man. This is so for the reason that, since man is defective in the knowledge and comprehension of the rational, cogitative faculty by which he can comprehend the coming-into-being of useful or harmful things in the future, so that he can prepare himself for the thing and be ready for it and also rejoice when the good occurs and strive for its occurrence, the faculty [of dreaming] will therefore aid this noble foretokening and this spiritual perception. Consequently, it is said that this perception is part of such and such a prophecy. This is manifest in the dreams which King Pharaoh had and concerning which he queried Joseph, may he rest in peace! When Joseph, may he rest in peace, had interpreted the dreams, he ordered them to make ready for the famine which the dreams had foretokened to him, by storing away the wheat in their stalks during the years of plenty, so that it would not spoil but would remain intact for the years of famine.[58]

As for the interpreter, he is the person whose soul is predisposed by nature to understand images which occur in dreams as imitations of things and he it is whom the intellect endows with corporeal things which, during sleep, are imitated by spiritual things.[59] It is a requisite condition that the interpreter know those dream-images that are common to all peoples and the dream-images that are peculiar to each and every people and to each class of individuals among that people, for peoples differ in

this matter in two respects: first, according to nature, that is, according to the faculties of their souls and according to the existing conditions peculiar to them in their province or city; second, according to the dream-images and opinions in the tradition of which they have been raised and in which they have been accustomed to believe since birth. Such is the belief in the First Principle,[60] in angels and the essential nature of human happiness. It is proper, as Aristotle says, that the interpreter habituate his soul to cogitation and reflection, and his body to cleanliness, and that he be temperate, spiritual, and not inclined towards the habits of the animal soul.

Sometimes it occurs that a person will comprehend the interpretation of a dream through another dream he has had, as did occur in the case of Hercules, the king, and his dreams, which were related by Aristotle, wherein the king had extraordinary dreams which the interpreter had failed to interpret. But when the king had fallen asleep, the very things he had dreamt were interpreted to him and he remained in a state of anxiety concerning these things the occurrence of which was predicted, until they actually occurred. Sometimes it happens that a person will have dreams and will forget them, and at other times he will remember them when he awakes; and when he recalls them, he will recall them in the manner in which things that were perceived in the past are recalled. It has already been stated how this is done.[61]

Some persons have truer dreams and can see them more frequently than others during sleep because of their superiority in this faculty, that is, in the faculty of imagination, and they are the ones who have melancholic, cold and dry mixtures of the humors.[62] This is so for the reason that it is the nature of the moistness in the mixture of the humors to engulf the faculties and nullify their activities and stop up the channels of the pneuma; and the sleep of such persons is so strong and profound that it is impossible for them to form an image of anything in their imagination during sleep. Indeed their sleep is similar to death. The melancholic humor, on the other hand, contains the property that is suitable for sleep and suitable for the action of this faculty.[63] As for its suitability for sleep, it is by virtue of the fact that this humor with its abundant vapor will ascend to the head and sleep will ensue. As for its suitability to this faculty [of imagination] it is by virtue of the fact that, since this faculty is powerful in its motion and is constantly in a state of commotion during sleep and waking and

is shifting from image to image, its poor functioning will be due to the speed of its motion and the shifting from one image to another and the shortness of duration and completion of the image of the conceived object. Its good functioning, however, will be due to the [length of] duration, and the excellence of the conception and completion of the conceived object. Now that which is suitable for this kind of action is the cold, dry mixture of humors, and this is so because cold causes a delay of the motion, and dryness causes the duration of the form. Consequently, this faculty is found to be dominant in melancholic people, so that they perceive during waking what others perceive during sleep.[64]

As to the question whether this kind of perception can occur in three different kinds of things, that is, in past, in present and in future things, this is a matter to be investigated. This is so for the reason that the aim of these things in prediction is to indicate what will arise in the future, but it is not remote for it to occur with reference to a past thing or to a present thing, when it is unknown to us. But the question as to which of the classes of knowable things this perception belongs [is to be investigated], for knowable things, as we have said, come under theoretical sciences or practical arts or particular cogitative faculties. Now it is apparent from the nature of this perception that it will occur, in most cases where it does occur, in connection with future things, the comprehension of which is peculiar to the particular cogitative faculties that are used to distinguish the beneficial from the harmful in future things.[65]

As for the practical arts, it is believed that at times some parts of them can be acquired during sleep as in the case of many things in medicine, the knowledge of which originated in the revelation of their existence through a dream.[65a] As for the theoretical sciences, it is remote that it should occur with reference to these sciences, for if it did occur with reference to these sciences, theorizing concerning these sciences would be in vain and useless. This is true for the reason that it is in the nature of man to comprehend the theoretical sciences by means of a knowledge of the primary propositions with which he is endowed, and if he could comprehend them without the propositions, the primary propositions that he is endowed with would be useless[65b]; as in the case where, if it were possible for a person to walk without his feet, his feet would be useless and in vain. Nature, however, rejects such assumption.

In general, the acquisition of any of the concepts of the theoretical sciences in this manner would be accidental and rare. It is therefore impossible that a theoretical art be fully acquired by a person, by God, unless a person assumes that we have here a species of man that can comprehend the theoretical sciences without training. Now this species, if it indeed existed, would be called "man" only equivocally,[66] but actually it would be closer to angels than to man. Now it will be seen that this is impossible from that which I shall say. This is so for the reason that theoretical knowledge in itself is one and not subject to change, whether it is acquired by training or it is acquired without training. Now if it is acquired by both means together, training would not be included in the definition of theoretical knowledge nor would training be necessary for the acquisition thereof.[67] We are therefore confronted with a dilemma. Either we admit that this kind of knowledge is applied to human knowledge only equivocally, or we agree that one thing in itself can exist through different causes.[68] According to the latter assumption, the relationship of the thing to its causes, whereby it has its existence, would not be a necessary relationship. Such assumption, of course, is entirely false. But if one were to assume that it is possible for the images of theoretical things to be acquired by a species of man in this manner of comprehension, such assumption would be untenable, since their acquisition in this manner would be superfluous, inasmuch as man has already acquired them in a more perfect manner; except that one may say that it is possible that this kind of comprehension may be found in one for whom the training in the theoretical sciences is impossible, either by nature or for some other reason. If such people do exist, they are "men" only in an equivocal sense.[69] We have now treated of the nature of true dreams, of the questions for what purpose they arise,[70] from what they arise and in what manner they arise.

We shall now treat of the causes of false dreams. These dreams generally occur through two causes[71]: first, as a result of the activity of the imaginative faculty during sleep in connection with the impressions[72] remaining in the common sense from the external sense-objects and also as a result of the activity of the imaginative faculty in connection with notions deposited in the memorative and cogitative faculties from the same sense-objects; for this faculty, that is, the imaginative faculty, always functions in connection with the repository of these two faculties, that is,

the repository of cogitation and memory and the repository of the common sense.[73] The second cause is the fact that false dreams arise as a result of the natural desires of the soul, for when the animal soul craves a thing, that is its existence or privation, the imaginative soul will naturally form an imitation of the desired thing in the condition in which it desires it[74] and will obtain an image of the desired thing in the condition in which it desires it. One who has an amorous desire for women,[75] therefore, will see himself having intercourse and one who is thirsty will see himself drinking water. To this class belong those dreams that indicate to physicians the dominance of certain humors in the body. Thus, a dream of fire will indicate to them the dominance of bile,[76] while a dream of water will indicate the dominance of phlegm.

The difference between these false forms in sleep and the true forms is that the soul marvels at the true forms and wonders about them and, at times, it awakens and is disturbed as if frightened at the sight thereof and amazed at the spiritual subtlety apparent therein. We have thus discussed the natures of true and false dreams and we have given their four causes[77] and the causes of the accidents that occur to them and overtake them. Now there have been completed the topics that were selected from this book. May Allah be praised!

BOOK THREE

LENGTH AND SHORTNESS OF LIFE

His aim in this book is to inquire into the causes of the length and shortness of life. We say that it must be acknowledged that there are natural causes which produce these two accidents. Any coming-into-being, passing-away, growth, diminution, sleep and waking, and generally, any transmutation[1] that may occur in an animal must be attributed to the four qualities, that is to say, heat, cold, moisture and dryness, and not to quantity nor to any other of the qualities, such as heaviness or lightness, blackness or whiteness, roughness or smoothness, unless they be attributed to them accidentally. This is a topic that has already been explained in the *De Generatione et Corruptione*. Since the foregoing has been established, length and shortness of life cannot be attributed to anything else but to these four qualities, and they are the ones that produce these two accidents in animals and plants.

We must inquire into how many ways this comparative relation [between length and shortness of life] can be used[2] and whether this proportion exists in animals and plants. Furthermore, following this, we shall inquire into the qualities which are peculiar to these two accidents. We say that [the terms] length and shortness of life may be used in four ways: first, as a comparative relation with reference to genus, that is, a comparative relation of one genus to another,[3] as when it is said that plants generally are more long-lived than animals[4]; second, as a comparative relation of one species to another, as when it is said that man is more long-lived than the horse or that the date-palm is more long-lived than the fig tree; third, as a comparative relation of one group of people to another, as when it is said that the people of a warm and moist region are more long-lived than the people of a cold and dry region[5]; fourth, as a comparative relation of one individual to another, as when we say that Zaid is more long-lived than Khalid or that this particular date-palm is more long-lived than that particular date-palm. The foregoing are all the different ways in which the terms length and shortness of life may be used.

After the foregoing has been established, we must then inquire

into the causes of this difference between length and shortness of life. We say that it has already been explained in the fourth book of the *Meteorologica* that coming-into-being occurs when the active powers[6] in that which comes into being dominate the passive powers, that is, when heat and cold dominate moisture and dryness; and passing-away occurs when the opposite is the case, that is, when the two passive qualities dominate the active ones and prevail over them. This is true for the reason that heat, whose measure is determined in comparison to cold, is that which endows that which comes into being with its natural form. In fact, the heat itself is the form.[7] The moisture whose measure is determined in comparison to dryness is that which receives the form and the figure. As long as the naturally existing thing continues to exist and the two active powers therein, namely, heat and cold, dominate the passive ones, namely, moisture and dryness, and prevail over them, its existence is preserved. But when these two active powers are too weak for this, there will dominate those passive powers other active powers that are peculiar to the existence of another thing, and thus, the previous existing thing will pass away. For example, so long as the natural heat, whose measure is determined in comparison to the natural cold, continues to dominate the humors, no putrefaction will arise therein. But if it is too weak to digest the humors and decoct them, or it is too intense, an extraneous corrupting heat will arise therein.

Passing-away generally occurs when the natural ratio between the active qualities and the passive, in any existing thing, is destroyed. The larger this ratio is, the less will the existing thing be subject to corruption and the further removed from passing away.[8] The smaller the ratio is, the faster will the existing thing be subject to corruption and the more prone to passing-away. Consequently, where the mixture of water and fire[9] in existing things dominates the mixtures of earth and air,[10] such things will have a longer existence, because in both water and fire, the two active qualities are more powerful than they are in earth and air, and in both earth and air the two passive qualities are more powerful than they are in fire and water.

An existing thing of such quality is of longer duration because of the fact that this ratio between the active and passive powers within it is not destroyed by any slight change occurring to the active qualities from without. This is so for the reason that,

when the natural ratio between the active and the passive qualities is large, it will not be subject to destruction except through a big change lasting over a long period of time; for passing-away is nothing more than putrefaction which arises as a result of the weakening of the active powers and the hardening of the passive powers.[11] Consequently, any one whose mixture of humors is such that it endures longer will have little generating of humors that are undigestible or humors that are combustible, or generally, humors that are poor in quality. This is true for the reason that the natural mixture of humors depends upon the natural ratio that exists between the active and the passive powers. When the active cold power is less than it should be, the humors are dissipated and burnt up. When the heat is less than it should be, the result is the absence of decoction and rawness. The foregoing is one of the causes for some species having longer existence than others and being less subject to diseases, excesses and corruption.

The second cause [for the length and shortness of life] is that the natural relation between the two active powers, a relation of one to the other, and also the relation between the two passive powers in any given genus, species, group or individual is greater than it is in some other genus, species, group or individual. Now the natural relation for animals and plants in this respect is that the heat must predominate over the cold and moisture must predominate over dryness for the reasons which were stated elsewhere. Wherever heat and moisture predominate in animals or plants and the active powers predominate over the passive, such animals or plants will be more long-lived.

Corruption will occur in animals and plants when one of these two relations or both of them are lacking; for when the active powers are weakened, matter will undergo the process of being deprived of its form because of the impairment of the digestion[12] and the poor quality of the matter. When moisture is not present in it in abundance, it will follow that the animal or plant will desiccate rapidly,[13] because it is the nature of heat to desire moisture, so that it becomes entangled with it and transforms it into a part of itself, since moisture serves as matter and nutriment for it. When it consumes the moisture, the heat passes away and dryness and cold prevail. The more the moisture is absorbed, the more the dryness and cold will prevail, for dryness seems to be the matter appropriate for cold, just as moisture is the matter appropriate for heat.[13a] The superiority of the species of animals

in length of life will depend upon their superiority in heat and moisture and upon their superiority in the predominance of the active powers over the passive. Upon the foregoing two causes, therefore, will depend the superiority of groups of people and their individuals with reference to their length of life.

Passing-away will occur in individuals in one of two ways: either naturally, where the natural heat consumes the natural moisture that is in the individual, and cold and dryness prevail so that corruption sets in[14]; or accidentally, where excesses of decoction[15] of food are generated in individuals, such as nature cannot set apart, and thus mortal diseases will overtake them. The latter individuals are such as in their cases it does not happen to be that their active powers predominate over the passive ones; for when the active powers naturally predominate over the passive powers in any given individual and there is no important external cause contrary to it and arising from things that usually change the internal mixture of humors, it will follow that the passing-away of this individual will be a natural passing-away. Furthermore, in this kind of natural life there will be a superiority in length and duration in accordance with the superiority of the mixtures of humors in heat and moisture.

The lives of people in general will be found to follow the predominant ratio of the mixture of humors that exists between the active and the passive powers and between the active powers themselves and between the passive powers themselves. Consequently, one can see some people whose limbs are apparently beautiful and strong and their faculties powerful, whom mortal disease will overtake and who will perish before they reach a natural old age. Then again we find such as are inferior to them in strength and beauty of limbs, who reach old age, though the regimen of both groups is similar.[16]

The proof that the cause of length of life is the abundance of heat and moisture and their dominance in the mixture of humors, together with the predominance of heat over moisture and generally of the active powers over the passive, is the fact that the opposite of life is death, and death is nothing else but cold and dryness.[17] Now since the cause of death is cold and dryness, the cause of life must be warmth and moisture. Consequently, the mixture of humors in young people is warm and moist, while the mixture of humors in old people is cold and dry. One of the proofs for this is the fact that those who have frequent sexual

intercourse have a shorter life-span than those who have little,[18] and eunuchs live longer than those who are not eunuchs. Old people who have much flesh live longer than those who have little flesh, because the cause of the abundance of flesh is warmth and moisture. Because of the paucity of sexual intercourse, the mule lives longer than the horse and the ass, although the former is the offspring of the latter two. Females live longer than males.[19] Those who dwell in warm and moist lands live longer than those who dwell in cold and dry lands.[20] The length of life of people in such lands is due to an accidental cause, that is, the paucity of putrefaction. Beasts and reptiles which dwell in maritime regions that have an abundance of moisture and heat, live longer than beasts and reptiles that dwell in warm and dry places or cold and moist places. The same is true of people, that is to say, people of maritime regions live longer than people of dry regions and maritime animals live longer than inland[20a] animals, because sea waters are warm and moist. Therefore, maritime animals are fatter than those in inland regions.[21]

Generally, the warmer and moister a thing is, the slower will it be to become desiccated, while the more earthy it is, the faster will it be to become desiccated. The cause which preserves the duration of an animal in its inner essence is the abundance of heat and moisture in its mixture of humors and the fact that the active powers in it prevail over the passive ones. These are the causes which preserve the animals in their inner essence.

As for those causes which preserve the animal from without, they are of six kinds as physicians have enumerated, to wit: food and drink, [diarrhea and constipation],[21a] the surrounding air, sleep and waking, motion and rest and the accidents of the soul.[21b] When the foregoing kinds [of causes] are used properly by a person in whose mixture of humors the following two conditions are found, that is, an abundance of heat and moisture and the condition in which the active powers in him dominate the passive ones, as described in the [works on the] art of hygiene, such person will necessarily live long and there will befall him only a natural death, which is such as has as its cause, cold and dryness. Wherever a person does not utilize the foregoing kinds [of causes] properly, his death may be brought about by the dominance of the passive powers over the active powers, and the latter is the cause of the generation of diseases arising from matter. It is also possible that a person may die a natural death when the generating

of the foreign humor in his body is not excessively bad in quality, but is of the kind of bad quality his mixture of humors can tolerate. Furthermore, in the case of many people it will happen that their appetities by nature will be suitable to their mixtures of humors and they will therefore live long.

But as for those whose active powers do not dominate their passive powers, most of them will die an unnatural death and few of them will reach the limit which the nature of the moisture in their bodies should permit them to reach, but instead will die because of putrefaction before any natural feebleness sets in, especially, when in addition to the weakening of the active powers, there is an unsuitable regimen.

In general, any who lack these two conditions that are stipulated for the mixture of humors of those who live long, will necessarily have a short life. Indeed, corruption will rapidly occur in their case in two ways: first, through the consumption of the natural moisture in their bodies; and second, through the predominance of cold and dryness in them, and that is where external conditions affect them in an unsuitable manner. It will frequently happen in the case of the latter class, in spite of their following a suitable regimen, that they will die an unnatural death, and this owing to the excesses that are generated in them as a result of the weakening of their active powers. Consequently, this class will be found, in spite of its caution, to have many diseases, and ignorant physicians will be puzzled by them, because they conceive of external causes only, as the causes of diseases.

It seems that the mixture of humors which we mentioned as being peculiar to length of life, namely, that which contains as the principle of its composition the aforementioned two conditions, is either unknown to the art of medicine or is too difficult to understand. If it could clearly and precisely be known, the physician would indeed be able to determine length or shortness of life. The balanced mixture of humors which Galen mentions, it would seem, is this very mixture of humors [which leads to a foreknowledge of length of life], except that a knowledge of this mixture of humors through the senses and the understanding of it are quite difficult, and its existence can more appropriately be known through reason than through the senses. Since the ratio between the humors in this balanced mixture is unknown by nature,[22] we can see many, who are weak by nature, reach the natural end of

their lives, and we see many, who are endowed with good constitutions, die suddenly. Praised be the Giver of life and He who measures it, the Knower of life! The superiority of people in their life-span is in accordance with their superiority in this ratio between the humors of the mixture, which is peculiar to those who are endowed with length of life.

Length and shortness of life will therefore be generally due to two kinds of causes: first, to external things; second, to causes that are of the inner essence of the thing, which are, as we have mentioned, the abundance of heat and moisture and the dominance of the active powers over the passive forces. In plants there is a third cause that makes its impress upon the length of the plant's duration and that is that it decays and grows again in its different parts, that is to say, when one branch withers, another branch may come into being,[23] and in addition to this, it acquires its natural heat from the sun to a greater degree than it is acquired by an animal, and besides, it is very aqueous, approaching the forms of the simple elements; for the further removed the form of a composite thing is from the forms of the simple elements of which it is composed, the more contrary will its form be to the forms of those simple elements, so that the activity of the simple elements within it is more intense[24] and their opposition to it is greater. Thus we have discussed the causes of length and shortness of life according to Aristotle's view and in accordance with the requirements of natural principles.

As for the ancients, they attributed length and shortness of life to accidental causes. Some were of the opinion that warm and dry regions were the cause of length of life; others were of the opinion that the cause thereof was the size of the body; and still others were of the opinion that the cause thereof was the copiousness of the blood. Warm and dry regions burn up and consume the natural moisture and, therefore, cannot be conceived of as an essential cause of length of life.[25] The latter will only be an accidental cause, for putrefaction resulting from moisture will be scant in such regions. It would seem that the cold and dry region would be a cause of length of life and would be more suitable for it than a warm and dry region, because it will lack the putrefaction that comes from moisture and the putrefaction that comes from heat. Consequently, such region will have the peculiarity that there will be few dying there from putrefaction. Similarly, size of body will be a cause of length of life when the size is due to

the abundance of heat and moisture and not to the abundance of the earthy part of it. Therefore man, though small of body, lives longer than many animals that have larger bodies than he.[26] Likewise, copiousness of blood is an accidental cause because copiousness of blood in animals is due to the abundance of heat and moisture. We have thus discussed the causes of length and shortness of life to the extent of our ability and intelligence and as far as the pressures of the day and the preoccupations of the time will permit. With the completion of this book, the extant works of Aristotle in this branch of science are thus brought to a close.

NOTES

[1] The Arabic and Hebrew translations of this Aristotelian work contain not only the *Historia Animalium* but also the *De Partibus Animalium*. In Bekker's Greek edition of Aristotle's works, these two treatises follow the *Parva Naturalia*.

[2] Aristotle discusses the five senses in general in Book II of the *De Anima*. Averroes calls these senses "parts of the soul", but they are not to be regarded as material parts, since Aristotle denies that the soul has particular, material parts (cf. *De Anima*, I, 5, 411b 25ff.). The parts of the soul also comprise the internal faculties such as imagination, cogitation and intellect, all of which are regarded as functions of the soul. Aristotle treats of these functions in Book III of the *De Anima*. Cf. Avicenna, *al-Najāt*, ed. Rome, 1593, p. 44, and Maimonides, *Introduction to Mishnah Abot*, ed. Warsaw, 1924, pp. 8ff.

[3] The Arabic شرع, Heb. דרך, have the meaning of "entering upon and following a certain course."

[4] Aristotle lists as examples of those that are common to all animals, those that are attributes of the soul and body together: sensation (*αἴσθησις*), memory (*μνήμη*), passion (*θυμός*), appetite (*ἐπιθυμία*), desire (*ὄρεξις*), pleasure (*ἡδονή*) and pain (*λύπη*). Cf. *De Sensu*, 1, 436a 9, 10.

[5] Sense-perception (*αἴσθησις*) is a function of the soul that is present in all animals. Motion (*κίνησις*) in its general sense includes growth and change and is likewise found in all animals, but in its restricted sense of movement in space, it is lacking in certain animals. Cf. *De Anima*, II, 2, 413b 2ff. Gersonides, in his *Supercommentary to Averroes' Epitome of the Parva Naturalia* (Jew. Theol. Seminary, Elkan Adler, MS. 1744, fol. 150v), explains that sensation, as an example of the first kind of faculties, is to be attributed to the sense-organs by virtue of the soul that exists in them. This soul is the principle and origin of their movement and this principle is exemplified in the faculties of imagination and appetition, as it has been explained in the *De Anima* (II, 2, 413b 22, 23).

[5a] Gersonides states the physiological reason for the cessation of sensation in the body during sleep (*op. cit.*, fol. 150v–151r): "The primary substrate of the soul, which is the natural heat, has already withdrawn to the interior of the body, i.e., to the heart. Now this affection that the perceptive soul is subject to during sleep, namely, that it does not make use of the primary perfection that is peculiar to it, which is the perception of sense-objects, as it does during waking, will occur to the perceptive soul by virtue of the fact that it exists in a body."

[6] Cf. *De Sensu*, 1, 436a 13ff. Here Averroes mentions a number of pairs of topics discussed in Aristotle's psychological treatises. In Bekker's Greek edition of Aristotle's works, there is no separate treatise on health and disease. Aristotle briefly touches upon this topic in his *De Respiratione*, ch. 21.

[7] See *De Anima*, III, 10, 433a 10ff., where Aristotle states that it appears that there are two agents causing locomotion: appetite and mind (*νοῦς*). In connection with this passage of Aristotle, Averroes notes in his *Long Commentary on the De Anima* (Latin ed. F. S. Crawford, Mediaeval Academy of America, 1953, p. 516) that neither appetite exclusively nor mind exclusively can be regarded as an agent of locomotion, for often we are moved by our appetites although the mind thinks we ought not to be moved; and vice versa, many people have appetites for certain things, but they follow their minds and not their appetites: "Quod igitur dominatur in isto motu et appropriatur ei non est cognitio, cum multotiens moveamur a desiderio, licet intellectus videat nos non debere moveri. Neque etiam quod dominatur in isto motu est desiderium, quia multi homines desiderant sed non consequuntur desiderium, sed intellectum." Locomotion must therefore be attributed to both appetite and mind, but Averroes adds that as an alternate for mind, the imagination may also function as an agent of locomotion; for in many things we are moved by the imagination without any cognition, just as other animals are moved, for other animals do not have the faculty of reasoning, but in place of reasoning they have imagination. These two faculties (and the alternate), therefore, are the agents that cause locomotion, viz. appetite, mind or imagination: "Idest, apparet igitur ex hoc quod diximus quod agens motum est duo, intellectus scilicet et desiderium, aut imaginatio, que est similis intellectui. In pluribus enim rebus movemur ab ymaginatione sine aliqua cognitione, sicut animalia moventur; alia enim animalia non habent cogitationem, sed in loco cogitationis habent ymaginationem. Iste igitur due virtutes sunt moventes de loco in locum, scilicet desiderium, et intellectus aut ymaginatio."

[8] I.e., those that are attributed to the soul insofar as it exists in a body. As illustrations, he lists sleep and waking, life and death, and respiration.

[9] Thus, sleep is a function of the soul which includes other functions, such as those of the five senses; for sleep is the quiescence of all the senses and is regarded as a genus to its species, which, in this case, are the five senses (cf. *De Somno*, 1, 454b 25ff.).

[10] Sleep and waking, in contradistinction to hearing and sight, are regarded as necessary functions, for animals cannot exist without sleep and waking, but they can exist without the senses of hearing and sight (cf. *op. cit.*, 454b 3 and *De Anima*, III, 13, 435b 19ff).

[11] I.e., in Andalusia, Spain.

[12] The title of this book is الحس والمحسوس.. This is the title listed in the earlier Arabic bibliographies. Cf. *Fihrist*, ed. Flügel, p. 251; *Tarīkh al-Ḥukamā'*, p. 41; Ḥāji Ḥalifah, V, 75, no. 10,054. The author of the *Fihrist* (987 A. D.) was apparently familiar with only two treatises, but by the period of Averroes (1170 A. D.), three treatises were known to be extant. Ḥāji Ḥalifah likewise lists three, but quotes Ptolemaeus (second cent. A. D.) as being familiar with only one treatise.

[13] In Aristotle's writings, this treatise is called memory and recollection. The change in title here may be due to the fact that in recollection the faculty of فكر (cogitation) plays an important rôle, for Aristotle regarded recollection as a mode of inference (*συλλογισμός*) and the process of recollection as a sort of investigation, the capacity for which belonged only to animals endowed with the faculty of deliberation (*τὸ βουλευτικόν*). At the beginning of the second book, Averroes employs the usual term تذكر (*ἀνάμνησις*).

[14] The reference is to the treatises on life and death, respiration, health and disease, and youth and old age, which, while not as yet in Spain, Averroes hoped some day to obtain.

[15] Cf. *De Anima*, II, 6–12.

[16] Cf. *ibid.*

[17] Cf. *De Sensu*, 1, 436b 13ff. In the *De Anima*, III, 13, 435b 19, Aristotle mentions the fact that only the sense of touch (*ἁφή*) is necessary for the existence of the animal. This differentiation between the necessary senses and the others is generally found in the writings of the Arabic and Jewish philosophers. Cf. Landauer, *Die Psychologie des ibn Sina*, p. 351, and *Emunah Ramah*, I, 6, 27.

[18] See *De Sensu*, 1, 436b 16.

[19] Cf. *De Anima*, III, 12, 434b 16ff. In commenting upon this passage, Averroes explains (*Long Commentary on the De Anima*, Latin ed. F. S. Crawford, Med. Acad. of America, 1953, pp. 537, 538) that taste and touch are closely associated with each other, for taste is a kind of touch since it pertains to that which is tangible and nutritious. Unlike taste, on the other hand, sounds, colors or odors do not nourish the body when they come in contact with it nor do they cause growth or decay, as food does. "Sonus autem et color et odor non nutriunt corpus quando veniunt super ipsum, neque faciunt in corpore additionem aut diminutionem sicut facit nutrimentum. Et propter hanc causam quam dico, gustus de necessitate est aliquis tactus, idest quia sensus gustus est alicuius tangibilis nutrientis."

[20] The senses of hearing, seeing and smelling serve for the attainment of a higher perfection in animals endowed with intelligence, for they inform one as to the distinctive qualities of things, from which the knowledge of theoretical and practical things is derived. Cf. *De Sensu*, 1, 436b 18ff.

[21] I.e., the eyes, the ears and the nose. See *De Anima*, III, 12, 434b 14, 15.

[22] The medium of sight is a translucent body (*τὸ διαφανές*) such as air or water. The medium of hearing is a body that is capable of transmitting sound, such again, as air or water (cf. *De Anima*, II, 7, 418b 7). The Greek commentators of Aristotle used the term *τὸ διηχές* to describe this body (cf. Themistius, *In De Sensu Commentarium* ed. Spengel, II, 113, 2ff.). The medium of smell is the body that is capable of transmitting odor (*τὸ διόσμον*), such as air (cf. Themistius, *loc. cit.*). Aristotle regards the flesh as the medium of touch and taste (*De Anima*, II, 11, 423b 26). Since flesh is part of the body, Averroes says that touch and taste are characterized by the fact that they do not need any media external to the body.

[23] *τὸ διαφανές*. The property of transparency is to be found in both air and water. Aristotle regards water as the predominant element of the eye and not air, because water is more easily confined and more easily condensed than air. The gelid part of the eye, which is that of the pupil, therefore consists of water. See *De Sensu*, 2, 438a 14ff.

Gersonides notes (*op. cit.*, fol. 152v) with reference to the composition of the eye:

"ואלו המים הם הכלי הראשון לזה החוש, והיא הלחות הכפורית אשר באמצע העין"

"This water constitutes the primary organ of this sense of sight, and this is the vitreous (lit. cold) humor that is located in the middle of the eye." See below, note 136.

[24] The sense is regarded as a mean (*μεσότης*) between two contraries and it can therefore perceive its objects. If the organ becomes impaired by some external cause, the faculty will likewise become impaired (cf. *De Anima*, II, 11, 424a 5-32).

[25] *τὸ ὀπτικὸν πνεῦμα*. The ancient philosophers and physicians believed that the natural heat resided in the pneuma. This heat is distributed through the blood vessels and by means of these vessels, sensation is transmitted from the external organs to the heart. Cf. *De Gen. Animal.*, II, 6, 744a 3, and Galen, *De Placitis Hippocratis et Platonis*, VII, 4.

[26] Cf. *De Gen. Animal.*, V, 1, 780a 23ff.

[26a] Gersonides adds (*op. cit.*, fol. 153v) that there is a second cause for the weakening of vision in regions with much snow and that is the result of the intense whiteness of the snow; and the same is true of all sense-objects that are intense such as, intense blackness, intense cold and intense heat.

[27] This cold, gelid part of the eye is the pupil which consists of the element of water. The pupil has the capacity of sight not because it is composed of water but because it is translucent. Cf. *De Sensu*, 2, 438a 13ff.

[28] Aristotle's opinion is that the skin over the pupil is fine and delicate in order to ensure keenness of vision, while the lids are superadded as a protection from injury (*De Part. Animal.*, II, 13, 657a 30ff.). According to this view, the thick eyelid does not make for keener vision but rather serves as a better protection against external objects than the thin one. Later writers seem to have confused the skin of the pupil of the eye with that of the eyelid. Thus Gershon ben Solomon in *Sha'ar ha-Shamayim*, IX, 53, says:

"וטבע העור אשר על העפעפים ג"כ עוזר על הראות, כי כשיהיה זך ודק וחלק, יתכן שיהיה הראות חד וחזק, וכשיהיה העור עבה וכורזן, הן בראות חלושה"

"The nature of the skin of the eyelids likewise aids acuity of vision, for when it is clear, fine and smooth, vision will probably be sharp and powerful but when the skin is thick and rigid, vision will be weak." While Averroes says nothing about the thinness or thickness of the skin of the pupil, he does state that those whose eyelids are thick will have keener vision for distant objects. This view of Averroes would seem to contradict the opinions held by Aristotle and Gershon ben Solomon.

[29] Avicenna gives a more detailed and precise account of the process of hearing (Landauer, *op. cit.*, p. 355): "Sound is the motion of the air which the ear senses when two solid tangible bodies strike each other quickly. The air transmits the motion generated by the concussion, which reaches the ear through the movement of the air distributed in the organ of hearing. When the motion takes place and is impressed upon the auditory nerve,

the faculty then perceives its quality." Falaquera (*Sefer ha-Nefesh*, ch. 8) has an abridged Hebrew translation of the same passage:

"האויר מסודר באוזנים ואינו נפרד מהם והוא שוקט מאד מפני שישיג פרקי התנועות, וכשיגיע הקול המוכן מהאויר בכלי השמע, חרשם תנועתו בעצם השמע, ישיגהו השמע על תבניתו"

[30] Gershon ben Solomon quotes Aristotle as saying that the nostrils constitute the organ of smell, for when the smoke-like odor enters the hollow of the nostrils, one becomes conscious of the odor by inhaling the air through the nostrils (*Sha'ar ha-Shamayim*, IX, 55b) and cf. *De Part. Animal.*, II, 10, 657a 6, 7). What Averroes implies here is that the air is only the medium for the perception of odor and that the nose, i.e., the nostrils, constitute the organ of smell. Falaquera adds that the perception of smell is realized through the media of air and water, for fish likewise have the faculty of smell (Falaquera, *ibid.*).

[31] It is not certain whether Aristotle regarded the flesh as the organ or as the medium of touch. In one place, he regards the flesh as the sense-organ (*αἰσθητήριον*) of touch (*De Part. Animal.*, II, 1, 647a 20); in another passage, Aristotle denies that the organ of touch is the flesh (*op. cit.*, II, 10, 656b 35). Furthermore, the problem as to whether the flesh is the organ or medium (*τὸ μεταξύ*) of touch is posed by Aristotle himself in the *De Anima*, II, 11, 422b 20ff., but it is not solved there. Averroes is of the opinion that Aristotle regarded it as a medium. The uncertainty seems to be widespread among Greek and Arabic commentators. A succinct summary of the different views is given by Falaquera in his *Moreh ha-Moreh*, II, 22, 111: "Themistius states that Aristotle was rather careless in this matter and that his views are not at all clear. The above-mentioned philosopher (i.e., Averroes) has written that inasmuch as he was inquiring into the parts of animals in the *Historia Animalium*, it seemed to him that the flesh was the organ of touch. He further stated in the *De Anima* that it is a medium, because it is vital for the sense-organs (*De Anima*, II, 11, 423b 25). Alexander Aphrodisias is of the opinion that the flesh is the organ of touch, for if it were only a medium, the organ would have to be somewhere below the flesh. Ibn Sina, on the other hand, regards the flesh as a medium, while Ibn Badja declares that this subject is not clear."

[32] The flesh perceives the distinctive qualities (*διαφοράς*), which are characteristic of the elements (*τὰ στοιχεῖα*), that is heat, cold, moisture and dryness (cf. *De Anima*, II, 11, 423b 27ff.).

[33] The organ of touch is capable of perceiving its objects because it is a mean between contraries such as heat and cold, moisture and dryness. According to Aristotle, when the tangible object is both hot and cold or hard and soft, perception is impossible. Animals are capable of perceiving only excesses (*αἱ ὑπερβολαί*), which means that the tangible object must be hotter or colder, harder or softer than the organ of touch. Cf. *ibid.*, II, 11, 424a 2ff. and Falaquera, *Sefer ha-Nefesh*, ch. 11.

[34] Cf. *De Anima*, II, 11, 424a 3.

[35] Cf. *De Part. Animal.*, II, 16, 660a 12.

[36] Aristotle regards man's sense of touch as keener in its power of discrimination (*διαφερόντως ἀκριβοῖ*) than that of other animals and

hence it is an indication of intelligence in man. Those who have thick, coarse flesh (*σκληρόσαρκοι*) are inferior in intelligence, while those whose flesh is soft (*μαλακόσαρκοι*) are quick-witted. See *De Anima*, II, 9, 421a 22ff.

[37] See *De Anima*, II, 10, 422b 8ff.

[38] Cf. *ibid.*, III, 13, 435b 8ff.

[39] Of the four elements, fire, air, water and earth, from which all composite things are formed, Aristotle associates the organ of smell with one of the two elements, water or air. Fire is present in the sensory organs, for without heat there can be no perception of sense-objects. The element of earth is likewise present in the organs, because it is part of the complexion of the organ of touch. Cf. *De Anima*, III, 1, 425a 3ff.

[40] See *De Sensu*, 5, 443a 23ff.

[41] Odors ascend to the brain because the element of heat in them is light. Aristotle states that odors arising from what is fragrant and pleasant are always beneficial to persons in any state of bodily health. Indeed odors of such species, according to Aristotle, have been generated for human beings as a safeguard to their health (*πρὸς βοήθειαν ὑγιείας*). See *De Sensu*, 5, 444a 15ff.

[42] The Arabic is لازمة. This term is expressed in the original Greek by the preposition *μετά*, followed by a noun, as in the phrase, *μετ' αἰσθήσεως*, which means that which is a concomitant of sense-perception. See *De Sensu*, 1, 436b 3.

[43] Aristotle cites the example of a colored object placed upon the eye, in which case it is impossible to see the color of the object. The same is true of the objects of hearing, touch, smell and taste. Cf. *De Anima*, II, 7, 419a 12, 25ff.

[44] Cf. *ibid.*, II, 7, 419a 21ff.

[45] The eye receives the color through the medium of the humors of the eye, and in the same manner, water or air, which are the media of sight, can receive the objects of sight, since these media are transparent. See *De Sensu*, 2, 438b 1ff.

[46] Averroes discusses the nature of senses and their media in the section immediately following.

[47] The Arabic and Hebrew MSS erroneously read نورية and ראות (sight), for light, but in order to avoid a tautology and a statement that makes no sense, the terms must be corrected to read ضوء and אור.

[48] Color, the object of sight, is invisible without light (*De Anima*, II, 7, 419a 9). Aristotle defines light as the actualization (*ἡ ἐντελέχεια*) of the transparent (*ibid.*, 419a 12). By means of light, color changes the transparent medium of air or water from a state of potentiality to that of actuality (cf. *ibid.*). Gershon ben Solomon describes this process succinctly as follows (*Sha'ar ha-Shamayim*, IX 52b):

"ויש לחוש הראות שלשה דברים לא יוכל להשיג זולתם, ואלו הן: הרוח הרואה והצורה המוחשת ואור השמש שהוא מוציא הרוח הרואה מן הכוח אל הפועל, ועל כן לא יוכל אדם לראות במקום חשוך שאין אור השמש או אור אחר שם":

'The sense of sight has to have three conditions without which it cannot perceive, to wit: the visual pneuma, the form of the sense-object, and the light of the sun, which changes the visual pneuma from potentiality to actuality. A person, therefore, cannot see in a dark place, because sun light or some other light is lacking."

[49] Averroes herewith rejects the efflux theory of vision, that is, that vision is realized through rays issuing from the eye and extending to the visual object, and is in complete agreement with Aristotle, who had refuted the efflux theory (*αἱ ἀπόρροιαι*) in the *De Sensu*, 3, 440a 19, 20. Falaquera expresses this view more pointedly in explaining the perception of color (*Sefer ha-Nefesh*, ch. 7):

"והאור אינו סבה בהגעת הגוונים אל הראות בלבד, אלא במציאותם, והגוונים שלמותם באור שהוא ניחוץ; ועל כן אמרו שהאור פועל הראות":

"Light not only causes the colors to reach the visual organ but is responsible for their very existence. The bringing of colors into completion is due to the external light. Light is therefore regarded as actualizing vision.

[50] Aristotle raises the point in the form of a question. If vision were the result of light issuing from the eye as from a lantern, why should the eye not have had the power of seeing even in the dark? Indeed this was the doctrine of Empedocles and of Plato (*Timaeus* 45D), which was emphatically rejected by Aristotle (*De Sensu*, 2, 437b 11ff.).

[51] For light changes the transparent body from a state of potentiality to that of actuality (*De Anima*, II, 7, 419, 10ff.).

[52] See the chapter on memory and recollection, Hebrew ed. H. Blumberg, Med. Acad. of America, 1954, p. 30, 5ff.

[53] Excesses can impair the visual organ. Cf. *De Anima*, II, 12, 424a 28ff.

[54] The medium is air or water and the luminous body is light. Cf. *ibid.*, II, 7, 419a 12ff.

[55] Cf. *De Anima*, II, ch. 7.

[56] The innermost coat is the retina. In the literature of the period, the place and function of this particular coat of the eye are vague. Averroes describes this part of the eye in the *Kulliyāt*, II, 15 as follows:

"עוד ילוה אחר היריעה הזאת דומית לשבכה תצמח מעצם העצב היוצא מן המוח היא חלולה. ואולם השבכה הנה תועלתה הראשונה שתביא הרוח הרואה במה שבה מהעצבים והוא החום הטבעי אשר כבר השתווה מזגו במוח ובשני העצבים ההולכים אל העינים, וגם כן היא הנה תלון הלחות הלכוכית על דרך הדייתות(?) ותקנה לה החום הטבעי במה שבה מהעורקים הדופקים"

"Attached behind this curtain is something similar to a net which shoots out from the hollow bone of the nerve that issues from the brain. The primary use of this net is to transmit the visual pneuma through its nerves, which pneuma is in reality the natural heat, the complexion of which has already been tempered in the brain and in the two nerves that lead to the eyes. Here it also nourishes the vitreous humor by way of offshoots (Heb. should probably read: הדיתאות) and endows it with the natural heat through its arteries." See Samuel ben Zarza's translation of *Kulliyāt*, 49b, in Kaufmann, *Die Sinne*, p. 89.

[57] Aristotle's view is that the cranium is located in the forepart of the head because it is the organ of perception. The back part would be unsuitable for it because it lacks the blood vessels through which the

sense-organs function (*De Part. Animal.*, II, 10, 656b 22ff.). In Duran's *Magen Abot*, III, 51b, the retina is located as follows:

"ותחלת צמיחת אלו המחיצות הוא מהמוח מעומק שני החדרים המוקדמים ממנו משכונת שתי הוספות שיש שם הדומים לשתי פטומות דדי נשים":

"The offshoot of these two partitions (i.e., nets) originates in the hollow of the two forechambers of the cranium close to the two appendages there, which resemble the two nipples of women's breasts."

[58] Heb. ירייעות, רשתות. Besides these two terms for tunics of the eye, quite a number of others were used in the literature of the period:

שבכות, קרומים, קליפות, עורות, מעילות, מעלות.

These are all probably translations of the two Arabic terms, شبكات and طبقات, which, in turn, are derived from the Greek ἡ μῆνιγξ. Cf. Kaufmann, *Die Sinne*, pp. 85 and 86 and *De Gen. Animal.*, V, 2, 781a 20.

[59] The reason for the sudden darkness, according to Aristotle, is that when a person receives a sudden blow on his eyelids, the transparent part of the eye, which is the pupil, is suddenly cut off from its connection with the perceptive faculty (*De Sensu*, 2, 438b 13ff.).

[60] Cf. *De Anima*, II, chs. 7–12.

[61] Heb. טבעיהם. Aristotle specifically states that in this book he will investigate the nature of color (τί χρῶμα). The Hebrew מהות, essence or nature, stands for the underlying Greek τί. טבע is used as a synonym for מהות in this passage (*De Sensu*, 3, 439a 10ff.).

[62] Aristotle defines translucency (τὸ διαφανές) as something that is not characteristic of water or air alone or of any other bodies, but as something that is common to all of them and does not exist apart from them. It merely varies in degree in different bodies (*De Sensu*, 3, 439a 21ff.).

[63] Light changes the translucent medium from a state of potentiality to that of actuality. Indeed, without light, color would not be visible through the medium. Aristotle regards light as something that is neither fire nor a body nor a ray issuing from a body, but something resembling fire, which is present in the translucent medium. Cf. *De Anima*, II, 7, 418b 11ff. Falaquera defines light as the perfection of the translucent body insofar as it is translucent. Light is distinguished from the visual object, which is color. When light is mingled with the potential color, it changes it into actual color. Falaquera further clarifies the nature of light as follows:

"איכות בעצמו לגוף הזך מצד שהוא זך והוא כמו כן איכות מה לנראה בעצמו":

"[Light] is an essential quality of the translucent body insofar as it is translucent and it is likewise a quality of the visible object *per se*." See Falaquera, *Sefer ha-Nefesh*, ch. 7.

[64] Averroes attempts to explain briefly the reason for the different colors. This he does by means of the rainbow (قوس قزح). Aristotle explains the genesis of colors in a different book, where he enumerates three causes for their diversity: (1) light or some luminous body; (2) a translucent medium such as water or air; (3) the colors of the visible body. The various colors are formed on the surface of smooth dark bodies such as clouds. Because of the smooth surfaces of the latter, the sun's rays

are easily imprinted on them in different hues and colors. Cf. *De Coloribus*, 3, 793b 8ff.

[65] The Hebrew version has the words בעל דרכים, literally, "possessing ways", following the term for "rainbow". This is an explanatory note of the translator. Inasmuch as *Lisān al-'Arab* defines قزح, "rainbow", as طرايق والوان, that is, "stripes and hues", the Hebrew here is to be translated "possessing stripes". Different colors are formed in the rainbow when the white light of the sun is reflected in the dim, dark raindrops. Cf. *De Sensu*, 3, 440a 11; *De Coloribus*, 2, 792a 9. The different colors arise according as the surface of the visible object is dark and smooth. Cf. *Meteorologica*, III, 4, 373b 20ff.

[66] I.e., fire, air, water, and earth. Aristotle calls the "elements", τὰ ἁπλᾶ, "the simple [bodies]", and he regards composite things as containing all the elements. This fact he attempts to prove logically. Every composite thing must contain earth, because each element is found in abundance, particularly in the place that is suitable for it. Each composite thing must contain water for two reasons: (1) the element must be found in a finite area, and of all the elements, water is best adapted to defined form and shape; (2) earth will not cling without moisture, which is water. Each composite thing must contain air and fire because they are contraries to earth and water. Since every composite thing is formed through contraries, it necessarily follows that besides earth, which is cold and dry, its contrary, air, which is warm and moist, must likewise be present; and besides water, which is cold and moist, it must contain its contrary, fire, which is warm and dry (*De Gen. et Corr.*, II, 8, 334b 31ff.).

[67] I.e., when it mixes with something else such as light, which is dispersed through the translucent medium.

[68] The pure fire is the sunlight which fuses with the most translucent body which is air, thereby producing the color white (*De Anima*, II, 7, 418b 11ff.).

[69] Aristotle posits three possible conditions for the production of the color black: (1) the visible object is by nature black; (2) light does not reach the eye from the visible object; (3) the visible object will always appear black when there is very little light reflected from it. Cf. *De Coloribus*, 1, 791a 13ff. The impure fire is that which is found above the elements and below the sphere, and in that locus it cannot give light. The mixture of darkness with the earthy element produces the color black.

[70] The intermediate colors vary in accordance with the difference in the degree of light and the quantity of air or water. Cf. Falaquera, *Sefer ha-Nefesh*, ch. 7. Aristotle states that colors are numerous for the reason that the ingredients may be combined with one another in a multitude of ratios; some will be based on determinate numerical ratios, while others will have as their basis, a relation of quantitative excess or defect not expressible in integers (*De Sensu*, 3, 440b 18ff.). Elsewhere Aristotle states that the remaining colors are formed from the mixture (τῇ μίξει) of the two primary colors, white and black. Cf. *De Coloribus*, 1, 791a 11.

[71] Aristotle adduces logical proof for this statement. Anything found in the genus of two contraries and intermediate to them must be composed

of the two contraries. The colors intermediate to black and white are in the same genus as black and white. Hence, they must be composed of the two contraries, black and white. Cf. *Physica*, I, 5, 188b 23ff. and *Metaphysica*, X, 7, 1057a 18ff.

[72] This phrase is borrowed from Aristotle's definition of color. He defines color as the limit of the translucent in a determinate body (ἐν σώματι ὡρισμένῳ). The translucent, which is air or water, is actualized by light, which is indeterminate (ἀόριστον). See *De Sensu*, 3, 439a 26, 27, b10.

[73] The underlying Greek expression is παρ' ἄλληλα τῶν ἐλαχίστων τιθεμένων. These atoms are so minute that they are not visible in themselves, but only when united with each other. See *De Sensu*, 3, 439b 20ff. Aristotle further on refutes the theory of juxtaposition of atoms.

[74] See *De Gen. et Corr.*, I, 10, 328a 5ff. Here Aristotle mentions two views concerning the production of colors, both of which are rejected by him. The first is the aforementioned view that colors arise as a result of the juxtaposition of atoms, each atom being invisible. Thus, when a black atom and a white atom are in juxtaposition to each other, they are not visible, but when they are united with other atoms, they do not appear as black or white atoms, but as different colors. This view is refuted by the fact that an invisible quantity is impossible in the transmission of the visible object to the organ of vision (*De Sensu*, 3, 440a 22). The second view is that one color is placed upon another and illumines through the second color, whence the composite color is derived. This view is rejected because of the fact that, in such a situation, there is no real mixture of the two colors.

[75] See *De Gen. et Corr.*, I, 10, 328a 5ff. Aristotle distinguishes between a mere combination (σύνθεσις) and a perfect intermixture (μίξις). Aristotle's theory is that all of the parts must be completely intermingled (τὸ μιχθὲν ὁμοιομερὲς εἶναι). Cf. Averroes' *Middle Commentary to De Generatione et Corruptione*, English translation by S. Kurland, Mediaeval Academy of America, 1958, pp. 64–66.

[76] See *De Caelo*, I, 6, 289a 15ff. The celestial spheres are not composed of fire, but of a fifth element αἰθήρ, which constitutes the substance of the spheres (*ibid.*, I, 3, 270b 21ff.). The celestial bodies, therefore, do not produce light by means of a medium such as air, since the closest element to the spheres is fire. We must therefore assume that the motion of the spheres ignites the fire, which, in turn, stimulates the air below, and thus light is produced. The celestial bodies, therefore, cannot be regarded as producing light directly. Cf. *Meteorologica*, I, 3, 341a 2, 3. Gersonides explains the difference between fire and the celestial bodies as follows (*op. cit.*, fol. 156r):

ואולם הגרמים השמימיים הם מאירים בעצמותם ולזה ג"כ היו נראים בעצמות בזולת הסתבכות בזולתם, מה שאין כן באש, כי האש הפשוטה בלתי נראית":

"As for the celestial bodies, they illumine through their own essence, and for this reason, they are also visible in themselves, without having to mix with other bodies. This is not true in the case of fire, for the simple element of fire is invisible."

[77] The distinction between cause and existence (παρουσία) is that cause precedes the existence of the thing caused and is apart from it. Light is, therefore, not the cause of color but is its very essence and existence (*De Anima*, II, 7, 418b 11ff. and *De Sensu*, 3, 439a 19).

[78] The color, white, is derived from the mixture of the pure fire, which is light, with the purest element, which is air. It is therefore inferior to light because it is derived from it.

[79] Aristotle states explicitly that colors are finite in species (εἴδη) and are not infinite (οὐκ ἄπειρα). See *De Sensu*, 3, 440b 24. Actually, there is no difference of opinion between Aristotle and Averroes regarding the different species of colors, for, in another passage, Aristotle admits that colors are potentially infinite. Thus, according to him, it is impossible to see in actuality a ten-thousandth part in a grain of millet, although sight has embraced the whole grain within its scope. It is thus divided into an infinite number of parts (*De Sensu*, 4, 445b 27ff.). Matter is the substrate of colors and it is divided into an infinite number of parts, which are visible only potentially, but in actuality (ἐνεργείᾳ) cannot be seen.

[80] Ar. النطق الباطن, Heb. הדבור הפנימי. The term דבור, as used in the philosophical literature, is a homonym with three different meanings: (1) the faculty by which man comprehends concepts, and this faculty is characteristic of man alone; (2) the concept itself which has been comprehended by man, in which case, the term דבור פנימי is used; (3) an oral expression representing an idea imprinted in the soul, in which case it is called النطق الخارج, הדבור החצוני. See Maimonides, *Millot ha-Higgayon*, ch. 14. Here the reference is to an inner spiritual sense such as imagination or cogitation.

[81] See previous note. Nature produces all kinds of mixtures even though the external sense cannot define the quantity of the mixture. Art can produce whatever the external sense can define.

[82] This expression is Aristotelian. Art imitates (μιμεῖται) nature. See *Meteorologica*, IV, 3, 381b 6.

[83] The sense-objects, such as colors and sounds, according to Aristotle, change into actuality whatever impression may have existed thereof in the soul in potentiality. See *De Anima*, III, 7, 431a 4, 5.

[84] Nature is regarded as a principle in the object itself (ἀρχὴ ἐν αὐτῷ). Art is a principle in another object (ἐν ἄλλῳ). Cf. *Metaphysica*, XII, 3, 1070a 7.

[85] This idea is expressed by Aristotle in several different treatises. See *Physica*, II, 2, 194a 21, *Meteorologica*, IV, 3, 381b 6. Thus, animal is prior to man in nature, because, as Maimonides phrases it, if you abolish the genus of animal, the existence of man is untenable; but if you abolish the species of man, the genus of animal is still existent. Hence, animal is prior to man in nature. See *Millot ha-Higgayon*, ch. 12.

[86] See *De Anima*, II, ch. 8.

[87] Aristotle has already dealt with odors and flavors in the *De Anima*, chs. 9 and 10, from the point of view of the media through which one smells or tastes. Here he treats of the qualitative aspects of odor and flavor.

[88] Aristotle maintains that the elements of fire, air, earth and water have no odor because both the dry and the moist have no flavor unless they are mixed with something else. See *De Sensu*, 5, 443a 9, 10.

[89] That which is mixed of the four elements is something that has a mixture of the dry and the moist. When the natural heat functions in the substance, it decocts it and flavor is produced. Cf. Falaquera, *Sefer ha-Nefesh*, ch. 10.

[90] I.e., cold, heat, moisture and dryness. The qualities are found to be combined in pairs: hot and dry, hot and moist, cold and dry, cold and moist. In each body there will be a predominance of one pair of qualities (cf. *De Gen. et Corr.*, II, 3, 330a 30ff.).

[91] See *De Anima*, II, 9, 422a 6 and compare *Magen Abot*, III, 50b:

"ולפי שאין חוש הטעם אלא באמצעות הלחות, ביבש כחום אין לו טעם":

"Inasmuch as there can be no sense of taste without the medium of moisture, in the dry as in the hot, there is no taste."

[92] This is Aristotle's theory of potentiality and actuality as applied to taste and flavor. Just as in the case of vision, the air is potentially translucent until it is actualized by light, so here in the case of the dry object of taste, it remains a potential flavor until it is moistened and actualized. Cf. *De Anima*, II, 10, 422a 17ff. and Falaquera, *Sefer ha-Nefesh*, ch. 10.

[93] The natural heat of the tongue decocts and dissolves the mixture of the dry and the moist and thus flavor is produced (*De Sensu*, 4, 441b 19ff.). Alexander describes the process in greater detail in enumerating its two causes: (1) the dryness of the element of earth; (2) the differences in the decocted humors that are generated as a result of the mixture with the earthy dryness. These two causes account for the production of the numerous flavors. See Alexander Aphrodisias, *In De Sensu Commentarium*, 4, 444b 9.

[94] I.e., according to the difference in moisture and heat. With regard to sweet flavor, Aristotle states that heat causes decoction (ἡ πέψις), and decoction produces sweetness (γλυκέα). Cf. *De Gen. Animal.*, V, 6, 786a 17.

[95] Sweetness and bitterness have one thing in common and that is that they are both produced by heat. Just as sweetness is produced by the mixture of the hot and the moist, so bitterness is produced by the mixture of the hot and the dry. Gersonides further clarifies the distinction between the bitter and the sweet on the basis of their material composition (Gersonides, *op. cit.*, fol. 158v). Bitterness is inferior in moisture to sweetness, although the bitter likewise has some moisture in it, for it is clear that taste, whether sweet or bitter, must be relative to heat and moisture. Furthermore, it is impossible for anything that is dry to be absolutely dry, for absolute dryness will only be found in the simple elements. When that which is composite is dry, its dryness will be inferior to the absolute dryness of the simple elements, for the fact that a thing is composite implies that it has already undergone a degree of mixture with the moist elements in its composition. Moreover, it has been explained above that every gustable thing has some dryness in it and that taste is the result of the mixture of the dry part with the moist, after they have been slightly decocted by the heat.

[96] Cf. *De Sensu*, 4, 442a 12, 13. Further on, Aristotle states that the flavors that cause pleasure and satisfaction are those whose parts are determinate and definite. See *De Sensu*, 4, 442a 16.

[97] Aristotle defines odor as the property of the dry, gustable object that is mixed with moisture (ἡ ἐν ὑγρῷ τοῦ ἐγχύμου ξηροῦ). See *De Sensu*, 5, 443a 7. We must be careful not to conclude from this statement of Averroes that the quality of odor is the same as the quality of flavor, because we know from experience that not everything that has a sweet odor has a sweet flavor. Averroes simply means that odor and flavor are generated in the same manner, i.e., by the mixture of the dry and the moist. Cf. Alexander, *In De Anima Commentarium*, p. 51, 15.

[98] ἡ καπνώδης ἀναθυμίασις. Aristotle rejects the view that odor is a smoke-like vapor that issues from the nostrils, just as he rejects the efflux theory of vision. Cf. *De Sensu*, 5, 443b 1, 2. Averroes, following Aristotle, declares that the smoke-like fumes are transmitted by the air to the nostrils, where they are perceived by the sense. Cf. *Sha'ar ha-Shamayim*, IX, 55; and *Shebile Emunah*, IV, 1, 30b. The air is the substrate of the smoke-like fumes because these fumes are composed of air and earth, and odors are sensed through the medium of air.

[99] Aristotle mentions the four elements as an illustration. None of the elements *per se* has odor, but when it is mixed with some other substance which warms or moistens the dry part, it acquires an odor. Cf. *De Sensu*, 5, 443a 10ff. Thus, when an object is brought close to fire (heat), it acquires an odor. See *De Sensu*, 5, 443b 17. Aristotle, in this passage, calls heat the actualizing creator (δεμιουργοῦν) of odors.

[100] Cf. *De Anima*, II, 9, 421b 27.

[101] Cf. *ibid.*, 421a 10ff. Themistius cites the dog and vulture as having a keener sense of smell than man. Cf. Themistius, *In De Anima Paraphrasis*, p. 67, 1, 13.

[102] See *De Anima*, II, chs. 7–12.

[103] See *ibid.*, III, 4, 429a 27, in which passage Aristotle probably reflects Plato's conception of the soul as the locus of the forms (τόπος εἰδῶν).

[104] Cf. *Timaeus*, 45bff.

[105] This opinion is that of the school of Democritus and Empedocles. Cf. Zeller, *Die Philosophie der Griechen*, I, 2^5, pp. 911, 912; *De Anima*, I, 2, 404a 5ff., and I, 3, 406b 1ff. In the latter passage, Aristotle mentions the fact that Democritus regarded the soul as composed of circular atoms.

[106] Aristotle states that all of the ancient philosophers who defined the soul as a sentient and intelligent faculty, excepting Anaxagoras, assumed that it was composed of one or more elements, because the philosophers maintained that one thing could perceive and cognize another thing similar to it. See *De Anima*, I, 2, 405b 12ff.

[107] According to Aldabi (*Shebile Emunah*, IV, 1, 29b), Plato was inclined toward the third theory with regard to the visual processes, i.e., the efflux theory:

"ונחלקו חכמי המחקר אם כח הראות יוצא לחוץ ויפגע במוחש או אם צורת המוחש נרשמת ונחקקת באויר הסמוך לו, והסמוך בסמוך עד הגיעו אל העין, כי אפאלטון וגאלינוס סוברים כי ביצוע הרוח הרואה יוצא לחוץ ומתפשט שם אל המוחש":

"Authorities on this science are divided as to the question whether the

visual faculty extends outwardly until it meets the sense-object, or whether the form of the sense-object is imprinted and engraved in the adjacent air and thence to the air adjacent to the latter etc., until it reaches the eye; for Plato and Galen are of the view that the ray of the visual pneuma extends externally until it reaches the sense-object." It is not surprising that there should be such a difference of opinion between Averroes and Aldabi regarding Plato's view, for in Plato (*Timaeus*, 45c), the subject is indeed far from clear. Vision is presented by him as being effected by rays that issue from the eye and also by rays that issue from the visible object. Earlier philosophers, such as Democritus and Empedocles, likewise held the view that vision was effected by rays issuing from the eye. See *De Sensu*, 2, 437b 24; and Zeller, *op. cit.*, pp. 913, 914.

[108] The fourth theory is Aristotle's (cf. *De Anima*, II, 7, 419a 27ff.; II, 12, 424a 17ff.). In this passage, Aristotle states explicitly that the soul acquires the forms apart from matter (*ἄνευ τῆς ὕλης*), and that it requires a medium. Cf. *De Sensu*, 2, 438b 5, and compare *Sha'ar ha-Shamayim*, IX, 50b.

[109] Aristotle calls the organ that dominates all of the sense-faculties and whose origin is in the heart *κοινὸν αἰσθητήριον*. Cf. *De Juven. et Senec.*, 4, 469b 11, 12. Avicenna defines this faculty (*al-Najāt*, p. 45) as follows: "The common sense, which is the faculty that is located (literally, arranged) in the hollow forepart of the brain, receives in its essence all of the forms imprinted in the five senses and conveyed to it." Falaquera, in *Sefer ha-Nefesh*, ch. 12, reflecting the views of Aristotle, states:

"בו כח, התקבצו בו השגת החושים הארבעה והיו כולם אצלו צורה אחת, ולולא הוא לא השגנו המתיקות ולא נשיג המרירות, כי המבדיל שני דברים הוא היודע אותם יחדו, וזה הכח הוא הנקרא החוש המשתתף והמצייר":

"We possess a faculty which combines the perceptions of the four senses. In this faculty, the perceptions will assume one form, for, were it not for this faculty, we could not tell sweetness from bitterness, because the faculty that discriminates between two things is the faculty that has cognition of both of them together. This faculty is called the common sense or the *informans*." Cf. *De Anima*, III, 2, 426b 8ff. Falaquera further explains that this faculty is single in one respect and multiple in another. It is multiple insofar as it perceives color with the eye, sound with the ear, flavor with the tongue and touch with the flesh. It perceives them with its own essence and passes judgment upon them. In this respect, it is similar to the center of a circle, which is single insofar as it is an indivisible point (*ἀδιαίρετος*) and it is multiple insofar as it is the end of numerous radii that extend to the circumference of the circle. See Falaquera, *Sefer ha-Nefesh* chs. 12 and 18; and compare Themistius, *In De Anima Paraphrasis*, p. 86, 20–22.

[110] The second argument is interestingly illustrated by concrete examples in *Sha'ar ha-Shamayim*, IX, 51a and the obvious conclusion is drawn:

"אם תהיה צורת המוחשת נרשמת באויר והבוא אל העין, איך יתכן שתכנס צורה גדולה מהר גבוה וגדל גבוה אל העין שהוא קטן בשעור, אם כן זאת ראיה שהרוח יצא לחוץ ומתפשט על כל המוחש תאם, ועל כן יוכלו לראות כלו ביחד בזמן אחד":

"If the form of the sense-object is imprinted upon the air and reaches the eye, how will it be possible for a large form of a high mountain or tall tower to penetrate into the eye, which is small in size? Consequently, this is a proof that the pneuma reaches outward and extends instantly to the entire sense-object, and therefore the entire sense-object can be seen at one time."

[111] I.e., those who follow the doctrine of Empedocles, Plato and Galen. See above, note 107.

[112] Aristotle is likewise of the opinion that vision is effected by means of a cone-shaped figure (*ἡ τῶν ὄψεων ἔκπτωσις κώνός ἐστι*). See *Problemata*, XV, 6, 911b 5; but he rejects the view that sight occurs by means of rays emanating from the eye. Visible objects are perceived by the eye only through a medium. See the following note.

[113] See *De Anima*, II, 7, 418b 2, 6, 9. The medium is the translucent air or water. Aristotle adduces the incontrovertible argument for the existence of a medium, namely, that if a colored object is placed upon the eye, it will be impossible to see it. See *De Anima*, II, 7, 419a 12ff. Aristotle defines the translucent as an object that is visible not *per se*, but through the color of another object (*ἀλλότριον*). This coincides with his view that the media of air or water receive light and color. In addition to air and water, Aristotle regards a few solid objects (*τῶν στερεῶν*) as translucent. See *ibid.*, II, 7, 418b 4–7. Themistius distinguishes between color and the visible object, for, although both have the same substrate, they are different in definition. The visible object is always referred to in connection with vision. If vision is lacking, the visual object will be present only potentially, but not in actuality. Color, on the other hand, can be present even if it cannot be seen. Cf. Themistius, *In De Anima Paraphrasis*, 59, 1–5.

[114] This is the view of Plato and Galen. Gershon ben Solomon quotes the proofs given by the school of Plato and Galen (*Sha'ar ha-Shamayim*, IX, 50b, 51a):

"הם סוברים כי ניצוץ הרוח הרואה יוצא לחוץ ומתפשט שם אל המוחש. והביאו ראיה לדבריהם ואמרו כי נמצאו אנשים מביטים מרחוק יותר מזולתם, והסבה בזה הוא מפני ניצוץ רוח הרואה שהוא חזק במקצתם, ולכן יתפשט ויוצא בחוזק למרחוק כמו שהולך החץ שיורה המורה בקשת חזקה למרחוק":

"They believe that the ray of the pneuma emanates outwardly and thence extends to the sense-object. They offer proof for their theory in the fact that some people can see at greater distances than others and that this is due to the visual pneuma, which is powerful in some people; and it therefore emanates and extends with force into the distance, as in the case where the arrow will go farther when shot by an archer with a more powerful bow." Cf. *Shebile Emunah*, IV, 1, 29b.

[115] See *De Part. Animal.*, II, 13, 658a 9; III, 1, 661b 24; and compare *De Caelo*, I, 4, 271a 33.

[116] *Sha'ar ha-Shamayim* cites the example of the form of a high mountain or tall tower that can be perceived by the eye (see above, note 110). The eye is compared to a mirror in which one can behold a form a thousand times larger than the mirror, which has no sense of sight; but because it

is a clear, translucent object, it is capable of receiving a large figure. This being true of a mirror, how much more so is it true of the eye, which is a very clear and translucent organ and is endowed with the faculty of sight! See *op. cit.*, IX, 51b.

[117] Aristotle mentions wax as a good illustration. When a gold or iron seal is impressed upon wax, the impression remains without a bit of the gold or iron matter clinging to the wax. In the same manner, the sense receives the forms of its objects apart from (*ἄνευ*) matter. Cf. *De Anima*, II, 12, 424a 17ff. Themistius, in his commentary, further clarifies the subject by stating that the senses do not serve as substrate or matter for their objects in the same manner as an object is cut by a knife or burned by fire; for the sense does not turn white or black when it beholds a white or black object. The sense merely receives the form (*τὸ εἶδος*) of the object and its definition (*τὸν λόγον*). See *Themistius, In De Anima Paraphrasis*, 78, 1–10.

[118] *τὰ νοήματα*. These are cognitions which the soul stores up within and man can recall them at will, but the perception of sense-objects is impossible without the presence of the external sense-object (*τὸ αἰσθητόν*), which is a particular (*τὸ καθ' ἕκαστον*). Cf. Themistius, *op. cit.*, 56, 17ff.; *Physica*, I, 5, 189a 4ff.; *De Anima*, II, 5, 417b 22ff.

[119] This is explained by the fact that concepts that are stored in the soul, though based upon matter and sense-objects, have been completely separated from matter, so that they are purely spiritual. The contrary is true of sense-objects, the substrate of which is the matter of the object perceived outside of the soul. See Themistius, *op. cit.*, 56, 22. According to Avicenna, concepts are acquired by man in two ways: "one of them is through divine inspiration without discipline, and it is not acquired through the senses like the primary notions, namely, our knowing that the whole is greater than the part or that two contraries cannot be present in the same body at the same time; the second is acquired through syllogistic and logical reasoning as our forming of logical truths. See Landauer, *Die Psychologie des Ibn Sina*, p. 361. In other words, the intellect cognizes abstract, intelligible forms without any medium or organ, in a purely spiritual manner.

[120] Those who hold this view are the followers of Empedocles and Plato. See *De Sensu*, 2, 437b 11ff., and above, note 107.

[121] If the eye can see by means of light and it issues rays of light from within the organ, it should be able to cast its rays upon the sense-object even in the dark. See *De Sensu*, 2, 437b 11–14, and also Alexander, *In De Sensu Commentarium*, 20, 21–23.

[122] See *De Sensu*, 2, 437b 15.

[123] According to Alrazi, there are seven coats in the eye and three humors. The coats or tunics are as follows:

הרשתי השליא, הקשתי יריעת העששיתי הענביתי הקרנית והחוברת;

and the three humors are:

הזכוכיתי הספיריתי וריר חלמוני

Cf. Alrazi, *Liber ad Almansorem* (Venice 1497) Bk. I, ch. 8, and Kaufmann, *Die Sinne*, p. 87 n. 15.

[124] This of course is contrary to fact. *Sha'ar ha-Shamayim* (IX, 51b)

suggests that the differences in acuity of vision may be due to the power or weakness of the visual pneuma; for it is a well known fact that the further removed the forms imprinted in the air are, the weaker and more extended they will be, but if the visual pneuma is powerful and clear, it will be able to receive the weak and extended form that reaches the surface of the eye. If the contrary is true, it may not be able to see even a close form. Cf. *Shebile Emunah*, IV, 1, 29b.

[125] Cf. *Physica*, IV, 12, 221a 1ff.

[126] See *ibid.*, VI, 4, 235a 11ff. This is the doctrine held by the followers of Empedocles, for they claimed that light extends over the hemisphere, but its motion is not perceptible to us. Aristotle rejects this theory on the following grounds. If the distance between the eye and the visible object were short, perhaps the motion of light would be imperceptible to us, but when the distance is from one end of the sphere to the other, as in the motion of the sun, which is so large a body, it is impossible for its motion to remain imperceptible to us. See *De Anima*, II, 7, 418b 20ff.; also Themistius, *In De Anima Paraphrasis*, 60, 31ff.

[127] *ἡ σύμφυτος θερμότης*. Each animal possesses this natural vital heat, which is the substrate of the soul and the source of life and has its origin in the heart. When the heat is gone, the animal cannot live. See *De Juven. et Senec.*, 4, 469b 6ff.; *De Anima*, II, 4, 416b 29.

[128] Heb. נפרד (separate) would indicate an Arabic reading لتبدرت. The uniform reading of the Arabic MSS لتبردت (it would cool off), is adopted here for its better sense.

[129] The underlying Greek terms for فعل and انفعال are *ποιεῖν* (action) and *πάσχειν* (passion). These processes can occur through contact (*ἅψασθαι ἀλλήλων*). See *De Gen. et Corr.*, I, 6, 322b 22ff.

[130] This is the very argument Aristotle employs against the efflux theory of vision held by Plato and Empedocles. If vision is realized through rays issuing from the eye, one should be able to see even in the dark. As a matter of fact, Plato anticipates this problem by saying that the eye cannot see in the dark, because the light is extinguished when it strikes something different from it, which is the darkness. Cf. *De Sensu*, 2, 437b 10ff.; Alexander, *In De Sensu Commentarium*, 20, 15ff.; and compare *Timaeus*, 45D. Aristotle answers the argument advanced in the *Timaeus* 45D as follows: "it is idle to say that the visual ray coming forth in the darkness is quenched. What is Plato's meaning of the term 'quenching' of light? That which is hot and dry like a fire of coals or a flame can be quenched by the moist or cold, but heat and dryness are evidently not attributes of light; or if they are attributes of it but belong to it in a degree so slight as to be imperceptible to us, we should have expected that in the daytime the sunlight should be quenched when rain falls, and that darkness should prevail in frosty weather, but experience shows that nothing of this sort happens to the sunlight" (*De Sensu*, 2, 437b 15ff.).

[131] See Galen, *De Puisuum Usu*, 2 (Opera, V, 154); *De Placitis Hippocratis et Platonis*, III, 8 (V, 356), VII, 4 (V, 611).

[132] Viz., the senses of sight, hearing and smell.

[133] There are three humors in the eye. The external humor, which is

like porcelain, is clear and white. The middle humor is the crystalline and the third is the vitreous humour. The tunic adjacent to the vitreous humor is called the retina, because it resembles a net into which are woven the muscles and the blood vessels. This tunic performs the function of conveying the visual pneuma to the crystalline lens. Cf. *Sha'ar ha-Shamayim*, IX, 53b 54a.

[134] This statement would lead one to believe that the common sense is located somewhere behind the eye, but Aristotle explicitly states that the organ of the common sense is the heart (see *De Somno*, 2, 456a 5; *De Juven. et Senec.*, 3, 469a 12ff.). According to Averroes' exposition, one can conjecture that the movements (*κινήσεις*) from external objects are conveyed to the retina and from there through the channels containing the pneuma, they are conveyed to the heart. Aristotle is not explicit as to how these stimulations reach the heart (cf. Zeller, *Die Philosophie der Griechen*, 2, 2[3], pp. 542–545). Alexander, however, supplies the details that are missing in Aristotle. He states that there are three channels (*πόροι*) that extend from the heart to the brain and from the brain to the organ of vision (see Alexander, *In De Sensu Commentarium*, 41, 5). Avicenna is quite specific as to the location of the common sense and the imaginative faculty:

وأما سلطان المتصورة ففي التجويف المقدم من الدماغ:»

"The faculty of imagination [and common sense] is dominant in the hollow forepart of the brain" (Avicenna, *Kanon*, 35). Similarly, Gersbon ben Solomon says that the cranium contains three chambers. In the forechamber one perceives the form of the sense-object and forms an image thereof and apprehends its nature, this being a function of the common sense. See *Sha'ar ha-Shamayim*, IX, 49b.

[135] Falaquera calls this coat or tunic the hail-like, gelid layer, because it resembles ice (see *Sefer-ha-Nefesh*, ch. 12). Ibn Tibbon renders it by the term קורית, because the Arabic برد can also mean "cold". Compare Galen, *De Usu Partium Corporis Humani*, X, 1. Gersonides describes the crystalline coat as follows (*op. cit.*, fol. 163v):

ורצה בזה הרשת הדקיקה הנקראת הענבית, והיא התבדלה בין הלחות הביציית אשר מחוץ והלחות הקפרית אשר יהיה בה הראותי, והיא הלחות הנקפא באמצע העין:"

"By this coat he means the fine tunic that is called הענבית (lit. grape-like), which divides between the external aqueous humor and the vitreous humor, through which vision is effected, the latter humor being the gelid humor in the middle of the eye." Compare Gersonides' description of the tunics of the eye with that of Alrazi's above, note 123.

[136] It seems that Galen recognized the importance of this humor (*κρυσταλλοειδὲς ὑγρόν*), for he designates it as the primary and most important organ of vision. See Galen, *op. cit.*, VIII, 5. Aldabi is of the opinion that Aristotle called this humor הרטיבות הברדית, the cold humor. This humor is located behind the crystalline lens, because nature has provided this humor, i.e., the vitreous humor, to receive the blood from the body, since all members of the body are nourished by the blood, so as to transform it into its own substance and then to convey it in a pure state

so as to augment the translucency of the humor. See *Shebile Emunah*, IV, 1, 29b and Kaufmann, *Die Sinne*, pp. 94–98.

[137] The innermost curtain of the eye is usually called the retina (شبكة, רשת). *Sha'ar ha-Shamayim* (IX, 54) states that this curtain performs the function of transmitting the visual pneuma to the crystalline lens because it is closest to it. This curtain likewise performs the function of conveying the blood from the body to the vitreous humor.

[138] Avicenna calls the faculty that distinguishes between sweetness and blackness the common sense (الحس المشترك) and the *informans* (المصورة). Here, however, Averroes makes no distinction between the *informans* and the imaginative faculty (المتخيلة). According to Avicenna, the common sense or *informans* is capable of apprehending only true forms that are acquired by the external senses, but the imaginative faculty can form false images too, because these images have not been conveyed properly by the senses. See Landauer, *Die Psychologie des Ibn Sina*, p. 359. In his *al-Najāt*, Avicenna does not differentiate between the *informans* and the imaginative faculty, which are apparently the same to him. Averroes is probably following this passage of Avicenna in citing both names for the same faculty. See *al-Najāt*, 45. The *informans* (المصورة) is mentioned not only by Averroes and Avicenna but also by their predecessor, Alfarabi. According to Alfarabi, this faculty is located in the forepart of the cranium and has as its function the preservation of the forms of sense-objects after they disappear from the senses. See Alfarabi, *Risalat Fuṣuṣ al-Hikm*, 73, 74.

[139] In Aristotle's writings, the قوة المتخيلة, is called *φαντασία* (*De Anima*, III, 3, 427b 14). This faculty is midway between sense and cogitation. Aristotle's view is that it is impossible to cogitate without the formation of an image (*De Memoria*, 1, 449b 31). The imagination is described as a kind of movement stimulated by the activity of the senses (*De Anima*, III, 3, 429a 1). Avicenna likewise calls this faculty القوة المتخيلة (see Landauer, *op. cit.*, p. 360). The same name is mentioned in the *Cuzari*, but Ibn Tibbon translated it there as כח יצרי (*Cuzari*, V, 12). Compare *Moreh Nebuhim*, II, 33. For a comprehensive discussion on the imaginative faculty and its place among the internal senses, see H. A. Wolfson, "The Internal Senses in Latin, Arabic and Hebrew Philosophic Texts", *Harvard Theological Review*, 28 (1935) 69–133.

[140] In this passage, a clear distinction is drawn between sense and imagination. As a matter of fact, Aristotle enumerates five distinctions between sense and imagination: (1) sense is either a faculty or an activity, e.g., sight or seeing, imagination takes place in the absence of both, as in dreams; (2) sense is always present, imagination is not; (3) sensations are always true, imaginations are for the most part false; (4) when sense functions precisely with regard to its object, we do not say, for example, that we imagine this object to be a man, but only when there is some failure of accuracy in the exercise of sense; (5) imagination is not one of the things that are never in error, such as knowledge or intelligence, for imagination may be false (see *De Anima*, III, 3, 427a 5ff.). *Shebile Emunah* enumerates the distinction as follows: (1)

והפרש שבין כח המרגשה וכח הדמיון, כי המרגשת תרגיש המורגש בעודנו מצוי עמה, אבל לאחר שנעלם, אינה משיגתו, וכח הדמיון בהפך זה, כי הוא אינו משיג הדבר אלא לאחר שנעלם מן העין":

"The difference between the sentient faculty and the imagination is that the sentient faculty perceives the sense-object while it is still present, but as soon as the object disappears, it cannot perceive it. The opposite is true of the imaginative faculty. It cannot apprehend the object until it is out of sight." Similarly, Albertus Magnus, quoting Avicenna and Algazali, says that the imaginative faculty forms the image of the sense-object after the sense-object is gone. Cf. Albertus Magnus, *In De Anima*, III, 1.

141 The different humors of the eye listed here are to be found in Avicenna's *Kanon*, which served as the source for the later Arabic and Hebrew philosophic texts. The Arabic and Hebrew names of the humors are as follows:

الجليدية : הכפורית, הקורית, הברדית ; الزجاجية : הזכוכית ; البيضية : הביצית, הלבנית.

See Avicenna, *Kanon*, 333.

142 This passage of Averroes would seem to indicate that odor is derived from the smoke-like vapor that arises from the object of smell and thence it is breathed into the nostrils by means of air or water. This view would contradict the passage in the *De Sensu*, in which Aristotle states that odor is neither a smoke-like vapor (*καπνώδης ἀναθυμίασις*) nor an aqueous vapor, for when aqueous vapor thickens, it changes to water, and inasmuch as water has no flavor, it necessarily has no odor. The smoke-like vapor cannot be generated in water at all. Indeed, many ancient natural philosophers held this view with regard to the formation of odor, but Aristotle rejects this view just as he rejects the efflux theory of vision, for they are both based on the same fallacy (*De Sensu*, 5, 443a 20ff.). This passage of Averroes must therefore not be interpreted as meaning that odor is a smoke-like vapor, but rather that odor is derived from heat or fire, which is the smoke-like substance. By this token, Falaquera states (*Sefer ha-Nefesh*, ch. 9) that odor belongs to the genus of smoke-like vapors and it is therefore transmitted by air. In fact, water and air are adapted to receiving the smoke-like odorous part. The animal perceives the odor when he breathes the air into his nostrils. Gershon ben Solomon describes odor as a smoke-like vapor which is dissolved from the odorous body and mingles with the air, and thence it is conveyed to the nostrils through which it reaches the cranium. The imaginative faculty then apprehends it, distinguishes it and grasps its nature. See *Sha'ar ha-Shamayim*, IX, 55b; and compare *Shebile Emunah*, IV, 1, 30b.

143 The composition of odor can be analyzed in its constituent parts—every element is made up of primary qualities: earth of cold and dryness, water of cold and moisture; air of moisture and heat; and fire of dryness and heat. Cf. *De Gen. et Corr.*, II, 3, 330b 4ff. Since all the elements have certain qualities in common, the vapors arising from the different elements will easily blend. The same is true of the object of smell. The dry substance, earth, mixes with the moist substance, water, to produce flavor, for they have the quality of cold in common. Odor can be generated only by means of air or water, which have the common property of moisture. The other substance necessary for the generation of odor is heat, which is

common to air and fire. From the foregoing it is therefore clear that odor is derived from a mixture of the elements. See *De Gen. et Corr.*, II, 4, 331a 25ff.

144 See *De Anima*, II, 8.

145 The differences in sense-objects are the causes and forms of the objects. Man, endowed with intelligence (*νοῦς*, عقل), is capable of comprehending the forms of objects, the comprehension of which is a function of the intellect (see *De Anima*, III, 4, 429a 15ff.). Other animals are only capable of perceiving sense-objects by means of the five senses, but they lack the capacity to comprehend concepts.

146 Aristotle adds that odors are evidence of pleasant flavors so long as the animal has an appetite. They are therefore pleasant only accidentally (*κατὰ συμβεβηκός*). See *De Sensu*, 5, 443b 20ff.

147 Cf. *ibid.*, 5, 444a 13, 14. The material cause for this phenomenon is the fact that the cranium is naturally cold and that the blood in the vessels of the cranium is fine and clear and readily cools. Consequently, odors, which are warm and dry, are provided to warm the parts of the head during illness. See Alexander, *In De Sensu Commentarium*, 98, 12ff.

148 In this connection, Aristotle states that speech (*λόγος*), which is an intellectual process, is the cause of learning (*μάθησις*), for speech occurs through hearing, not essentially (*καθ' αὐτόν*), but accidentally. This is due to the fact that speech is composed of words and each word is the symbol of some concept. See *De Sensu*, 1, 437a 12ff. and also Alexander, *op. cit.*, 13, 8.

149 See *De Sensu*, 1, 437a 11ff.

150 Man is not endowed by nature with a knowledge of the primary notions and concepts. The knowledge of concepts is acquired through the sense-objects he perceives in the following manner. The impressions of the sense-objects remain in his soul or memory, and out of these memories, an experience is formed. This experience constitutes the concept. Thus, a person may see many individual human beings in the course of time. From this experience he compares one human being to another and comprehends their similarity. He then forms the concept of man (*Analytica Posteriora*, II, 19).

151 Aristotle himself distinguishes between those who lack the sense of sight and those who lack the sense of hearing. Those who are congenitally blind usually have a sharper sense of hearing, while those who lack the sense of hearing also lack the faculty of speech and therefore cannot readily learn, for learning is achieved through words and speech, which, in turn, depend on hearing. See *De Sensu*, 1, 437a 15ff.

NOTES TO BOOK TWO

Chapter One

[1] The term used is רשם, ר"ש. On the origin of the distinction between "description" and "definition" (גדר, ح د) in Arabic philosophy, see Wolfson, "Avicenna, Algazali, and Averroes on Divine Attributes", *Homenaje a Millás-Vallicrosa*, Vol. II (1956), pp. 545–571, especially pp. 556–560 and pp. 567–571 (where Averroes' view on that distinction is discussed).

[2] Here Averroes lists all the topics and questions that will be dealt with in his treatise. In Aristotle's writings, however, only three topics are mentioned and these are arranged differently: the nature of memory, the cause of its occurrence, and the part of the soul in which it occurs. Cf. *De Memoria*, 1, 449b 4–6.

[3] Aristotle uses the term τοῦ παρόντος, for things that are apprehended in the present. It is impossible to use the term "remember" in connection with those things of which we become aware only in the present, such as we do in the case of the sense-objects we perceive. Aristotle uses the term τὸ μέλλον for those things that occur in the future. These are objects of opinion (δοξαστά) or things that are objects of expectation (ἐλπιστά). Memory, however, can be used only in connection with those things that were known to us or perceived by us in the past (τοῦ γενομένου). Cf. *De Memoria*, 1, 449b 10–15.

[4] Memory (μνήμη) is the recall of what was heard, perceived or thought in the past (*De Memoria*, 2, 449b 26ff.). Recollection (ἀνάμνησις) is a psychic stimulation that is the result of some movement or impression that we are trying to recall (see *De Memoria*, 2, 451b 19). Aristotle does not seem to be precise in his use of the two terms and at times uses them interchangeably (cf. Freudenthal, "Zur Kritik und Exegese von Aristoteles' Parva Naturalia", *Rheinisches Museum für Philologie*, 24 [1869], 402, 403). Furthermore, Aristotle regards recollection as a process that is not completely voluntary. Some people make an effort to recollect but do not succeed. This is particularly true of melancholic people whose imaginations are easily aroused. In order to be able to recollect, man must employ the cogitative faculty (διάνοια, δόξα) because the process of recollecting is similar to syllogistic reasoning. One begins with a primary proposition, which, in this case, is the impression or experience now present, and through a process of deduction one arrives at the conclusion, which, in this case, is the thing we are trying to recall. These movements or stimulations are activities of the intellect (τὸ βουλεύεσθαι νοῦ). Consequently, recollection occurs in man alone and not in any other animal. See Themistius, *In Parva Naturalia Commentarium*, 15, 1–9.

[5] In addition to these, Aristotle mentions the ant and the bee as lacking in imagination (*De Anima*, III, 3, 428a 10, 11). Gersonides illustrates in his supercommentary (*op. cit.*, fol. 165v) how those animals that do possess

imagination make use of their memories. Animals usually move towards that which is beneficial for them and avoid that which is harmful. Thus, when an animal, who has in the past perceived that the wolf was harmful, now perceives a second wolf, he will avoid the second wolf, for he will recall the notion of harm that is associated with the impression of the wolf that he has in the imagination. This combining of the object of the image with the image itself is the function of memory. In the same manner, animals will love those who have been kind to them and will approach them. Cf. below, note 15 for Avicenna's illustration.

[6] This distinction between recall and retention is not to be found in Aristotle's writings. Averroes does not aim to set up a new faculty but to distinguish between two different phases of the same faculty as he indicates further on (see below, note 8).

[7] I.e., uninterrupted. As long as the copy or impression of the image is retained in the imagination, it is called memory *in actu* (see *De Memoria*, 1, 450a 12 and compare Falaquera, *Sefer ha-Nefesh*, ch. 16).

[8] The subject (τὸ ὑποκείμενον) of memory is the same because the image is the same whether it be retained or recalled, but it has two different aspects (κατὰ τρόπον), because memory has two activities: the retention of images and the recall of forgotten images. Where the comprehension is continuous, it is called retention, where it is interrupted, it is called memory.

[9] In this passage, Averroes defines memory and recollection somewhat differently from the definition given previously. In the former definition, he states that man can remember what was previously perceived at some time in the past, but here he states that memory is the knowledge of a thing previously known, after the knowledge thereof has been discontinued. Actually there is no marked difference between these two definitions. The former applies to a sense-object which was recalled and the latter to a concept that was recalled. Indeed, in the Aristotelian text, we find that memory is applied to both sense-objects and to ideas or concepts. See *De Memoria*, 1, 449b 20.

[10] This definition of recollection is taken almost verbatim from Aristotle. He states that recollection is the search (ζήτησις) for an image in a corporeal substratum and the application of thought (ἐπέχειν τὴν διάνοιαν) in presenting it. See *De Memoria*, 2, 453a 15–17.

[11] Aristotle explains why memory cannot be considered as a function of sensation. The perception of objects takes place in the present, while memory can be employed only in connection with objects perceived or known in the past (*De Memoria*, 1, 449b 25ff.). The difference between memory and imagination, however, is not so clear or precise in Aristotle's writings. In one passage, Aristotle associates imagination with memory even with reference to the memory of ideas and concepts (*De Memoria*, 1, 450a 14). This distinction is clearly drawn, however, by Alfarabi: "There is a faculty called the retentive, which stores up what the estimative faculty apprehends, just as the imaginative faculty stores up what the sense perceives." See Alfarabi, *Risalat Fuṣuṣ al-Ḥikm*, 74. This distinction which Averroes makes between memory and imagination is likewise to be found in Avicenna: "It is clear that this faculty (i.e.,

memory) is not the same as imagination, because the latter forms images without having the estimative faculty verify them or arrange them insofar as they are based on sensation (Landauer, *Die Psychologie des Ibn Sina*, p. 360). In other words, the difference between the two faculties is that in the formation of an image, judgment is not employed, while in the functioning of memory, judgment is employed. Compare *Sha'ar ha-Shamayim*, IX, 49b, in which passage, Averroes' views concerning imagination, memory, recollection and cogitation are quoted.

[12] المعانى الجزئية الشخصية. These are the ideas or concepts that have their bases in external sense-objects. Thus, the lamb sees the wolf by means of its organ of sight. It perceives its size by means of the common sense. It stores away the image of the wolf in the imagination. It apprehends the idea that the wolf is its enemy by means of the estimative faculty (Wahm), and this idea is stored away in the memory. The foregoing illustration is frequently repeated in the philosophical literature. See Sprenger, *Abdu-r-Razzaq's Dictionary of the Technical Terms of the Sufies*, Calcutta, 1845, sub voc. الحافظة.

[13] Only the intellect is capable of comprehending universal concepts such as quantity. Memory, which is based upon sense-objects and particulars, cannot comprehend the universal. Aristotle states in this connection that the sense *in actu* deals with particular things (*τὸ καθ' ἕκαστον*), while knowledge deals with universals (*τὸ καθόλου*). See *De Anima*, II, 5, 417b 22 and also *Physica*, I, 5, 189a 7. A determinate quantity, however, can be comprehended by memory, for the common sense apprehends the quantity of the object and the imaginative faculty forms an image of it and stores it away in the memory. See *De Memoria*, 1, 450a 11 and also G. R. T. Ross, *De Memoria*, 1, notes to 449b 30 and 450a 11.

[14] Aristotle denies that memory is either sensation or imagination (*οὔτε αἴσθησις οὔτε ὑπόληψις*). He affirms that memory is a result or affection based upon a sense-object or an image, after a lapse of time. Consequently, Aristotle believes that sense and imagination are associated with the activity of memory. See *De Memoria*, I, 449b 24, 25.

[15] The term معنى is here used as the object of the activity. Thus, the object of memory is the thing remembered and the object of the imagination is the thing imagined. Avicenna illustrates the activity of memory as follows: the lamb has in his imagination the image of the wolf and of the child; the object (المعنى) of the image of the wolf in the soul of the lamb is one of enmity and hatred, while the object of the child in the soul of the lamb is one of love and affection. The imaginative faculty forms images of the boy and the wolf without passing judgment as to whether they are his enemies or his friends. Judgment is passed by the faculty called Wahm. This judgment is then stored away in the memory. See Landauer, *op. cit.*, p. 360.

[16] The faculty that conceives the object of the image as still present is called by Aristotle *φαντασία* (*De Anima*, III, 3, 428a 1). The image itself is called *φάντασμα*. In Avicenna's works, we find no distinction between the two aspects of memory. He uses both terms, الحافظة (the retentive)

and المتذكرة (the memorative), for memory. Judah Halevi employs the same classification (*Cuzari*, V, 12). Averroes, on the other hand, distinguishes between interrupted comprehension and continuous comprehension. Interrupted comprehension is called الذاكرة (the memorative), while continuous comprehension is called الحافظة (the retentive).

[17] Aristotle uses the term *δόξα* for judgment through affirmation or negation (cf. *De Anima*, III, 3, 428a 19). In this passage, Averroes attributes this activity in man to the intellect (*νοῦς*). Actually there is no divergence between Averroes and Aristotle, for according to the latter, there can be no opinion (*δόξα*) without the presence of some conviction (*πίστις*), and there can be no conviction without the use of the intellect (*νοῦς*). Consequently, judgment by affirmation or negation is a function of the intellect. See *De Anima*, III, 3, 428a 20ff.

[18] Aristotle's view is that irrational animals do not possess the faculty of judgment (cf. *De Anima*, III, 3, 428a 21). Averroes, following Avicenna, acknowledges the existence of such a faculty in other animals, which he designates by the name of "Wahm" (see Landauer, *op. cit.*, pp. 359, 401A6); but as for the activity of recollection, it is similar to syllogistic reasoning, for which the effort of thinking (*διάνοια*) is necessary. Therefore, recollection is attributed to man alone. See *Metaphysica*, III, 7, 1012a 2.

[19] وهم. Averroes is not the first philosopher to mention this internal faculty. Alfarabi includes it among the internal senses and describes it as follows: "There is a faculty called *Wahm*, which apprehends with reference to the sense-object that which it does not perceive with the sense, e.g., when the lamb imagines the form of the wolf through its sense, it has a faculty that apprehends the enmity and evil of the wolf which its sense cannot perceive (Alfarabi, *Risalat Fuṣuṣ al-Ḥikm*, 74). On the origin and meaning of the term *Wahm*, see Wolfson, The Internal Senses, etc.", *op. cit.* (above Book I, note 139), pp. 86–95.

[20] In this connection, Avicenna supplies the full passage: "By means of this faculty (*Wahm*), the animal will avoid what is harmful to it and will aim for that which is beneficial" (Landauer, *op. cit.*, p. 359). Gersonides translates Avicenna's Wahm by the Hebrew term רעיון, and he cites a few illustrations of the use of this faculty in animals (*op. cit.*, fol. 167r–v):

"ובבח הזה יתנועעו קצת ב"ח אל הדברים המועיליבו כהתנועע החולדה כשנשכה נחש אל עשב הפיגיקב"ט (?) לפי מה שסופר, והתנועע הסנונירת אל עשב הצנונית אשר ישיב הראות לעין אחר שנקרעה, אנחנו נסינו מזה העשב כשנקרעו עיני בן יונה ושמנו ממין העשב ההוא ומן העשב על עיניו, ושב ראותו שלם, וזה הכח יקראהו בן סינא רעיון":

"By means of this faculty some animals will move towards things that are beneficial to them, just as the mole that was bitten by a snake will move towards the fenugreek(?) herb, as we have been told; and as swallows will move towards radish herbs, which restore vision to eyes that have been injured. In fact we experimented with this herb when the eyes of a pigeon were injured and we placed some of the sap of this herb together with the herb itself upon its eyes, and its vision was completely restored. This is the faculty which Avicenna calls רעיון (Wahm)."

[21] Falaquera has a different version of this passage:

"כמו שבורחים רבים מההיונים האחרים הצרים אותם אף על פי שלא ראו אותן מעולם."

memory) is not the same as imagination, because the latter forms images without having the estimative faculty verify them or arrange them insofar as they are based on sensation (Landauer, *Die Psychologie d. Ibn Sina*, p. 360). In other words, the difference between the two faculties is that in the formation of an image, judgment is not employed, while in the functioning of memory, judgment is employed. Compare *Sha'ar ha-Shamayim*, IX, 49b, in which passage, Averroes' views concerning imagination, memory, recollection and cogitation are quoted.

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and المتذكرة (the memorative), for memory. Judah Halevi employs the same classification (*Cuzari*, V, 12). Averroes, on the other hand, distinguishes between interrupted comprehension and continuous comprehension. Interrupted comprehension is called الذاكرة (the memorative), while continuous comprehension is called الحافظة (the retentive).

[17] Aristotle uses the term *δόξα* for judgment through affirmation or negation (cf. *De Anima*, III, 3, 428a 19). In this passage, Averroes attributes this activity in man to the intellect (*νοῦς*). Actually there is no divergence between Averroes and Aristotle, for according to the latter, there can be no opinion (*δόξα*) without the presence of some conviction (*πίστις*), and there can be no conviction without the use of the intellect (*νοῦς*). Consequently, judgment by affirmation or negation is a function of the intellect. See *De Anima*, III, 3, 428a 20ff.

[18] Aristotle's view is that irrational animals do not possess the faculty of judgment (cf. *De Anima*, III, 3, 428a 21). Averroes, following Avicenna, acknowledges the existence of such a faculty in other animals, which he designates by the name of "Wahm" (see Landauer, *op. cit.*, pp. 359, 401A6); but as for the activity of recollection, it is similar to syllogistic reasoning, for which the effort of thinking (*διάνοια*) is necessary. Therefore, recollection is attributed to man alone. See *Metaphysica*, III, 7, 1012a 2.

[19] وهم. Averroes is not the first philosopher to mention this internal faculty. Alfarabi includes it among the internal senses and describes it as follows: "There is a faculty called *Wahm*, which apprehends with reference to the sense-object that which it does not perceive with the sense, e.g., when the lamb imagines the form of the wolf through its sense, it has a faculty that apprehends the enmity and evil of the wolf which its sense cannot perceive (Alfarabi, *Risalat Fuṣuṣ al-Ḥikm*, 74). On the origin and meaning of the term *Wahm*, see Wolfson, The Internal Senses, etc.", *op. cit.* (above Book I, note 139), pp. 86–95.

[20] In this connection, Avicenna supplies the full passage: "By means of this faculty (*Wahm*), the animal will avoid what is harmful to it and will aim for that which is beneficial" (Landauer, *op. cit.*, p. 359). Gersonides translates Avicenna's Wahm by the Hebrew term רעיון, and he cites a few illustrations of the use of this faculty in animals (*op. cit.*, fol. 167r–v):

"ובכח הזה יתנדעו קצת ב"ח אל הדברים המועילים, כהתנדע החולדה כשנשכה נחש אל עשב הפיניקב"ט (?) לפי מה שסופר, והתנדע הסנונית אל עשב הצנונית אשר ישיב הראות לעין אחר שנקרעה, אנחנו נסינו מזה העשב כשנקרעו עיבי בן יונה ושמנו ממיץ העשב ההוא ומן העשב על עינוי, ושב ראותו שלם, וזה הכח יקראהו בן סינא רעיון":

"By means of this faculty some animals will move towards things that are beneficial to them, just as the mole that was bitten by a snake will move towards the fenugreek(?) herb, as we have been told; and as swallows will move towards radish herbs, which restore vision to eyes that have been injured. In fact we experimented with this herb when the eyes of a pigeon were injured and we placed some of the sap of this herb together with the herb itself upon its eyes, and its vision was completely restored. This is the faculty which Avicenna calls רעיון (Wahm)."

[21] Falaquera has a different version of this passage:

"כמו שבורחים רגיש מהחיתנים האחרים הצרים אותם אף על פי שלא ראו אותן מעולם."

"Just as many animals flee from other animals that are hostile to them, even though they have never before seen them." See *De'ot ha-Pilosofim*, V: *Sefer ha-Nefesh*, ch. 6.

[22] The third faculty is *Wahm*, which judges affirmatively or negatively. This faculty is capable of combining the image with the notion represented by the image; e.g., it apprehends that the image of the wolf is that of a hostile animal and therefore the lamb must avoid the wolf.

[23] The substrate of the imaginative faculty is the image of the sense-object. The object of the image is called its form. The function of the third faculty (وهم, *aestimativa*) is to combine both the image and its object.

[24] I.e., the external sense-object is composite and therefore, when it is comprehended in the soul, it is likewise composite. The external sense-object is composed of matter and form. The formation of the image of the sense-object is a function of the imagination and constitutes the matter of the sense-object, while the object of the image represents the form of the sense-object and it is comprehended by the memorative faculty.

[25] As stated previously, recollection is the search for the idea of the sense-object after it is stored in the soul (*De Memoria*, 2, 451b 3ff.). Consequently, there are three faculties involved that precede the functioning of the faculty of recollection. The imaginative faculty presents the image, the memory comprehends the object of the image and the *Wahm* combines both the image and the object and passes judgment by affirmation or negation.

[26] The distinction between the informant faculty or imagination and memory is not too clear in Aristotle. In one passage, indeed, he ascribes imagination and memory to the same faculty (*De Memoria*, 2, 450a 12ff.). His commentators attempt to clarify the matter by saying that the two faculties have the same substrate (τὸ ὑποκείμενον) because both are activities of the common sense (cf. Themistius, *In Parva Naturalia Commentarium*, 4, 1; Michael Ephesius, *In Parva Naturalia Commentaria*, 5, 3ff). The Greek commentators explicitly differentiate between the imaginative and memorative faculties as far as their objects of perception are concerned. When the sense-object disappears and only its impression remains in the soul, this impression is called the image. When the impression is not comprehended *per se*, but requires some other impression to serve as an aid in realizing the first impression, it is then called memory or recollection (see Michael Ephesius, *op. cit.*, 4, 9ff.). Themistius clarifies these different aspects by stating that when the object is comprehended *per se*, the process is called θεώρημα (the object of observation) or φάντασμα (the object of the imagination), but when it is comprehended by means of some other object it is called μνημόνευμα (the object of memory). See Themistius, *op. cit.*, 6, 17.

[27] The reason for our ability to retain the memory of many things at the same time but not to imagine them all at the same time is not very obvious from the foregoing statement. Albertus Magnus sheds some light on the topic, however, by means of a different passage of Averroes. He states that Averroes distinguishes between the retentive and imaginative faculties in the following manner. The imaginative faculty is the faculty that relates the form to the object perceived externally. The retentive faculty retains the forms that are imprinted upon it. Consequently, Averroes states that it is possible to retain in the soul many forms of sense-objects at the same time, but it is impossible to imagine them all at the same time (see Albertus Magnus, *De Memoria*, 1, 1). Gersonides further clarifies the topic by stating (*op. cit.*, fol. 169v) that inasmuch as the memorative faculty is different from the imaginative faculty, it is possible for us to retain many things at the same time without our having to form a separate image of each one of these things in our imaginations. We simply apprehend the object of each image, as, e.g., when we know that certain people did certain things at a certain time. Under such circumstances, it would be impossible for us to form images of all of these things together at the same time, for the imagination can form the image of only one thing at a time, and then only when it is in a state of quietude and after some effort.

[28] Aristotle illustrates the point made here in a somewhat different manner. A picture painted on a panel is at once a picture and a likeness and both of these are one and the same thing, yet the actual existence of the two is not the same thing, and one may contemplate it either as a picture or a likeness. In the same way we have to conceive that the presentation (φάντασμα) within us is something which by itself is merely an object of contemplation (θεώρημα), while in relation to something else, it is also a presentation of that other thing. Insofar as it is regarded in itself, it is only an object of contemplation or a presentation; but when considered as relative to something else, e.g., as its likeness (εἰκών), it is also an object of memory (μνημόνευμα). Thus, when one contemplates the painting in the picture as a likeness, it is the object of the imagination; but when one contemplates it as a likeness of Koriskos, without having at the moment seen the actual Koriskos, it is the object of memory. See *De Memoria*, 1, 450b 20ff.

[29] That this passage is complicated and needs further elucidation is evidenced by the fact that the copyist of the Hebrew MS, in a marginal note, explains that the passage can be interpreted in one of two ways: (1) as a continuation of the previous passage explaining the difference between imagination and memory; (2) as a new passage in which he deals with the two methods by which the faculties perform their functions, i.e., in combination or in separation. Falaquera prefers the second interpretation and reads הכחות האלו (these faculties), instead of הכח הזה (this faculty). According to the first interpretation, the restoration of the image of the object perceived in the past occurs by means of a combination of the faculties as in the case when the faculty of memory is active. However, when the form of the object is apprehended by the faculties while the sense-object is present, it is apprehended by the process of separation. This is what occurs in the case of the imaginative faculty. It cannot occur in the case of memory because we can only remember some sense-object that has disappeared and is no longer present. Memory can therefore occur only by a process of combination, while imagination can function by a process of combination or separation.

Falaquera, who interprets this statement as a new passage, explains the two methods by which the faculties perform their functions as follows.

When the *informans* combines the image and its object, the action is called one of combination; but when the sense-object is present and the faculties perform their functions in succession, the action is called one of separation. As soon as the sense-objects are gone, the faculties perform their activities by means of combination. See *De'ot ha-Pilosofim*, ch. 5.

[30] This faculty is likewise called by Alfarabi المميزة, but Falaquera translates it as הכח המכיר. Avicenna, on the other hand, has two different names for this faculty: المتوهمة and المفكرة. When reason is employed in addition to imagination, the faculty is designated المفكرة. See Landauer, *op. cit.*, p. 360; Alfarabi, *Risalat Fuṣuṣ al-Ḥikm*, 74; *De'ot ha-Pilosofim*, ch. 5.

[31] Avicenna specifies the circumstances under which the estimative faculty (المتوهمة) is called the cogitative faculty (المفكرة). See above, note 30.

[32] Avicenna, Judah Halevi and Averroes concur on the location of the estimative faculty in the middle of the cranium and also on memory in the back part of the cranium. They differ, however, as to the location of the imaginative faculty, Averroes placing it in the forepart of the cranium, while Avicenna and Judah Halevi locate it in the middle (Landauer, *loc. cit.* and *Cuzari*, V, 12). Falaquera and Gershon ben Solomon concur with Averroes in locating the various faculties in the cranium (Falaquera, *Sefer ha-Nefesh*, ch. 16; *Sha'ar ha-Shamayim*, IX, 49b). Aldabi enumerates the four chambers of the cranium in which the faculties reside: the first contains the sense-faculties; the second, imagination; the third, the intellect or judgment, because this faculty passes judgment with regard to the image, just as the sense judges with regard to the sense-object; the fourth contains memory (*Shebile Emunah*, IV, 1, 28b).

[33] This view is phrased somewhat differently by Avicenna: "As diseases affect these regions, the activities of these faculties will thereby be affected." See Landauer, *op. cit.*, p. 360, and compare Falaquera, *Sefer ha-Nefesh*, ch. 16.

[34] Ar. قشور. In Averroes' writings, the "rinds" constitute the residue of matter in form. When the form reaches the fifth stage, which is the most spiritual, it is completely devoid of matter. In the phraseology of Falaquera: "הוא נשאר זך בלי פסולת", "it remains clean, completely free of impurities." See *De'ot ha-Pilosofim*, ch. 5.

[35] These stages correspond to the forms of the sense-objects as they are conveyed by the five faculties, one external and four internal. The disposition of forms into different stages cannot be found in any of Aristotle's writings nor in those of his Greek commentators, but this classification is well-known in the philosophical literature of the Middle Ages. Albertus Magnus enumerates four stages only, inasmuch as he regards both the common sense and the imagination as belonging to the second stage. According to him, the estimative and cogitative faculties belong to the third stage and the intellect to the fourth, which is the highest. See Albertus Magnus, *De Anima*, II, iii, 4. The five stages enumerated by Averroes are those of sense, common sense, imagination, estimation and memory.

[36] Many animals besides man are endowed with memory, but recollection is peculiar to man, because its process is similar to that of syllogistic reasoning (قياس, *συλλογισμός*). A person who strives to recollect something goes through the process of arranging in his mind different things that are connected with the thing he is attempting to recall, for he starts with the assumption that he has heard or seen something previously, and he strives by means of related things to arrive at the object he is trying to recall. This search (*ζήτησις*) is possible only in those endowed with the faculty of deliberation (*τὸ βουλεύεσθαι*). See *De Memoria*, 2, 453a 9–14.

[37] The difference between memory and recollection, as it has been explained above, is that memory is the comprehension of something stored away in the soul, while recollection is the voluntary search for an object by a process similar to syllogistic reasoning (*De Memoria*, 2, 451b 19ff.). Aristotle illustrates the process of recollection as follows. A person wishes to recall at what season of the year he did a certain thing. Let us assume that the first thing that comes to his mind is the image of milk. From milk he passes on to the concept of white, from white to air, from air to dampness and from dampness to the season of autumn (*De Memoria*, 2, 452a 13ff.). Michael of Ephesius cites another illustration. Let us assume that a person sees the picture of a harp and he wishes to recall a certain melody. The picture brings to mind the actual harp he had seen, and the harp reminds him of the melody. Cf. Michael, *In Parva Naturalia Commentaria*, 2, 451b 16.

[38] The function of combining and separating is ascribed to the estimative faculty (المميزة).. Abdu-r-Razzaq's *Dictionary of the Technical Terms of the Sufies*, under the term متصرفة (p. 838), illustrates the two processes: "The combining of the form and the notion or characteristic occurs as when you say, 'the honest man is of such and such a color' ". If you were to say that the honest man is not of such and such a color, the process would be that of separation. Falaquera, unlike most MSS of Ibn Tibbon, translates the passage «والمركب هو المفصل» as follows: "והמרכיב הוא המפרק" (that which combines is that which separates), a reading that is more in consonance with the functioning of the two processes. See above, note 29. Most of the Tibbon MSS translate the passage in a passive sense, "והמורכב הוא המחולק" (that which is combined is that which is separated).

[39] This theory has apparently been adopted from Galen, for the assignment of specific locations in the cranium for the various faculties is not to be found in any of Aristotle's writings. The sense-faculty, according to Aristotle, resides in the heart (*De Part. Animal.*, III, 4). Galen adopted this view from Hieropolus and Irasistratus. See Galen, *De Usu Partium Corporis Humani*, VIII, 11 (*Opera* III, 667). As evidence, Galen cites the case of a man whose cranium was injured so that he had no motion nor sense-perception. In spite of this deficiency, the heart and the blood vessels continued to perform their functions. He therefore drew the conclusion that the cranium was the origin of sense-perception. See Galen, *De Placitis Hippocratis et Platonis*, III, 6 (*Opera*, V, 333).

[40] Alexander expresses the same view negatively, "The view of the one who holds that the incorporeal (*ἀσώματον*) is not affected by the corporeal (*σώματι*) is absolutely false." See Alexander, *In De Anima Commentarium*, 117, 9.

[41] Michael expresses a similar view when he states that one can form the image of a sense-object merely from the description of the object without previously having seen or perceived the object externally. The illustration is the one of the elephant, which Averroes later on cites. Michael states that it is possible to see the image or figure of an elephant in Athens. From the image seen, it is possible to conceive of the exact form of the elephant as it actually exists in India (Michael Ephesius, *In Parva Naturalia Commentaria*, 9, 15ff.).

[42] Recollection, which is the process of searching for a thing that is hidden from the soul, occurs through a process of deliberation, and this is a function of the rational soul or intellect. See *De Memoria*, 2, 453a 9ff. and compare Alexander, *op. cit.*, 109, 4.

[43] One of the principal functions of the animal soul is the perception of sense-objects (*De Anima*, II, 2, 413b4 and *Averrois Cordubensis Commentarium Magnum in Aristotelis De Anima Libros*, ed. F. Crawford, The Mediaeval Academy of America, 1953, p. 155). When the soul is occupied in perceiving sense-objects, it is impossible for the internal faculties to combine to enable the soul to recall an object. In fact, while a person is engaged in sense-perception, it is difficult to think about other things. Furthermore, the common sense, which functions in presenting the image of the thing to be recalled, cannot perform its function because it is preoccupied with the perception of sense-objects. Sometimes we see a person shutting his eyes so as to bar the perception of sense-objects, and it is then that he has the ability to combine the internal faculties in order to think and to recollect.

[44] That is to say, the animal soul, which is occupied in perceiving sense-objects is the cause of the separation of the internal spiritual senses as explained in the preceding note.

[45] Aristotle defines sleep as sensation in potentiality and waking as sensation in actuality (*De Somno*, 1, 454a 5). Consequently, all of the external senses are quiescent during sleep, so that the internal faculties can unite without any interference from sense-objects. Cf. J. I. Beare, English translation of *De Somno*, 454a 7, n.1.

[46] الاغما, חולי השתוק. In fainting spells, swooning and similar ailments, the internal senses are released from their nexus, because the external senses have ceased functioning. In this condition a person can possibly behold the marvels of the universe and the spheres. Averroes describes such people as «عرج باروا حهم» (ill in their spirits). See below, Bk. II, ch. 2, note 35, on the interpretation of this phrase.

[47] I.e., when a person forms the image of a thing he has perceived in the past without abstracting the idea or nature of the thing or passing negative or affirmative judgment thereon, he presents only the image of the thing through the imaginative faculty and does not employ any other faculty. In recalling, however, he attempts to bring to mind some previous perception and is therefore obliged to unite the imaginative and estimative faculties.

[48] Averroes distinguishes two activities that are present in recollecting: (1) the retention of an object in the soul; (2) the stimulation or movement in search of it in the soul. In the first activity, the movement is steady and uninterrupted. In the second instance, it passes from one object to another and from one notion to another until the person finally reaches the thing he is striving to recall. Cf. *De Memoria*, 2, 451b 19ff.

[49] In the process of recollecting, a person uses words, ideas or objects that are related to each other until he finally reaches the thing he is striving to recall. See *op. cit.*, 2, 452a 9–18.

[50] Aristotle defines the continuous (τὸ συνεχές) as that which has one single movement that is essential and no other movement. The movement is one when it is indivisible (ἀδιαίρετος) in space or time. See *Metaphysica*, V, 6, 1016a 5, 6.

[51] The rinds, as it was previously stated (above, note 34), are the residue of matter in the soul. When the object, of which an image is formed in the soul, has many rinds, that is, is very material, the forming of the image in the soul will take longer, because the estimative faculty will take longer to abstract its nature and its object. Consequently, when a person strives to recall something that has many rinds, it will be more difficult to pass from one thing to the next, and the process of recollecting will be difficult. When the images have fewer rinds, that is, when they are less material, it is easier to pass from one thing to the next, the process of recollecting becomes easier and the estimative faculty abstracts the idea more readily.

[52] Universal concepts are comprehended by the intellect (νοῦς). Since there can be no thought or knowledge without the presentation of the image of an object (*De Memoria*, 1, 450a 1), universals must therefore likewise be comprehended by means of images. Memory or forgetting cannot be ascribed to the active intellect, for the latter functions only with indivisible things (ἀδιαιρέτων νόησις, see *De Anima*, III, 6, 430a 26), while memory and forgetting occur in time, which is divisible. It is therefore believed that God and the celestial bodies have no memory, for they are not subject to time or corruption (ἀΐδιοι, ἄφθαρτοι). Averroes is apparently referring here to the acquired intellect which is endowed with the memory of universals. Cf. J. I. Beare, English translation of *De Memoria*, 450a 17, n. 1.

[53] In other words, the more corporeal the form is in the case of particulars, the longer will the form remain in the common sense, and the easier will it be to recall it. When the form is more spiritual, however, as in the case of universals, it will not linger long in the common sense, and it will therefore be more difficult to recall it.

[54] The first question is based upon a passage in Aristotle (*De Memoria*, 2, 453a 16ff.). Aristotle states that recollection deals with an object that was perceived in the past and therefore its form will be material. To prove that it is very material, Aristotle cites the example of a man who is in pain when he cannot recall the thing he wishes to recall. The pain continues sometimes even after he stops trying to recall. Therefore Averroes poses the question as to why a person suffers or derives pleasure even when the object is not present in actuality. The second question is likewise based upon a passage in Aristotle (*De Memoria*, 1, 449b 8ff.) in which he states that some people who are slow-witted nevertheless have good memories.

[55] Aristotle attempts to explain the experience of pleasure or pain from a material point of view. He states that those whose region of sense-perception in the cranium is moist, suffer more, for when the moist part is stimulated, it will not rest until the desired object is recalled. This is true of people who try to recall a certain melody or certain passages. Even though they try to ignore them or put them aside, these things nevertheless keep on coming up (cf. *De Memoria*, 2, 453a 20ff.).

[56] In the activity of recollection, the imaginative faculty presents the image of the thing to be recalled, while the image can be true or false (*De Anima*, III, 3, 428b 17). Therefore, at times it represents the image in actuality and at times it does not.

[57] Here Averroes refers to the acquired intellect, the function of which it is to judge whether the thing is related to the very object one is trying to recall. Aristotle designates this intellect by the general term *τὸ νοητικόν* (*De Anima*, III, 8, 431b 2).

[58] This is true because during youth the complexion of the cranium is not too soft nor too hard, but rather intermediate. Consequently, youth grasps forms quickly and retains them (*De Memoria*, 1, 450b 6ff.).

[59] The very young do not have good memories because the complexion of their crania is soft and moist. The old too, when they begin to lose their powers, find the complexion of their crania to be soft and moist, not by nature, but by accident, because of disease and impairments. See *De Memoria*, 1, 450b 1ff.; 2, 453b 5ff.

NOTES TO BOOK TWO

Chapter Two

[1] See *De Somno*, 1, 453b 12. Aristotle is of the opinion that sleep and waking cannot be ascribed to the body alone nor to the soul alone, because the body is the substrate of the soul and the relationship of the body to the soul is like that of the organ to the sense-faculty. See *De Part. Animal.*, I, 5, 645b 14ff.

[2] Heb. מה שישתתפו, Gr. *κοινά*, i.e., that sleep is common to body and soul. Cf. *De Somno*, 1, 453b 13.

[3] Aristotle uses the term *μόριον* for both a part of the body and a part of the soul (*De Somno*, 1, 453b 13, 14). Averroes distinguishes between them by calling the faculties of the soul, parts (اجزا) of the soul, while parts of the body are called members (اعضا) of the body.

[4] See *op. cit.*, 1, 454a 8ff. and b 25.

[5] This is an illustration of potential sensation. Through the same part by which a person asleep can see himself eating, hearing or writing, he can also realize sensation. Therefore, sense in actuality (*κατ' ἐνέργειαν*) is attributed neither to the soul alone nor to the body but to both of them together; and therefore sleep, which is sensation in potentiality, and waking, which is sensation in actuality, are common to both soul and body. See Michael Ephesius, *In Parva Naturalia Commentaria*, p. 43, 13–26.

[6] A person, to be called awake (*ἐγρηγορέναι*), must actually be using his senses and will be experiencing some external (*ἔξωθεν*) or internal (*ἐν αὐτῷ*) stimulation. Cf. *De Somno*, 1, 454a 2ff.

[7] *στέρησις τῆς ἐγρηγόρσεως* (*De Somno*, 1, 453b27, 28). Sleep and waking are found in the same part of the animal because they are opposites (*ἐναντία*), for two contraries are always found in the same subject (see *ibid.*). Aristotle presents as illustrations of contraries: health and disease, the good and the bad, strength and weakness. Cf. *De Somno*, 1, 453b 30 and *Metaphysica*, XIV, 1, 1087b 1.

[8] See *De Divinatione*, 1, 463a 30. Aristotle mentions this phenomenon (*τὰ μέλλοντα προορᾶν*) as the subject of inquiry in this treatise (*De Somno*, 1, 453b 21.

[9] See *De Anima*, II, 12, 424a 16ff. The sense in actuality receives the form of the sense-object and in this respect it is more corporeal than the sense in potentiality.

[10] The material sense-faculty is any one of the five senses, while the spiritual faculty of comprehension is an internal sense, such as the common sense, the imagination or the memory.

[11] הרוחני במוחלט, الروحانى على الاطلاق. An alternate term for במוחלט is בשלח, and its meaning is "apart from matter."

[12] See above Book II, ch. 1, note 25.

[13] I.e., that sleep is sense in potentiality and waking is sense in actuality.

[14] The subject of sense in potentiality (*δυνάμει*) is the same as that of sense in actuality (*κατὰ τὴν ἐνέργειαν*). See *De Somno*, 1, 454a 6. They differ, however, in their nature (*τὸ εἶναι*), that is, their sense-objects are divided into genera (*τὸ γένος*) and species (*τὸ εἶδος*). Cf. *De Sensu*, 7, 449a 17.

[15] Sleep is sense in potentiality and in this respect it is ascribed to the soul, while waking is sense in actuality and is therefore ascribed to the body. In the *De Anima*, II, 1, 412a 23–26, Aristotle compares waking to the exercise of knowledge (*τὸ θεωρεῖν*), i.e., knowledge in actuality, and sleep to knowledge in potentiality. Cf. note 5 above.

[16] The nutritive faculty (*τὸ θρεπτικόν*) controls growth, nourishment and the propagation of the species and is common to both plants and animals. Inasmuch as plants are not endowed with the capacity for sleeping, it is impossible to ascribe sleep to the nutritive faculty. See *De Anima*, III, 9, 432a 29; *De Gen. Animal.*, II, 4, 741a 2, 3. Furthermore, since plants are not endowed with the sentient faculty (*De Somno*, 1, 454a 17), it is impossible for them to have the capacity for sleep and waking, for waking is sense in actuality (*De Somno*, 1, 454a 5).

[17] Sleep and waking cannot be attributed to the intellect because there are animals that can sleep but are not endowed with reason. Furthermore, reason is a function of the intellect, while sleep and waking require the activity or the quiescence of the senses. See *De Somno*, 1, 454a 7ff.

[18] Cf. *De Somno*, 2, 455b 8–10. According to Gershon ben Solomon, the cessation of sense-perception which really produces sleep has its origin in the sense of touch, and subsequently, the remaining senses cease to function (*Sha'ar ha-Shamayim*, IX, 66b). This view is likewise expressed by Aristotle who regards the common sense as performing its function in conjunction with the sense of touch. He further concludes that sleep

and waking are present in all animals because they are all endowed with the sense of touch (ἡ ἁφή). See *De Somno*, 2, 455a 22–27; *De Anima*, II, 2, 413b 5.

[19] See *De Anima*, III, 2, 426b 8ff.; *De Sensu*, 7, 449a 8–20; *De Somno*, 2, 455a 12ff. Thus the common sense distinguishes (κρίνει) between sweet and white things and decides that black is the opposite of white (*De Somno*, 2, 455a 17). The common sense can likewise determine that the same object is sweet, white, smooth and pleasantly fragrant.

[20] Sleep occurs as the result of the movement of the natural heat from the sense-organs to the heart. When an animal lacks this natural heat, it cannot perceive its sense-objects (*De Somno*, 3, 456b 18ff.). Avicenna, whose description of sleep is quoted by Gershon ben Solomon, gives a more detailed explanation of the material cause of sleep. The material substance of sleep is the vapor that arises in the stomach upon initial digestion and moves toward the heart. The efficient cause is the heat of the heart that causes the vapor to ascend to the head, which is the farthest it can go. There it condenses and cools off because of the cranium, and it thereupon descends to the organs of the senses and causes the cessation of sense-perceptions, for the same vapor stops up the channels of the blood vessels, which serve as a track for the pneuma, which in turn is the cause of sensation. Once sense-perception is lacking, sleep ensues. Cf. *Sha'ar ha-Shamayim*, X, 67a.

[21] In dreams we sometimes find ourselves doing the very things we were doing previously while awake. These movements and stimulations that occur during waking leave an imprint upon the soul during sleep and in dreams. By the same token, motions and stimulations that occur during sleep will sometimes serve as the start of activities that are later performed during the waking day. The recurrence of these activities during the day and our thinking about them have their foundation in the images we perceived during sleep. Consequently, there are dreams that portend future events. See *De Divinatione*, 1, 463a 23–31.

[22] The cogitative faculty performs its function with the aid of the imagination by abstracting the form from matter, which, in this case, is the sense-object itself. Aristotle explicitly states that when the mind is actively aware of anything, it must necessarily be aware of it along with an image (ἅμα φαντάσματι), for images are like sense-objects (αἰσθήματα), except that they are without matter (ἄνευ ὕλης). See *De Anima*, III, 8, 432a 8ff.

[23] See *De Memoria*, 2, 453a 8ff. Aristotle concedes that the faculty of memory is possessed by certain other animals too, but he denies that they have the capacity for cogitation, which is a function of the intellect, possessed by man alone.

[24] See above, Book II, ch. 1, note 34. This term has been used by Averroes to describe things that are associated with matter and linger on in the form, even after the latter has been abstracted from its matter by the common sense. When the form reaches the fifth stage, that of cogitation, the faculty can comprehend the object and nature of the form absolutely divested of matter.

[25] The commentator here employs the exact Arabic equivalent of

Aristotle's δεσμός, which is رباط (*nexus*), and of Aristotle's λύσις καὶ ἄνεσις, which is انحلال (*dissolutio*). See *De Somno*, 1, 454b 26ff.

[26] τὸ αἰσθάνεσθαι (cf. *De Somno*, 1, 454a 5).

[27] Fatigue (ὁ κόπος) functions in a manner similar to food before it is digested. It sends up a large amount of vapor to the cranium. The cranium, in turn, will drive back the warm vapor, because the former is naturally cold, and thereupon sleep will ensue. See *op. cit.*, 3, 456b 34ff.

[28] Sleep will necessarily ensue because it is impossible to engage the faculties continuously, and therefore it is impossible to keep awake forever (*ibid.*, 1, 454b 8; 1, 454a 30, 31).

[29] An animal experiences pleasure or pain by means of its five senses and the common sense. When several of the senses are lacking, it is devoid of perfect sense-perception, and the common sense, therefore, cannot fulfill its function. As for sleep, however, even if an animal lacks one or several senses, it still will have the capacity for sleep. Actually, sleep does not occur as a result of the inactivity of the senses, for we know that when a person faints and his senses cease to function, he is not necessarily in a state of sleep. Furthermore, we have seen insane people biting their own flesh without even feeling any pain. Their senses have ceased functioning but they are not asleep. Cf. Michael Ephesius, *In Parva Naturalia Commentaria*, 49, 3ff. Sleep, however, will occur when the common sense cannot function, for then all of the five senses will have ceased functioning (*De Sensu*, 2, 455b 8ff.).

[30] These defects in man are regarded as accidental, because man, by nature, is endowed with five senses, but other animals that lack several senses are not naturally endowed with perfect sleep; and such animals only appear to be sleeping, since it is hard to tell whether they are or not. See *De Somno*, 1, 454b 18ff.

[31] Sleep depends upon the common sense, which is connected with the heart, and it does not depend upon the external organs. Cf. *op. cit.*, 2, 455b 8ff.

[32] Ar. يشرف. Falaquera translates this term, ישקוף (perceives or views), which would mean that the common sense lacks the organs through which it can perceive its sense-objects (*De'ot ha-Pilosofim*, ch. 6). Moses ibn Tibbon translates the term, ימשול (dominates or controls).

[33] Cf. *De Somno*, 1, 454b 4. This will occur when one continues to use his perceptive faculties excessively, especially during illness, for it is a known fact that when people do not sleep for days and nights because of illness or malnutrition, their sense-faculties are weakened and cease to function (Michael Ephesius, *In Parva Naturalia Commentaria*, 46, 2–8.

[34] Ar. اطلاعها على. The passage means that in such condition these people can comprehend spiritual things such as the angels and the spheres. This is true of those who are very ill in spirit, when the external senses cease to function and the internal senses are busily engaged.

[35] Ar. عرج بارواحهم. Falaquera translates this phrase, שעלו לשמים (that have ascended to heaven). See *De'ot ha-Pilosofim*, ch. 6. Ibn Tibbon translates it חגרים ברוחם (ill in their spirits), which would mean that his Arabic text probably read عوج instead of عرج.

[36] *Per se*, the common sense is single, but when it perceives by means of the different organs, such as the eyes, ears and nose, it is multiple (τὸ δ'εἶναι αἰσθήσει ἕτερον). See *De Somno*, 2, 455a 20–22. In this passage, the common sense is called by Aristotle τὸ κύριον αἰσθητήριον, "that which rules over all the senses".

[37] The common sense is the substrate or subject (موضوع) of sleep and waking. Aristotle explicitly states that the controlling sensory faculty is one (ἕν), though differing as a faculty of perception in relation to each genus of sensible objects, e.g. sound or color. This common sensory activity exists chiefly in association with the faculty of touch, for touch can exist apart from all the other organs of sense, but none of them can exist apart from touch. This explains why sleep and waking belong to all animals, for touch, with which the common sense is chiefly connected, is alone common to all animals. See *De Somno*, 2, 455a 18ff.

[38] These two faculties are contraries and man must follow the middle path to prevent their deterioration, for all organs which have a natural function must lose power when they work beyond the natural time-limit of their working period; for instance, the eyes must lose power from too long seeing and must give it up. See *op. cit.*, 1, 454a 26.

[39] All of these topics are dealt with in ch. 2 of the *De Somno*.

[40] The cranium (ὁ ἐγκέφαλος) is naturally cold, and when the heat that is generated from the digestion of food ascends to the cranium, it cools off and descends through the veins. This process produces sleep in man and in other animals (see *De Somno*, 3, 457b 27ff.).

[41] Gershon ben Solomon, though following Averroes in his definition of sleep, has a somewhat different and more detailed exposition of the whole process:

"השינה הוא בטול ההרגשה והכנס החום הטבעי אשר מחוץ המתפשט בכל הגוף ובכל האברים לפנים במקום התחלתו שהוא הלב, ובהכנס החום הטבעי לפנים, יכנסו כל ההרגשות עמו. וסבת הכנס החום לפנים הוא הקור ולחות אשר מתקרר ומתלחלח החום אשר בלב ומתמעט כמותו, ונכנס החום החיצון לעזור לו, וזה המקרה מקבל אותו הלב מן המזון בעת שיבוא אליו המזון."

"Sleep is the cessation of sense-perception and the withdrawal of the natural external heat, which is distributed throughout the entire body and its organs to the interior, to the place of its origin, which is the heart. When the natural heat withdraws to the interior, all of the sense-faculties are withdrawn with it. The reason for the withdrawal of the heat to the interior are the cold and moisture that cause the heat of the heart to cool off and dissolve and to diminish in quantity. In this process it is aided by the external heat that penetrates the body. This is the process that the heart is subject to by way of the cranium during the period of ingestion of food." See *Sha'ar ha-Shamayim*, X, 67b.

[42] The reason for this is that the natural coolness of the cranium brings about a recoil (ἀντιπερίστασις) of the natural heat and thereby induces sleep. See *De Somno*, 3, 458a 27.

[43] الحار الغريزى, τὸ σύμφυτον θερμόν. This is the heat that is generated in the body as a result of the digestion of food. See *loc. cit.*

[44] The subject or substrate of the common sense is the natural heat, and when this heat contracts in the interior of the body, sleep ensues.

[45] See *De Somno*, 3, 458a 10ff.

[46] Ar. منبعثه, Heb. משלחו, i.e., its source which is the heart.

[47] As a result of the digestive process, warm vapors ascend to the cranium, which is cold. The heat then contracts and descends and sleep usually follows. The second cause, that of weakness, likewise produces the expansion of vapors through the veins until they reach the cold cranium and then they descend and induce sleep. Cf. *De Somno*, 3, 456b 32ff. and *Shebile Emunah*, V, 6, 48a.

[48] The digestion of food produces vapors (ἀναθυμιάσεις) which ascend until they meet cooler parts, whereupon they are pushed downward and contract towards the heart, thus producing sleep (see previous note). The Greek commentators explain the process by saying that when the pneuma rises towards the head and then descends, it contracts the blood vessels. The channel through which we breathe is called the πόρον. When this channel contracts to the point where it breathes very feebly, sleep will follow. This is exactly what happens in the case of epilepsy (*De Somno*, 3, 457a 12ff. and Michael Ephesius, *In Parva Naturalia Commentaria*, 55, 8–16).

[49] The cranium will become impaired as a result of the dominant (املك) elements, which are the cold and the moisture (*De Somno*, 3, 457b 30). Consequently, the cranium must be regarded as a controlling factor in the process of sleep.

[50] The reason for this is given by Aristotle in greater detail. During sleep, much of the heat of the external organs of the body contracts downward into a narrow space. When the heat expands again and becomes dominant, the animal will awake. This will occur only after the impure blood is separated from the purer blood of the heart, for the finest and purest blood is that which is found in the head, while the thickest and most turbid is that which is found in the organs below. Sleep will therefore continue until the purer blood in the upper regions is separated from the impure blood in the lower regions. See *De Somno*, 3, 458a 10–25.

[50a] For the expression, "there will be some withdrawal in all of these faculties", all of the collated Arabic MSS read: تصرف ما بمجموعها. The term تصرف can mean either "withdrawal" or "functioning". All of the collated Hebrew MSS, with one exception, translate the term تصرف by נטייה (withdrawal). In the one exception, the term is translated שמוש (functioning), with which the Latin translation "operatio" seems to agree. Apparently, Gersonides used a MS that had the latter reading and on that basis he explained the text as follows (*op. cit.*, fol. 178v):

"הנה היה באלו הכחות שמוש מה בכלם, רצוני כי מצד שהיא אחת, הנה תעזר בפעלה אשר תרצה לעשותה בכלים אשר אינם מיוחדים לעשות זאת הפעלה":

"It (i.e., the soul) functions to a certain extent in all of these faculties, that is to say, that insofar as the soul is single, in any activity it desires to perform, it can obtain the assistance of other organs that are not especially adapted to the performance of such activity."

[51] Sleep, which results from fatigue, dissolves the natural heat and diminishes it, for it digests the food more quickly than usual, thereby causing the natural heat to cool off more quickly. See note 47 above.

[52] The blood that is generated through the decoction and digestion of food must be separated and purified. This process produces sleep. The purer blood is conveyed to the upper organs, the thicker and more turbid blood to the lower regions (*De Somno*, 3, 458a 21ff.).

[53] Gr. *σύντηγμα*. Labor and fatigue dissolve and humefy the interior regions of the body. The dissolved area, if not cold, may be compared to food before it is digested, for heat generates ascending vapors, which, in turn, induce sleep (see *op. cit.*, 3, 456b 35).

[54] Aristotle enumerates four causes: (1) the efficient cause, which is the movement of the primary heat (*τὸ θερμόν*); (2) the material cause, which is the generation of vapors (*τὸ ἀναθυμιώμενον*); (3) the formal cause or the definition of sleep, which is the nexus (*δεσμός*) of the common sense and the cessation of the activities of the faculties; (4) the final cause, which is the preservation of the body (*σωτηρία*), for the quiescence and rest of the faculties are necessary for the preservation of the animal. See *De Somno*, 3, 458a 25ff.

NOTES TO BOOK TWO

Chapter Three

[1] The topics dealt with in this chapter, viz. the dream (*τὸ ἐνύπνιον*), divination and prophecy (*ἡ μαντική*) are discussed by Aristotle in two separate treatises: (1) 458a 33–462b 11; (2) 462b 12–464b 18. Falaquera defines divination as follows:

"כל מלאכה שיגיע עמה האדם לדעת העתידות"

"Any art by which man can arrive at a knowledge of future events." See *De'ot ha-Pilosofim*, ch. 7.

[2] According to Aristotle, the dream is the image (*τὸ φάντασμα*) that arises as a result of the movement of sense-impressions (*αἰσθήματα*) during sleep, and therefore, the rejection of the existence of dreams virtually amounts to the rejection of the existence of sense-objects. See *De Somniis*, 3, 462a 29–31.

[3] Here the English translation follows the uniform Arabic reading: «ما من الانسان الا وقد را». Ibn Tibbon's translation reads:

"כי קצת האנשים פעמים רבות יראו חלומות"

"for some people will frequently have dreams". As an example, Aristotle cites the case of images that arise in the soul during sleep. These images serve as a starting point for action that will be performed during waking time, particularly when one concentrates his thoughts upon them (*De Divinatione*, 1, 463a 28, 29).

[4] المشهور, *τὸ ἔνδοξον*. Aristotle defines conventional truths as opinions that are known and accepted by all or most people or by scholars or by most of the best-known (*Topica*, I, 1, 100b 21–23). Contentious reasoning is based upon the conventional propositions and these are proved to be correct not because they are necessarily existent *per se*, but because they are believed in by all or most human beings, the opposite of which is true of logical proof. See *ibid.*, 100b 23–26, and Munk, *Guide des Egarés*, I, 2, p. 39, n. 1. We must therefore conclude that there are other kinds of perceptions that are conventional but do not exist of necessity.

[5] Falaquera interprets this passage somewhat differently:

"הנבואה תבוא להודיע איזה אדם יגיע אל ההצלחה."

"Prophecy aims to announce which person will attain a state of happiness." See *De'ot ha-Pilosofim*, ch. 7.

[6] This distinction is not explicitly presented by Aristotle, but there is an implied distinction in a passage in the *De Somniis*, 2, 460b 4, in which he states that people err very readily with regard to the truth of perceptions at a time of great stress and excitement (*ἐν τοῖς πάθεσιν*), which may bring about false dreams. According to Michael, the degree of error depends upon the degree of agitation. A slight degree of excitement will produce no error in sense-perception, but should a person become very much frightened or enraged, the degree of error would be large and the perception would be false. See Michael Ephesius, *In Parva Naturalia Commentaria*, 67, 2–10.

[7] Cf. *De Somniis*, 3, 462a 18ff. Aristotle notes that a phenomenon in which it is doubtful as to whether the person is awake or asleep and in which an external sense-object is present, cannot be called a dream. But where the imaginative faculty is stimulated during sleep by means of impressions that linger in the soul, such stimulation may be called a dream. See *ibid.*, 3, 462a 29ff.

[8] The five stages of the faculties in ascending order are those of the sense, the common sense, the imaginative faculty, the estimative faculty and memory. See above Book II, ch. 1, note 35.

[9] In dreams we do not pass judgments as to whether the object approaching is a man or a horse. Such judgments are the function of the cogitative faculty (فكر, *δόξα*). We simply state that the object is black or white and such statements necessarily assume the presence of sense and sense-objects (*De Somniis*, 1, 458b 10, 11.)

[10] الاثار, *αἰσθήματα*, literally marks or signs. These are the imprints of the sense-objects that last for some time in such internal senses as the common sense, after the sense-object is no longer present (*ibid.*, 2, 459b 5ff.).

[11] محاكة, *ὁμοιότης*. That is to say, the common sense and the imaginative faculty receive impressions that are similar to the object in question.

[12] This is the faculty which forms the image, the material substrate of which is the external sense-object. This faculty is designated by Aristotle as *τὸ φανταστικόν* (*De Somniis*, 1, 459a 16). Gershon ben Solomon defines the dream as follows:

"הוא מה שיצייר הכח המדמה בעת השינה, מה שתפס ועצר אצלו מתכונת המוחשים שהרגישם בהקיץ."

"[The dream] is that which the imaginative faculty forms an image of during sleep, that is, that which it has received and retained of the nature of sense-objects that have been perceived during the waking state." This definition does not include all dreams, for at times, a person will dream of something he has not perceived while awake. Cf. *Sha'ar ha Shamayim*, X, 68b.

[13] See *De Somniis*, 2, 460b 5. Aristotle cites the example of the coward (ὁ δειλός) who, in his fear, imagines on the basis of a slight similitude or impression that his enemies are approaching. He also cites the example of the person who is sick with a high fever (ὁ πυρρέτων) who imagines that he sees animals on the wall, where in reality there are only lines or sketches. This is due to the fact that the cogitative faculty and judgment cannot function because of the excessive stimulation of the imaginative faculty in a siege of fright or illness. See *ibid.*, 2, 460b 16, 17.

[14] When the external sense-object is present, the imprint is made upon the common sense, which, in turn, will transmit the object of the form to the imaginative faculty and will then store it away in the memory; but when the imaginative faculty is excessively active during periods of fright or illness, it will stimulate the common sense, which will sometimes form false images.

[15] This faculty is described by Aristotle as τὸ κύριον καὶ τὸ ἐπικρίνον, i.e., "that which rules and judges", for both of these activities are functions of الفكر, the cogitative faculty. See *De Somniis*, 3, 461b 25. In the case of the frightened or sick person, however, the activity of the cogitative faculty is weakened and the imaginative faculty is given full sway.

[16] See *Analytica Posteriora*, I, 1, 71a 10ff. The meaning of the passage is that the knowledge acquired even in a true dream is not acquired by the same process in which true knowledge is acquired during the waking state. This somewhat vague passage is further clarified by Falaquera in his *De'ot ha-Pilosofim*, ch. 7:

"המבוקשים שיתאווה האדם לדעתם בכל המלאכות העיוניות שני מינים, הא' ציור, והב' הצדקה. והציור הוא שיובן הדבר במה שבו קיום עצמו. והשאלה בו במלת מה, כמו, מה הוא האדם? ומה הוא הטבע? וההצדקה הוא חיוב דבר לדבר אחר או שלילתו. והשאלה בו באות ה"א, כאמרך, הזה הדבר נמצא? או הזה האיש חכם? ויתחייב שיהיו קודמים לכל אחד מאלו שני מינים בשעת הלימוד, שני מינים מהידיעה: פועל או מציע. והמציע לציור הוא מה שיורו עליו המלות, והפועל הם חלקי הגדרים או הגדרים. והמציע להצדקה הוא היות הצדק עצור בשעת הבקשה בשני חלקים מתנגדים או יותר, כמו אמרך, הזה הדבר קדמון או חדש? או הזה הדבר גדול מזה או שווה לו או קטן ממנו?"

"The objects of knowledge that a man aims to acquire in all theoretical arts are of two kinds: (1) conception; (2) verification. Conception implies the understanding of the essential nature of the thing, and the question usually asked about it usually begins with the word, 'what?'; e.g., 'What is man?' 'What is nature?' Verification implies the affirmation or negation of something with reference to an object. The question to be asked in this connection usually begins with an interrogation, as, e.g., 'Is this thing existent?' 'Is this man wise?' Each of these two kinds of objects of knowledge must necessarily be preceded in the process of learning them by two kinds of cognition: (1) actual; (2) preparatory. The cognition preparatory to the formation of a concept is the meaning of words. The actual cognition consists of parts of definitions or complete definitions. The cognition preparatory to a verification is that the truth be contained in one of two or more contradictory parts of the question, as, e.g., 'Is this thing eternal or created?' 'Is this object bigger than, equal to, or smaller than the other object?' " On the origin and meaning of this distinction

between "conception" and "verification", see Wolfson, "The Terms Taṣṣawur and Taṣdiq in Arabic Philosophy, and their Greek, Latin and Hebrew Equivalents", *The Moslem World*, 33 (1943), pp. 114–128.

[17] Aristotle asserts that the primary propositions are not inherent in man but must be acquired through previous discipline and knowledge. First, man learns through his faculty of perception to distinguish between sense-objects. When the forms are imprinted in the soul and are arranged and retained, memory of them will be acquired on the basis of several memories, and one experience (ἐμπειρία μία) will be acquired. On the basis of several experiences or concepts, the principles of the arts and the sciences are formulated. See *Analytica Posteriora*, II, 19, 99b 20ff.

[18] This is the intellect that abstracts the forms of existing things from their matter so that these become concepts in actuality. This intellect is midway between the material intellect and the acquired intellect. This same intellect in actuality functions in both genera of cognitions, i.e., in universal principles and in dreams. Cf. *Moreh ha-Moreh*, 141. The division of the intellect into three grades or stages is not explicitly presented by Aristotle. The Arab philosophers, however, following the Greek commentators Alexander and Themistius, ascribe three or four grades or stages to the intellect. Cf. Munk, *Guide des Egarés*, I, 68, p. 304, n. 1.

[19] See *De Anima*, II, 5, 417b 19ff. and III, 3, 428b 10ff.

[20] These are the primary propositions (المقدمات الاولى). See above, note 17.

[21] I.e., without the propositions.

[22] τὰ διανοούμενα. See *De Somniis*, 1, 459a 8. Aristotle denies that dreams and divination during sleep emanate from God, for even inferior human beings have dreams and predictions of future events. It is therefore inconceivable that the deity should convey these things to such human beings (*De Divinatione*, 2, 463b 15).

[23] The quotation of Socrates is to show that those who believe in prophecy believed it to be from God. *Apology* 20 d. Halevi has a somewhat different version of Socrates' remarks from that of Averroes:

"חכמתכם זאת האלהית אינני מכחישה, אך אני אומר שאינני יודעה, אמנם אני חכם בחכמה אנושית."

"This divine wisdom of yours I do not deny, but I do say that I have no knowledge of it. I only possess the knowledge of human wisdom." See *Cuzari*, IV, 13; V, 14.

[24] عقل برى من المادة. This is the intellect that is separated from matter. See *De Anima*, III, 4, 429a 27, b22, in which passages the intellect is described as the place (τόπος) of all forms. This intellect, viz, the intellect *in actu*, cannot comprehend particulars but only universals.

[25] العقول المفارقة. According to Arab and Jewish philosophers, Aristotle believed in the existence of separate intelligences which were the final causes of the movements of the celestial spheres. In their opinion, Aristotle was led to this conclusion by the fact that upon investigation he found that there were many spheres that differed in speed and course of motion. The Arabic and Jewish philosophers, of course,

injected Ptolemaic theories regarding the spheres. These same commentators went on to say that after a searching investigation of the subject, Aristotle concluded that the motion of one sphere at a fast speed in one day did not have the same cause as that of another sphere which moved once in thirty years. Aristotle therefore arrived at the theory that there are separate intelligences for each of the spheres and that each sphere eagerly looks toward that intelligence which is its principle and mover. Since these intelligences are apart from matter (*τὰ κεχωρισμένα*), they can comprehend only universals. Cf. Maimonides, *Guide*, II, 4; *De Anima*, II, 7, 431b 12ff.

[26] The objects we comprehend are composed of form and matter. The intellect abstracts the form from the matter and the form is described as having existence only in matter. See *De Anima*, III, 4, 429a 15ff.

[27] The knowledge of particulars is based upon matter and the process is effected through active and passive contact. See *De Gen. et Corr.*, I, 6, 322b 23ff. The separate intelligences, however, are not composed of the elements and are not subject to action and passion and therefore cannot comprehend particulars.

[28] *νοῦς ποιητικός*. On Averroes' conception of the Active Intellect, see Munk, *Mélanges*, pp. 445ff.; Léon Gauthier, *Ibn Rochd* (Averroès), pp. 236ff.; and Paul Sidney Christ, *The Psychology of the Active Intellect of Averroes*, pp. 7–66.

[29] This is likely because the stimulations of sense-objects that are very familiar to the dreamer, such as his relatives or his townsfolk etc., are much clearer in his soul. Aristotle adds that the fact that familiar friends have foresight in a special degree respecting one another is due to the circumstance that such friends are most solicitous on one another's behalf (*De Divinatione*, 2, 464a 27).

[30] As stated above (note 24), the intellect *in actu* can comprehend only universals, which are completely apart from matter, while particulars are perceived by the senses.

[31] *τὰ ἁπλᾶ*, i.e., four elements (*στοίχεα*). See above, Book I, ch. I, note 66.

[32] On the soul of plants, see *De Anima*, I, 5, 411b 28.

[33] I.e., the causes which produce individuals of substance are defined and determined, for no individual of substance can exist by chance. See *Physica*, II, 5, 196b 10ff. and *Metaphysica*, I, 3, 983a 24ff.

[34] See *De Gen. et Corr.*, II, 9, 336a 13ff. The cause of generation and corruption is ascribed to the oblique activity of the sphere (*κατὰ τὸν λοξὸν κύκλον*). Cf. *ibid.*, II, 10, 336a 32.

[35] *ὁμοιομερῆ*. The implication is that bodies whose parts are similar, such as flesh and bones, come into being from the elements. This is Empedocles's theory. See *De Gen. et Corr.*, I, 1, 314a 28. Bodies of similar parts are composed of the four elements, and the former are generated from the latter by a process of mixing and blending. The four elements are subject to the influence of the spheres, and by means of these spheres, things come into being and pass away. When the forces of the spheres influence the elements and move them and cause them to mingle, many entities come into being. The first of these entities are

the superior creatures that are generated in the air and then come the minerals, plants and animals that bear the reproductive capacity. See Falaquera, *Sefer ha-Nefesh*, ch. 18.

[36] Cf. *De Gen. et Corr.*, II, 11.

[37] Plants and animals have determinate existence and causes, for the reason that the reproductive power endows matter with the form of the object.

[38] I.e., the relationship of the reproductive capacity and the Active Intellect to the individuals of substance is the same as art is to the thing produced by art.

[39] It is impossible to have any cognition of them because they do not possess intelligible natures, since they have no determinate causes.

[40] At this juncture, Falaquera has a passage regarding accidental individuals of the volitional kind, which is lacking both in the Arabic MSS and in Tibbon's translation. The passage reads as follows:

וכמו כן מה שיתחדש מן הבחירה והרצון מה שהוא מהן בעצם סבותיהם מוגדרות בנפשם, ומן החיוב שיהיו מוגדרות אצל השבע ואעפ"י שאנו מכלים בהם.

"Likewise, with regard to such accidents as come into being through freedom of choice and volition, those of them, which by their very cause are determinate *per se*, must necessarily be determinate in nature, even though we may be ignorant of them" (*De'ot ha-Pilosofim*, ch. 7). This passage would imply that volitional accidents, like natural ones, with determinate causes, are capable of being comprehended through their universal nature.

[41] Cf. *De Gen. Animal.*, II, 1, 735a1.

[42] We can comprehend only the more general and material causes, but there is an infinite number of fine degrees among those that are determinate in intelligible nature. Cf. *Physica*, II, 2, 194b 1ff.

[43] Maimonides explains the generation of individuals through the four powers that are conveyed by the spheres to this world in the following manner: "There is a power that is responsible for mixture and composition and there is no doubt that this power suffices for the compounding of inanimate things; a power that endows all animals with the animal soul; a power that endows every rational creature with reason by means of light and darkness which extend to illuminate them and encompass them around the earth" (*Moreh ha-Moreh*, I, 72, p. 46). Falaquera goes on to describe the history of the controversy regarding the influence of the spheres upon generated things and things that pass away. According to Falaquera, Aristotle regards the bodies of the spheres as the external principles of generation, but the later philosophers ascribe it to the Active Intellect. Aristotle acknowledges this principle but regards the soul-faculty as the more proximate principle and the form of the spheres as the more remote principle (*ibid.*, I, 72, p. 47).

[44] The Arabic MSS all record the unintelligible reading of باهرزوابات. Moses ibn Tibbon's translation of the word is חזרת חלילה. There is one occurrence of this phrase in Samuel ibn Tibbon's translation of the Moreh Nebukim (*Guide*, III, 2) where the original Arabic for חזרות חלילה is راجعة على اعقابها. The unintelligible Arabic reading may therefore

have been a corruption of the phrase راجعة على اعقابها. This expression has been traced to the Greek phrase *ἀνακυκλεῖν καὶ ἀνακάμπτειν* (*De Gen. et Corr.* II, 11, 338a 4–5) by Wolfson in "Arabic and Hebrew Terms for Matter and Element with Special Reference to Saadia", *JQR*, N.S., 38 (1947), p. 52, n. 28. Gersonides explains how, according to the theory of the circular motion of the spheres, the sense-objects in the sublunary world are affected by the properties of the celestial bodies (*op. cit.*, fol. 179v):

ולכן חשבו האומרים בחזרת חלילה ר"ל האומרים בישובו הנמצאים המוחשים בסבוב שהוא מחוייב שישובו האישים המוחשים בעצמם, וזה בעבור מה שחשבו כי תכונות הגרמים השמימיים בעצמם מוקפות המציאות עד שכל תכונה מהם גרמז אליה בעתה מחוייב שתשוב אצלם, וזה בנוי על זמני סבובי הגלגלים הם משותפים; ואולם אם היו נבדלים, הנה אי אפשר שתשוב זאת התכונה הרמוז אליה אשר לגרמים השמימיים עתה. והעמידה על אלו הזמנים אשר הם נבדלים או משותפים היא בלתי אפשרית, כי מה שתדע מזמני סבובי הגלגלים הוא בקירוב לא על דרך האמת. ואיך מה שהיה, הנה אלו יראו שמציאות האישים ומה שיתחדש מהם ממקרים מוגבל מצד הגרמים השמימיים, ולזה תוייב אצלם שישוב ראובן הנמצא עתה להיות כאשר ישוב] מצד הגרמים השמימיים על מה שהוא עליו עתה:"

" 'Therefore those who maintained the theory of circular motion', that is to say, those who held, with regard to existent individuals that become sense-objects through the circular motion (of the spheres), that these individuals must necessarily become the sense-objects in essence; they held this view for the reason that they thought that the properties of celestial bodies had in themselves determinate existence, so that, according to their view, each one of their properties, which is definite at present, must become a sense-object. This theory was built on the premiss that the time-intervals for the revolutions of the different spheres are the same. If they were different, however, it would be impossible for a definite property of the celestial spheres at present to become (a sense-object). A precise knowledge of these time-intervals, be they different or the same, is impossible; for that which can be known with regard to the time-intervals of the revolutions of the spheres is only an approximation and not an accurate calculation. Be that as it may, these people are of the opinion that the existence of individuals and of accidents that may arise in them are determinate by virtue of the celestial bodies. For this reason, according to their view, it follows that the individual Reuben, who is presently existent, must have come into being, whenever he did come into being by virtue of the celestial spheres, in the very same condition in which he is at present."

[45] Ar. تقرر, for which Ibn Tibbon has נכפל (repeated); but the correct translation is given by Falaquera as התישב (ascertained). See *De'ot ha-Pilosofim*, ch. 7.

[46] Averroes means to say that the immaterial intellect endows the imagination with the nature of the forms. Aristotle phrases the same idea somewhat differently by stating that the intellect comprehends the forms through images (*De Anima*, III, 7, 431b 4).

[47] This is true because the imaginative faculty forms an image of the sense-object, which is material.

[47a] In connection with this passage, Gersonides clarifies the distinction

between primary perfection and final perfection as far as the imaginative faculty is concerned (*op. cit.*, fol. 180r):

וכמו שהשכל הפועל יתן השלמויות הנפשיים כוללים ר"ל צורות הצמח והחי, והם השלמויות הראשונים להם ויקבלם ההומר קבול פרטי, כן יתן הנה השלמות האחרון לנפש המדמה כללי ותקבלהו הנפש פרטי ואמרנו שלמות האחרון הוא לפי שהשלמות הראשון לנפש המדמה הוא ההכנה, והשלמות האחרון הוא השתמשו בפעלה ההיא כמו שהתבאר בספר הנפש.

"Just as the Active Intellect endows one with the perfections of the soul in the form of universals, that is, with the forms of plants and animals which are their primary perfections, and matter receives these perfections as particulars, in the same manner the Active Intellect here endows the imaginative soul with the final perfection in the form of a universal and the soul receives it as a particular. We use the term 'final perfection' for the reason that the primary perfection of the imaginative soul is its potential capacity, while the final perfection is its actual use of that capacity, as it has been explained in the *De Anima*" (III, 3, 429a 1, 2).

[48] I.e., the Active Intellect endows the soul with the final perfection or realization in the case of a spiritual perception such as the dream.

[49] Ar. عناية Heb. השגחה, Lat. sollicitudo. This term reflects the Greek *φροντίζειν* in the following passage in the *De Divinatione*, 2, 464a 29ff.: "That certain persons in particular should have vivid dreams, e.g., that familiar friends should thus have foresight in a special degree respecting one another, is due to the fact that such friends are most solicitous (*φροντίζειν*) on one another's behalf."

[49a] As an illustration of this kind of perception of the imaginative faculty during waking, Gersonides cites two personal experiences he had (*op. cit.*, fol. 180v). On one occasion, as he was sitting in his room, he saw in his imagination the image of one of his younger brothers falling off the table in an adjacent room. Gersonides had had no previous information as to whether his younger brother was on the table or not. He suddenly bestirred himself and ran to the other room and surely enough found that his younger brother had already fallen off the table. On another occasion, while he was on the road, he saw in his imagination the image of a man striking his neck with a sword, without causing him any injury, and immediately thereafter, the incident proved to be true.

[50] The soul, though single in substrate, has different faculties such as the common sense, imagination, memory and cogitation. See above Bk. II, ch. 1, note 35.

[51] The movements and stimulations of the imagination which result from the impressions of sense-objects are weaker, particularly during the day, when sense and thought function together, and may be compared to a small fire within a big fire (*De Somniis*, 3, 460b 32–461a 2).

[52] I.e., imagination, memory and the estimative faculty.

[53] صنم, *εἴδωλον*. These are the images that are formed by the imagination during sleep (*ibid.*, 3, 462a 11ff.).

[54] *δι' ἀργίαν τῶν κατὰ μοριὸν αἰσθήσεων*. See *De Somniis*, 3, 461a 4. Aristotle's theory is that the senses are inactive during sleep owing to the withdrawal of the natural heat to the interior of the body.

[55] اغ, נכפה, λειποψυχία. Cf. *De Somno*, 3, 456b 10ff. Aristotle states that persons who have fallen into a deep trance (οἱ σφόδρα λειποψυχήραντες) and have come to be regarded as dead, say many things while in this condition, but these are not to be regarded as cases of sleeping or dreaming. See *ibid.*, 456b 15ff.

[56] عرج باراحهم, חגרים ברוחם. This phrase is omitted in all of the Latin MSS. See above Bk. II, ch. 1, note 46.

[57] This passage is omitted in all of the Hebrew MSS, but is found in the Paris and Modena Arabic MSS.

[58] See Koran, XII, 40–45.

[59] The interpreter of dreams (κριτὴς ἐνυπνίων), who is a master of the art, is naturally gifted in the understanding of dream-images (τὰς ὁμοιότητας). Aristotle further explains his use of the term ὁμοιοτήτας. Images in a dream may be compared to forms that appear in water. If the water is highly agitated, the images or reflections in the water become distorted and no longer resemble the original. To understand these distorted figures and shapes, one must possess a special ability in interpreting dream-images. Cf. *De Divinatione*, 2, 464b 5–15.

[60] According to Aristotle, God is regarded as the cause (αἴτιον) of all things and a First Principle (ἀρχή τις). Cf. *Metaphysica*, I, 2, 983a 10.

[61] Cf. Bk. II on Memory and Recollection, p. 24.

[62] Aristotle explains that people with melancholic dispositions are highly stimulated by the imagination (*De Memoria*, 2, 453a 19).

[63] This humor (ἡ μέλαινα χολή) is very vaporous. The vapors ascend to the cold head and thereupon the heat recedes downwards and sleep is thereby induced (*De Somno*, 3, 457b 20ff.).

[64] Aristotle mentions the fact that when these melancholic people shoot at a target with their bows, they usually do not miss the mark, because their impetuosity (διὰ τὸ σφόδρα) enables them quickly to arrange the series of movements in their minds (*De Divinatione*, 2, 464a 32ff.).

[65] A person sometimes realizes the images and thoughts that exist within him potentially, because the intellectual faculty (τὸ νοητικόν) comprehends the forms of the images and acquires a definite notion as to what is harmful or beneficial. From present notions, a person can judge as to future occurrences and can know enough to avoid what is harmful and to seek what is beneficial. Aristotle cites a specific case in point. When one perceives by sense that the beacon is fire, he recognizes by virtue of his common sense that it signifies an enemy, because he sees it moving, and he therefore knows that what is coming is harmful (*De Anima*, III, 7, 431b 2ff.).

[65a] Gersonides explains how Galen, for example, was able to account for some of his medical discoveries through the dream (*op. cit.*, fol. 181v):

כמו מה שסיפר גאלינוס מהרבה ענינים הגיעה ידיעתם לו בחלום, וזה הולך באופן מה מהלך ההשגות הפרטיות שתהייבה בענינים העתידים, כי ההודעה תגיע בענין כזה בענין פרטי יועיל בו הענין ההוא, ואחר כן יעשה מזה השכל גזרה כוללת, אבל על כל פנים, ההודעה היתה בענין פרטי, כמו שיחלום בעל חולי מה שהעשב הפלוני יועיל לו; הנה זאת ההודעה היא פרטית, ואחר כן אפשר לבעל מלאכת הרפואה שיעשה מזה גזרה כוללת.

"As Galen has related concerning many matters about which he obtained

information in a dream; and this follows somewhat the process of particular perceptions that occur in connection with future events, for the information conveyed in such matters is of a particular nature, which, in turn, can be beneficial to the person. Subsequently, the intellect may form a universal judgment based upon this particular. But in any event, the information is conveyed is in reference to a particular matter, as in the case where a person stricken with some illness dreams that a certain herb will be beneficial for him. Now this information is of a particular nature, and subsequently, the medical practitioner may form a universal judgment based upon this particular."

[65b] Besides Averroes' argument that if man were able to comprehend the speculative sciences through a dream, the primary propositions would be utterly useless, Gersonides offers another argument based upon logic (*op. cit.*, 181v–182r):

ועוד כי זאת הידיעה כבר תהיה ידיעה חסרה לפי שלא יודע בה הדבר בעלתו, אשר הוא בה נמצא, כי לא יודע הדבר בעלתו אשר הוא בה נמצא, אם לא יודע באמצעות ההקדמות הראשונות.

"Furthermore, this kind of knowledge (i.e. through a dream) would indeed be defective, because through such knowledge, the cause which would account for the very existence of the object could not be known, since the cause by which an object exists cannot be known except by means of the primary propositions."

[66] باشتراك الاسم, ὁμωνύμως. Cf. *Categories*, 1, 1a, 1ff.

[67] According to this definition of speculative science, discipline would not have to constitute an essential part of it, for it would be possible to acquire the speculative sciences without any previous training, an assumption which is, of course, absurd and untenable.

[68] I.e., either by means of previous discipline or without it.

[69] The prediction of future things through dreams dealing with theoretical sciences is impossible because man acquires the theoretical sciences through the primary propositions and through syllogistic reasoning. If a species of man did exist that could acquire the theoretical sciences through dreams, the term "man" would be used of such species only in an equivocal sense. See above, note 66.

[70] Gersonides has a twofold explanation for the origin of true dreams:

ומי אשר דמיונו חזק אף בהקיץ שהוא זמן טרדת ההשגות החיצוניות המונעות אותו מפעולתו, שכן שיתבונן שיהיה חזק בעת השינה שהוא זמן בטול ההרגשות המונעות, ועל כן חלומותיו הם צודקים ולאמתיים ומשך; ומפנים אחרים מצד הטבע מה שבארו החכמים כי בעת המאכל באסטומכא ומעי עולה אל הראש, הכח המדמה חלוש ומבולבל מפני בלבול המוח הנושא אותו, כי בהחלש ובהבחרת יחלש הנשוא בו, וכאשר יעוכל המזון וישפוך העשן, אז יתחזק הכח ההוא ויהיה חלומותיו צודקים.

"One whose imagination is powerful even during waking, which is the time when the external senses that are capable of obstructing the functioning of the imagination are busily engaged, will surely have a powerful imagination during sleep when the obstructing senses are idle. Consequently, the dreams of such people will be true, while those of others will [illegible]. Another reason, based upon nature, is in accordance with what physicians have shown that while food is being digested in the stomach

[55] اغما, נכפה, *λειποψυχία*. Cf. *De Somno*, 3, 456b 10ff. Aristotle states that persons who have fallen into a deep trance (*οἱ σφόδρα λειποψυχήραντες*) and have come to be regarded as dead, say many things while in this condition, but these are not to be regarded as cases of sleeping or dreaming. See *ibid.*, 456b 15ff.

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"As Galen has related concerning many matters about which he obtained

information in a dream; and this follows somewhat the process of particular perceptions that occur in connection with future events, for the information conveyed in such matters is of a particular nature, which, in turn, can be beneficial to the person. Subsequently, the intellect may form a universal judgment based upon this particular. But in any event, the information so conveyed is in reference to a particular matter, as in the case where a person stricken with some illness dreams that a certain herb will be beneficial for him. Now this information is of a particular nature, and subsequently, the medical practitioner may form a universal judgment based upon this particular."

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"Furthermore, this kind of knowledge (i.e. through a dream) would indeed be defective, because through such knowledge, the cause which would account for the very existence of the object could not be known, since the cause by which an object exists cannot be known except by means of the primary propositions."

[66] الاسم باشتراك, *ὁμωνύμως*. Cf. *Categories*, 1, 1a, 1ff.

[67] According to this definition of speculative science, discipline would not have to constitute an essential part of it, for it would be possible to acquire the speculative sciences without any previous training, an assumption which is, of course, absurd and untenable.

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[70] Gershon ben Solomon has a twofold explanation for the origin of true dreams:

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"One whose imagination is powerful even during waking, which is the time when the external senses that are capable of obstructing the functioning of the imagination are busily engaged, will surely have a powerful imagination during sleep when the obstructing senses are idle. Consequently, the dreams of such people will be true, while those of others will not. Another reason, based upon nature, is in accordance with what physicians have shown that while food is being digested in the stomach

and the fumes are ascending to the head, the imaginative faculty is weak and disturbed, because of the disturbance of the cranium which is its substrate, for when a substrate is weak, that of which it is the substrate will necessarily be weak. When the digestion of the food is completed and the fumes cease, the imaginative faculty will become stronger and the dreams will become true" (*Sha'ar ha-Shamayim*, X, 69b). In the above passage, I have translated the term החכמים by "physicians" on the basis of the context and on the assumption that the term reflects the Arabic حكما.

[71] Cf. *De Somniis*, 3, 460b 3ff.

[72] انفعال, *πάθος*. Things that are perceived by the external senses are imprinted in the common sense and remain therein a potential state, while the impressions or notions derived from the sense-objects are stored away in the memorative and cogitative faculties.

[73] I.e., the imaginative faculty makes use of the impressions that are stored in the memory and thought.

[74] The imaginative faculty will then function erroneously because of the tremendous disturbance within, as in the case of the faint-hearted, who, out of fear, will imagine an enemy approaching, or the amorous person who, out of passion, will imagine himself fulfilling his desires. The vapor, which is then in a state of motion, will not require any large and clear images but will get along with vague and small images, that will none the less appear very clear to the person. Aristotle describes such a situation in connection with a person suffering from a high fever or having a strong yearning for something. Thus, when a person, who is not very sick, sees lines and figures on the wall which bear a resemblance to animals, he will not err in his vision; but if he has a high fever, he will imagine the figures to be real animals and he will be stimulated and disturbed by them. See *De Somniis*, 2, 460b 3–16; and Michael Ephesius, *In Parva Naturalia Commentaria*, 67, 4–9.

[75] *ὁ ἐρωτικός* (*De Somniis*, 2, 460b 5). Aristotle also cites the case of the faint-hearted. See note 74 above.

[76] אדומה, صفرا. Both Falaquera and Gershon ben Solomon render the Arabic by the term ירוקה "yellow". In other words, a fiery dream will indicate to physicians the dominance of the yellow substance, because the latter has the property of fire. Cf. Falaquera, *De'ot ha-Pilosofim*, ch. 7, and *Sha'ar ha-Shamayim*, X, 69b. Aristotle mentions the *χολὴ ξανθὴ καὶ μέλαινα*, the yellow and black humor. The white humor is called *φλέγμα* (*Historia Animalium*, III, 2, 511b 10).

[77] I.e., the efficient, material, formal and final. Compare *De Somno*, 3, 458a 25ff.

NOTES TO BOOK THREE

[1] *ἀλλοίωσις*. Any transmutation occurring in animals is attributed to the four qualities enumerated below. Cf. *De Gen. et Corr.*, II, 3, 330a 30ff., II, 4, 331a 6ff.

[2] I.e., from how many aspects one can compare length and shortness of life in different animals and plants.

[3] *κατὰ γενός*. For this comparison, Aristotle cites the difference between horse and man; for species (*εἶδος*), the difference between one man and another (*De Long. Vit.*, 1, 465a 1ff.).

[4] The illustration given by Aristotle is that of the date-palm (*ὁ φοῖνιξ*). Aristotle uses the term *ὅλως* to indicate that plants generally live longer than animals (*De Long. Vit.*, 4, 466a 9).

[5] See *op. cit.*, 1, 465a 9, 10.

[6] القوات الفاعلة. The active powers or qualities (*τὰ ποιητικά*) are heat and cold; the passive qualities (المنفعلة, *τὰ παθητικά*) are moisture and dryness. The topic is discussed in the *De Gen. et Corr.*, II, 2, 329b 25, 26 and not in the *Meteorologica*. Falaquera cites the reference as *Sefer ha-Yesodot* (Book of the Elements). Gersonides explains the material process by which the preservation of the composite being is assured when the active qualities of heat and cold dominate the passive qualities of moisture and dryness (*op. cit.*, fol. 183v):

ר"ל כאשר גבר החום והקור על הלחות והיובש, כי אז יתמיד ללחות גופיות ועמידה ולא יתפרדו חלקי המורכב כי לא יותך הלחות ההוא, כי כבר יעמידהו החום המזוג בקור המיוחס אל הדבר ההוא.

"That is to say, when heat and cold dominate moisture and dryness [the body is preserved]; for then, the moisture will be given continuous body and duration, and the parts of the composite body will not disintegrate inasmuch as the moisture will not evaporate too readily, for the heat mixed with the cold that are relative to the composite body will have caused it to endure."

[7] When the active qualities dominate the passive qualities, the natural form of the object is preserved.

[8] If the ratio of the active qualities of heat and cold is greater than the ratio of the passive qualities of moisture and dryness, there will be no danger of corruption or destruction of the object; but if the ratio between the active and passive qualities becomes smaller, the danger becomes greater.

[9] The qualities of these two elements, viz. moisture and heat, constitute the cause of longevity in animals (*De Long. Vit.*, 5, 466a 20).

[10] Earth is cold and dry, while air is moist and warm (*De Gen. et Corr.*, II, 3, 330b 5).

[11] Putrefaction will cause death accidentally or through natural means, for a large degree of putrefaction will weaken the body and destroy the

nature of the animal or will consume certain organs of the body (*De Long. Vit.*, 5, 466b 5–7). Putrefaction is actually the result of the diminution of heat and moisture, for the latter two qualities prevent drying and congealing.

[12] The digestive process functions as a result of heat and moisture. When the heat is diminished and the moisture dried, the digestive process becomes impaired.

[13] Aristotle's view is that not only the quantity of moisture but also the quality of moisture, which is the result of heat, will lengthen the life of the animal; for heat prevents the moisture from congealing and the abundance of moisture prevents desiccation (*De Long. Vit.*, 5, 466a 28–32).

[13a] Gersonides questions (*op. cit.*, fol. 184v) Averroes' statement that "dryness seems to be the material suitable for cold just as moisture seems to be the material suitable for heat." Gersonides cannot see why this should be so, since the dry does not possess anything that would give it the peculiarity of cold any more than that of heat, for we know that heat is found to exist in bodies that are dry. Similarly, the moist does not possess anything that would give it the peculiarity of heat more than that of cold, for cold is found to exist in bodies together with moisture. As a solution of the difficulty, Gersonides suggests that Averroes may have meant by the above statement that the moist is more suitable for the perfect functioning of the natural heat of the body and for changing itself into the substance of the natural heat, so that the natural heat may be continuously preserved in its proper condition. On the other hand, in the case of the dry, the natural heat can function only very imperfectly, because it is difficult for the dry to be affected very readily and therefore the dry will receive only a small measure of heat. Consequently, cold is more dominant in the dry than in the moist.

[14] Due to the insufficiency of heat, the moisture will cool and congeal and the body will become impaired (*De Long. Vit.*, 5, 466b 1ff.).

[15] افضال الهضام, *περίττωμα*. Excesses of the body, which are formed either through disease (*νόσῳ*) or through natural causes (*φύσει*), produce decay (*ibid.*, 5, 466b 4–7.).

[16] Aristotle discusses this point by posing two questions. Can length of life in animals be ascribed to health and strength of limbs? Is there no relationship or connection between shortness of life in the animal and the prevalence of disease? (*De Long. Vit.*, 1, 464b 26–28).

[17] Aristotle states that old age (*τό γῆρας*) is characterized by coldness and dryness, and similarly the corpse (*τὸ τεθνηκός*) is cold and dry (*op. cit.*, 5, 466a 21).

[18] According to Aristotle, the loss of seed (*τὸ σπέρμα*) in the body makes for desiccation (*ibid.*, 466b 8, 9).

[19] Heat, which according to Aristotle is the cause of the abundance of flesh, prevents desiccation and congealing in the body (*ἔστι τὸ θερμὸν λιπαρόν*). The mule, which is the offspring of the horse and the donkey, is more continent, remains moist and therefore lives longer than its genitors (*De Long. Vit.*, 5, 466b 9). Females (*θήλεα*) live longer than males that are salacious (*ὀχευτικά*). See *loc. cit.*

[20] The reason has been given in the previous note. Cf. also *De Long. Vit.*, 5, 466b 17.

[20a] Ar. برى. Ibn Tibbon translates this term by the Hebrew מדברי (pertaining to the desert) but the Arabic for "desert" is usually the feminine form برية. The Latin translation "agrestis" (pertaining to the fields) reflects the underlying Arabic more accurately.

[21] Corpulence is the result of the superfluity of moisture and warmth, and maritime regions are usually warm and moist (*ibid.*, 5, 466b 17).

[21a] Averroes states that there are six external causes which help to preserve the animal, but in all of the Arabic MSS only five are mentioned. On the basis of the Hebrew translation, which lists the missing sixth cause (i.e., והשלשול והעצירה, which are the usual translations for the Arabic terms الاسهال والقبض), we have supplied the missing terms "diarrhea and constipation".

[21b] Gersonides describes in detail how the six external causes mentioned by physicians may affect length and shortness of life (*op. cit.*, fol. 185r–v):

"המאכל והמשתה והוא שיאכל וישתה מה שראוי לו לפי מזגו ובעת הראוי ובכמות הראוי. והשלשול והעצירה, ר"ל שישתדל בהנהגות הרפואות שיהיה עניינו בשלשול ובעצירה כפי מה שראוי, כי כאשר תגבר עליו העצירה יותר ממה שראוי יקרוהו חוליים רבים, וכן כאשר יגבר עליו השלשול יותר מן הראוי. והאויר המקיף ר"ל שישתדל שלא יהיה האויר המקיף מקביל למזגו הקבלה החזקה, כי אז יפסידהו בלי ספק וכן ישתדל לזכך האויר המקיף מהעפושים אשר יקרו בו, כי האויר המעופש יפסיד הב"ח בקלות. והשינה והיקיצה ר"ל שיעשה השינה והיקיצה בעת הראוי ובשעור הראוי, לא יטה אל אחת מהם יותר מן הראוי, שאם נטה אל השינה יותר מן הראוי, היתה הנפש מזה עצלה, ואם נטה אל היקיצה יותר מן הראוי תחלש הנפש ויחלש החום היסודי. וכן הענין בתנועה והמנוחה ר"ל שהוא ראוי שלא יטה אל אחת מאלו יותר מהראוי, וזה כי רבוי התנועה יפזר החום היסודי, ורבוי המנוחה יקנה לנפש עצלה, עם שהתנועה כאשר תעשה בשעור הראוי תעזור לברר מהאברים הליחות הרעות שיתילדו ממותרי הבשול. והמקרים הנפשיים, ירצה, לפי מה שאחשוב, שלא יכעיס אלא לפי מה שראוי ובשעור הראוי, וכן הענין בשמחה, וזה כי הכעס יקבץ החום היסודי, והשמחה תפזרהו, ומי שיפליג בשמחה או בכעס יהיה אפשר שימות מצד הקבוץ החזק אשר יקרה לחום היסודי או מצד הפזור החזק."

" 'Food and drink', that is to say, that one should eat and drink that which is suitable for his constitution, at the right time and in the proper amount. 'Diarrhea and constipation', that is to say, that one must try medical prescriptions, so that he may establish a normal condition again, during diarrhea or constipation; for when constipation becomes too severe, many sicknesses are likely to occur. The same is true of too severe a case of diarrhea. 'The surrounding air', that is, he must try not to have the surrounding air too strong for his constitution, for then, he will undoubtedly cause injury to his constitution. He must likewise try to purify the surrounding air of its accidental putrefying elements, for putrid air will readily cause the body to decay. 'Sleep and waking', that is, one must perform the functions of sleeping and waking at the proper time and in the proper amount. One must not incline to either of them more than is suitable, for if one inclines more than is necessary towards sleep, the soul will thereby become indolent, and should one incline more than is necessary toward waking, the soul will become debilitated and the natural heat will weaken. The same is true of 'motion and rest', that is to say, it is proper not to incline to either one more than is necessary; for excessive

motion will dissipate the natural heat, and excessive rest will cause the soul to become indolent, although motion, when exercised in the proper amount will aid in purifying the limbs of the body of the injurious humors that arise in them as a result of the excesses of decoction. By 'accidents of the soul' he means, in my opinion, that one should anger only when it is absolutely necessary and to the extent that is necessary. The same is true of joy; for anger will cause the natural heat to contract and joy will dissipate it. Whoever goes to great extremes in rejoicing or angering may possibly bring on death as a result of the violent contraction to which the natural heat is subjected or as a result of its excessive dissipation."

[22] This ratio between the active qualities and the passive in the body is unknown by nature and human intelligence cannot fathom it.

[23] See *De Long. Vit.*, 6, 467a 12.

[24] My translation of this passage is based upon the original Arabic and upon the Hebrew translation of the passage in Falaquera's *De'ot ha-Pilosofim*, ch. 8, end: ״ויהיה פועל הפשוטים בו יותר״ "so that the activity of the simple elements within it is more [intense]". Ibn Tibbon translated the Arabic ״كان״ as כאלו, and therefore his translation of the passage reads somewhat differently: "so that as if the activity of the simple elements in it were more [intense]". The Latin translation agrees with the Arabic and with Falaquera's Hebrew version: "quapropter actio simplicium fortior erit in ea"; "on account of which the activity of the simple elements in it will be more intense".

[25] Aristotle rejects the claim that the various causes given for longevity, such as warm and dry places, the size of the body, copiousness of the blood etc., are essential causes. He regards these as merely accidental. See *De Long. Vit.*, 4, 466a 1ff.

[26] The horse's span of life, for example is shorter than that of man (*op. cit.*, 4, 466a 1, 2).

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