

THE LOGICAL PART

OF

AL-GHAZĀLĪ'S MAQĀSID AL-FALĀSIFA

ABU HĀMĪD said, Glory be to God who has preserved us from error and made known to us the stumbling block of the ignorant. And may praise be uttered for him who is the most distinguished of the exalted ones. You have asked me, my brother, for a thorough exposition, which would contain a refutation of the philosophers - the contradiction of their opinions, and (the disclosure of) their hidden errors and mistakes. But you cannot hope to refute them before you know their doctrines and study their dogmas, for to grasp the falsehood of certain doctrines before having a complete understanding of them is absurd. Such an effort leads only to blindness and error. Therefore, before entering upon a refutation of the philosophers, I deemed it necessary to present an exposition and a full description of their ideas of the logical, physical and metaphysical sciences without, however, distinguishing between the true and the false. My sole intention is to set forth the purport of their words without prolix and so I omit glosses and additions. I shall set forth their ideas in expository and descriptive form adding what they consider to be proofs. The purpose of this book is to give an account of the Meanings Of The Philosophers; and that is its title. Know, first, that their sciences are divided into four classes; the mathematical, the logical, the physical and the metaphysical. The mathematical sciences deal with arithmetic and geometry. There is nothing in the theorems of arithmetic and geometry which contradicts truth, nor are they subject to disagreement and denial. Since this is so, it is not our intention to deal with them, and we will not trouble to deal with them. In metaphysics most of their dogmas contradict truth, and the true occurs only sporadically.

In the logical sciences most of their propositions are correct and error occurs only sporadically; here they deviate from truth only in so far as their conventions and assumptions are concerned, but not in so far as the objects and purposes are concerned. For the purpose of the logical sciences is to correct the methods of logical proof. On this all logicians are agreed. In the physical sciences the true mingles with the false and right resembles error; no judgement is possible. What must be regarded as false will be explained in the al-Tahāfut. Know then that what we shall set forth will be a general and unqualified account without examination of what is true and what is false. Only after we have completed the exposition will we begin, earnestly and with zeal, a separate book, to be called al Tahāfut al falāsifa, if God will. Now we shall begin with the exposition of logic and its assumptions.

#### TREATISE ON LOGIC.

ABŪ HĀMID SAID: Introduction to an exposition of logic, its parts and its value.

EXPOSITION: Although the sciences are divided into many branches they may be reduced to two; conception and judgement. Conception consists of grasping the essence of things designated by uncombined words by way of making something understood and asserting a truth. As for example the grasping of the object designated by the word "body", 'tree', 'angel', 'spirit', and the like. But judgement is e.g. the knowledge that "That the world was created," that "The believers will be rewarded and the rebellious will be punished." Every judgement is of necessity preceded by two concepts. For

without understanding either 'world' and its definition, or 'created' and its definition one cannot possibly assert that it was created. But the word 'created', when its meaning cannot be properly conceived, is like the word 'preated', for example. For if it were asserted that "The world was preated," it would be impossible to affirm or deny it. For how can that which is not understood be negated or confirmed? The same is true of the word "world" when it is replaced by a meaningless word. Every conception and judgement is further divided into that which is grasped immediately without investigation and reflection and into that which results only from investigation and reflection. That which is apprehended without investigation is e.g., 'things', 'beings' etc. That which results from investigation is, e.g. the realization of the true nature of 'spirit', 'angel', 'truth', 'elements' and the conception of those things whose essences are hidden. Judgements that are immediately affirmed are e.g. the assertions that "Two is more than one," or that "Things equal to the same thing are equal to each other." To this may be added judgements accepted on the basis of sense perception or authority and judgements which are embraced by people without preliminary investigation or reflection. All these judgements are reducible to thirteen classes and will be revealed later in their proper place, if God Wills. The judgement which is grasped through reflection is e.g., the affirmation that "The world was created," or that "Material bodies were created", or that "There is reward and punishment for good and evil deeds," etc. A conception that is made possible only through investigation is arrived at only by

definition. And judgement that is made possible only through investigation is arrived at only by argumentation. Each one of them must be preceded by undoubted knowledge. For when we do not understand the concept 'man' and we ask "What is man?" and are told "He is a rational animal," then the concept 'animal' and the concept "rational" should both be known to us so that from both these concepts we arrive at the knowledge of the unknown concept 'man'. When we doubt that "The world was created" and proof is adduced that "The world has form," and that, "whatever has form was created," and therefore the "The world was created," then this proof will not give us any knowledge we did not have before concerning the creation of the world, unless this proof is preceded by the two judgements that "The world has form" and that "Whatever has form was created." Thus by these two affirmations we gain knowledge we did not have before. Consequently, it is hereby established that all knowledge which is acquired through investigation results only from a preceding knowledge. But there cannot be an infinite regress. For it is impossible not to arrive at first principles which occur in the intellect without investigation and reflection. This is the introduction to logic.

ABŪ HĀMĪD SAID: THE VALUE OF LOGIC. Now that it has been established that the unknown follows only from the known, it must be understood that not every unknown will result from every known, but for every unknown there is a particular known which is related to it. There is a method of bringing it into the intellect and this method makes the unknown known. That which yields affirming

conceptual knowledge is called definition or description. And that which leads to affirming knowledge is called argumentation. To the latter belong the syllogism, induction example, etc. Every definition and every syllogism is divided into that which is true, and gives certainty, and that which is false, but resembles truth. Therefore, the knowledge of logic will furnish us with the criteria by which we may distinguish between the sound and the unsound definition and syllogism, so that by it we may distinguish between certain and uncertain knowledge. It is, as it were the weights and scales of all knowledge. But you cannot differentiate increase from decrease, gain from loss, in knowledge which is not weighed on these scales. You might demur and say that, while the value of logic is that it discriminates between knowledge and ignorance - or what value is knowledge? the answer is that all values

are contemptible compared with eternal bliss, which is the ultimate bliss and depends on perfection of the soul. This perfection is of a two-fold character: ornamentation and purification. Purification consists of cleansing (the soul) of mean virtues and ridding it of vices. Ornamentation consists of engraving on the soul the ornament of truth, so that there will be revealed to it the divine truths, nay the whole of existence in its proper order, with a complete and true knowledge corresponding to reality, free from ignorance and error. It is like the mirror, the perfection of which lies in the fact that beautiful forms may be seen in it as they really are, without perversion or change. This is effected by keeping it clean of dirt and rust and further by having beautiful forms

placed in front of it. The soul is a mirror in which the forms of the whole of Existence are impressed when it is freed of the mean virtues and cleansed and polished. But to distinguish the praiseworthy from the blameworthy virtues is possible only through knowledge. Thus the engraving of the whole of Existence on the soul is made possible only through knowledge; there is no way of reaching it except through logic. Therefore, logic serves to acquire knowledge, and knowledge gains for us eternal bliss. Since it is true that eternal bliss may be traced back to the soul made perfect by purification and ornamentation, logic, then, without doubt is of extra-ordinary value.

#### THE PARTS OF LOGIC AND ITS STRUCTURE

will become clear a statement of its purpose; viz. definition, the syllogism and the differentiating between the true and the false in both of these. The more important of the two is the syllogism, which is composed of two premises, for a syllogism is constructed out of two premises, as will be seen in what follows. Every premise contains a subject and a predicate, and every subject and every predicate is a term which clearly designates a concept. He who wishes to grasp that which is combined, whether it is a real object or only an object of thought, must put the uncombined parts first. Just as the builder of a house must prepare wood, bricks, and clay, and bring the uncombined and the particular first - and then concern himself with building - so is the process of knowing in relation to the known. For it is an image corresponding to the known. Therefore, he who strives after knowledge of

the combined must first strive after knowledge of the uncombined. It follows from this that we must deal first with terms and the manner in which they designate concepts; then with the concepts themselves and their divisions; then with the proposition composed of a subject and a predicate, and its divisions; then with a syllogism, which is composed of two premises. We will discuss the syllogism in two chapters. In one we will deal with its matter, and in the other with its form, as will follow.

This is the subject matter included in our presentation of logic. It contains five chapters.

## CHAPTER I

### CONCERNING THE MEANING OF TERMS

This theme will be explained in five sections.

Section 1. The term designates the idea in three different ways. One of them is by congruence, as when the term house designates the idea of house completely. The second is by inclusion, as when the term "house" designates "wall". For the term "wall" expresses only what it means by congruence, and designates it accordingly. But the term house also designates it, except that it differs in the manner of designation. The third is by means of connotations, as when the term "ceiling" designates wall. This method differs from the method of congruence and inclusion. The latter two are employed, though not connotations. Connotations imply other connotations and therefore may be applied to an indefinite number of connotations without arriving at any definite meaning.



designates a wall, since the existence of the ceiling presupposes a wall upon which the ceiling may rest. Therefore, a wall is also called a ceiling. He said that this should not be employed because the connotation may have a further connotation. The foundation may be called both 'ceiling' and 'the interior of the house'. Thus no definite meaning would be arrived at.

Section 2. The term is divided into the incomplex and the complex. The incomplex is a term no part of which designates any part of the concept, e.g., "man" (Enosh). For neither part of the term, whether "en" or "nosh," designates any part of the ~~xxxxx~~ concept "man", in contradistinction to the statement "Reuben's son" and "Reuben walks," where the "son" which is part of the sentence, designates a concept and "Reuben" designates a concept. When you say "Abd-Ullah," if the word is a kunyā, it is incomplex because you mean by it only what you mean when you say "Zaid," but if you mean a na'at then it is a complex term. For all who bear the name 'Abd-Ullah are really servants of God. Therefore, this expression is in essence homonymous, sometimes it serves as a designation - and then it is incomplex, and sometimes it serves as an attribute, and then it is complex.

THIRD SECTION: The term is divided into the particular and the universal. The essential (nefesh) meaning of the particular excludes ambiguity, e.g., "This Zaid," and "this horse," and "this tree." The essential meaning of the universal does not exclude ambiguity, e.g., "the horse," "the tree," "the man." If there were only one horse in the world "the horse" would still be a universal since its ambiguity is potential though not actual. It becomes particular when you say, "this horse". Therefore, were you to say "the sun" it

would be a universal. If you were to assume the existence of other suns, they would be included under this term which would not be the case with "this sun".

FOURTH SECTION: The term is divided into verb, noun and syncategorematic term. The logicians called the verb a categorematic term, and the particle a syncategorematic term. Both noun and verb differ from the syncategorematic term in that they are complete and understandable in themselves, which is not the case with the syncategorematic term; for if you are asked, "Who enters" and you answer, "Zaid," the answer is clear and complete. Or when you are asked, "What did Zaid do," and you answer, "He struck", the answer is complete. But if you were asked, "Where is Zaid", and you answer, "in" , or "on", the answer is incomplete as long as you do not add "in the house" or "on the roof". The meaning of the particle becomes clear in connection with other things and not in itself. The verb differs from the noun in that the former designates the action, and the time of the action, and the time of the action, e.g., "He struck". The verb designates the striking and that it occurred in the past, while the noun, e.g., "the horse", "the striking", "health", does not indicate time. But if it should be said, e.g., that the words "yesterday", "last night", also indicate time and therefore they should be verbs, the answer is that the verb is that which designates the action and the time of the action. But the time indicated by "last night", is the action itself, not the time in which the action took place. Were "last night", to indicate that the concept "last night", took place in time -

which is not the meaning of "last night", then it would be maintained that it is a verb, and it would agree with the definition of a  $\bar{h}$  verb.

FIFTH SECTION: Words in relation to their meaning are divided into five classes; univocal, synonymous, equivocal, homonymous and distinct. "Animal", for example, is univocal for it has the same meaning when applied to "horse," "ox", and "man", without any differentiation as to strength and weakness, priority and succession because animality is the same for all. Similarly, the term "man" is applicable to Zaid, 'Amr, Khālid, and Bakr. Synonyms are different words applicable to the same object, e.g. layish, aryeh, (lion,) chemar, yayin (wine). Distinct terms are different words used for different objects. E.g., the words "horse," "ox," "sky," refer to different objects. A homonym is a word applicable to different objects, e.g. the word "ain," meaning "eye," "sunbeam," and "spring of water." Equivocal terms fluctuate between homonyms and univocal terms. Existence for example, in relation to essence and accident, is not like the word "ain," which designates objects that have nothing in common. It belongs to accident as well as to essence. Nor is it like a univocal, since animality inheres in the essence of horse and man in the same manner while Existence inheres in essence first and then, through its mediation, in accident. Therefore, it inheres by priority and by succession. Sometimes because of its fluctuation, it is called amphibolous. We shall limit ourselves in this chapter to incomplex terms.

## CHAPTER II

### CONCERNING UNIVERSALS: THE DIFFERENCE IN THEIR RELATIONSHIPS AND THEIR PARTS:

When we say "This man is an animal and white" we recognize a difference between the relation of animality to him and the relation of whiteness. The relation of animality ascribed to objects is called an essential relation. The relation of whiteness ascribed to objects is called an accidental quality. For every universal concept which is applicable to a particular subsumed under it is either essential or accidental. No concept is essential as long as it is not of a three-fold character. First: When we know what the essential (of the universal) is and what the essential (of the particular) is we can think of the subject (i.e. the particular) and know it only if we know that the essential (of the universal) belongs to it. But we cannot know the particular without knowing the essential (of the universal). ~~When we know what the essence of man is only when we know what the essence of animal is, since we cannot know what man is unless we know what animal is.~~ When we know what the meaning of "number" is we know what the meaning of "four" is since we cannot know what "four" is without first knowing what "number" is. But if we replace the expression "animal" or "number" by "existence" or "white" we know the "four" without knowing whether it (exists) or not, or whether it is white or not. In other words, we may (even) doubt whether "four" exists in the world. However, this does not prevent us from knowing the essential meaning of "four". Similarly, we may know the essence of man without knowing that he is white or that he

exists. But we cannot know man without knowing that he is animal. If our intellect fails to grasp this example because we are men and there are many men who exist, we can replace the word "man" by "crocodile" or any other animal. It then becomes evident that existence is accidental to beings in general, while the concept of animal belongs to man as an essential. Similarly, color is essential to blackness and number to five. Second, know that there must first be a universal before a particular can be subsumed under it, whether this particular be a real object or an object of thought. For we know that there must first be "animal" before there can be "man" or "horse," and that there must first be "number" before there can be "four" or "five." But one cannot say that there must first be laughter before there can be man. On the contrary, there must first be a man before laughter is possible. Man's laughing nature is an attribute, accidental to him, which follows from his existence and is similar to his being an animal in that it inheres in him and is inseparable from him. But the difference between them is recognizable. Without animality there can be no man, but we cannot say that there must first be laughter before there can be man. There must first be man before laughter is possible. This priority is not of a temporal but rather of a logical order, since both occur at the same time. Thirdly, the essential cannot be caused. We cannot ask what has made man an animal, blackness a color or four a number. Man is an animal by virtue of his essence, not because of the action of an agent; for if the latter were true one might assume

that this agent might make him a man without his being animal. But this is inconceivable, though it is conceivable that he could be a man, without being a laughing man. The accidental, however, is caused. One may ask: What has made man exist? This is a proper question. But it is not proper to ask: What has made him an animal? In other words, to ask: "What made man an animal?" is like asking: "What made man a man?" For one may say he is a man by virtue of his essence, and similarly, he is an animal, by virtue of his essence. For "man" is a rational animal, and there is no difference between asking: What made him an animal? He simply abbreviated the latter question by stating one of the two essential attributes and excluding the other. In general, when the predicate does not differ from the subject and they both proceed from its essence in the universal, we may not ask for its cause; for we may not ask: Why is the possible possible and the necessary necessary? But we may ask: Why does the possible exist?

ANOTHER SECTION CONCERNING accidents in particular:  
The accidental is divided (into that which is separable from its subject and that which inheres permanently and inseparably, e.g. the laughter of man, the duality of two and the angles of a triangle being equal to two right angles. They are inseparable from the concept of a triangle, inherent in it without being essential. The separable is divided into that which is slowly separable, e.g., the state of being a boy, youth or graybeard, and into that which is quickly separable, viz., the pallor of the coward and the flush of the shamefaced one. The inseparable is divided into that which is separable in thought but not in reality, like the Blackness of the Ethiopian,

and into that which even in thought cannot be apprehended as being separable, like the indivisibility of the point, and the duality of four. Sometimes it is separable in thought but not in reality in another way, e.g., the angles of the triangle being equal to two right angles, since one who does not understand that may nevertheless understand a triangle. But it is impossible to understand the "four" unless it is combined with the understanding of duality, though all (the elements) are inherent. Because these examples of the inseparable resemble essentials and may be mistaken for them, we have assembled these three categories to consider them together, so as to know by their combination when a quality is essential and not to have to rely on one only. The accidental is divided into that which distinguishes its subject, e.g., the laughter of man, which is called a property, and that which it has in common with others, e.g., eating, in relation to man, which is called a general accident.

**ANOTHER SECTION CONCERNING ESSENTIALS.** From the point of view of universality and particularity, the essential is divided into that which is not subsumed under anything more universal, and is called genus; into that under which nothing more particular is subsumed, and is called species; into that which is the mean and is called a species in relation to that which is above it, and a genus in relation to that which is underneath. The species under which no further species is subsumed is called the lowest species. The genus which is not subsumed under any other genus is called the highest genus. The highest genera that are not subsumed under any other are ten in number, as will appear. One is "substance" and nine are

accidents". Substance is the highest genus since there is nothing more universal outside of "existence", which is accidental and not essential. Genus is a term for the most universal essential. Substance is divided into matter and non-matter, and matter is divided into the growing and non-growing.

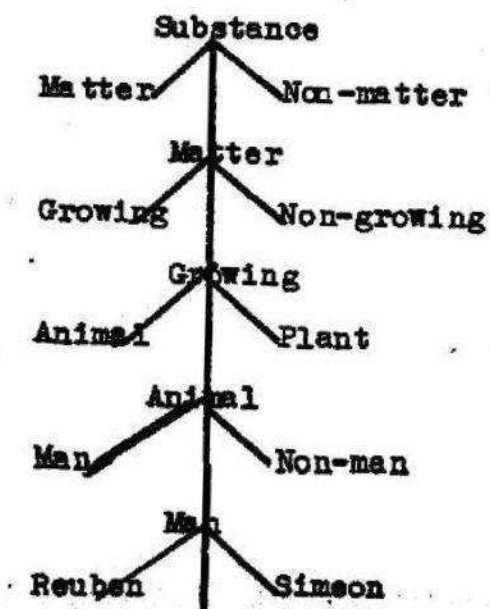
The growing is divided into plant and animal, and animal is divided into man and not-man. Thus, ~~instanss~~ substance is the highest genus and man the lowest species. Plant and animal, which lie between, are called relative species and genus. Only man is called the lowest species because men differ only in accidental characteristics, e.g. boy, graybeard, long, short, wise man, fool. These characteristics are accidental and essential. Man differs from the horse in essence, and the color black differs from white in essence, but one black color does not differ in essence or nature from another black color. One is found in pitch and the other in a raven, its relation to the raven being accidental. So too, Zaid does not differ from Umar either in being "man" or in any other essential thing save in being the son of another person or from another country, or of another color, size, or disposition. All these are accidental characteristics in accordance with the definition of accidental given above.

**ANOTHER SECTION CONCERNING ESSENTIALS:** From another point of view, the essential is divided into that which serves as an answer to the question: What is it? when we mean by the question what is its real essence; and into that which serves as an answer to the question: What kind of thing is it? The first is called a genus or species, the second is called a difference. An example of the first is the answer, "animal"



to the question: What are they? after one has pointed to a horse, an ox or a man, or

a) The text has the following diagrams:



the answer "man" to the question: What are they? after the question has pointed to Zaid, 'amr or Khālid. An example of the second is the answer "rational". For when one has pointed to man and asks: What is he? and you answer, "animal" the question is incompletely answered, for "animal" includes more than man. What is necessary is that which differentiates his essence from others. The question is, therefore: What kind of animal is he? The answer is that he is rational. Rational, therefore, is the essential difference in answer to the question: What kind of thing is he? The combination of "animal" and "rational" contains the real definition, for the definition expresses what the person who asks apprehends as being the essence of the thing. If we replace "rational" by an accident which differentiates him from all other animals, e.g. an animal of erect stature with wide nails and of a laughing disposition,

this defines him and differentiates him from all other animals. This is called description, and is of benefit only in awareness of differences. But by means of definition, the real essence of a thing is investigated, and is attained only by stating all the essential differences. Awareness of differences is attained from the generally known and is sometimes attained ~~by~~ by only one difference. The apprehension of essence, however, is attained only through stating all of the differences.

Sometimes there is more than one difference, so that when the question concerns the essence of the thing, it is necessary to state these differences. Whoever, therefore, in defining "animal" says that it is a body, equipped with a soul and sentient, is stating characteristics which are essential, distinctive and of general application which may be inverted. However, he must add to it "that which moves by its own will," so that the stating of essential differences is exhausted by it and the apprehension of its true essence is completed.

Now that the exposition of definition is understood, we shall point out the errors which may occur in definition. They occur when after having combined the nearest genus with all the essential differences in the proper order we define a thing by something that is not clearer than the thing itself, i.e., when you define a thing by itself, or by something that is as obscure as the thing to be defined, or by something that is more obscure, or by something that is known only after the thing to be defined is known. An example of the first is the statement, in defining "time", that it is "duration of movement", for "time" is indeed "duration of movement". But he who does not understand the concept of "time" does not,

therefore, understand what "duration of movement" means and what the concept of duration is. An example of the second is the statement that whiteness is the opposite of blackness, making the thing known by its opposite. But when the thing is unknown its opposite is unknown, for its opposite is as unknown as the thing itself. Defining whiteness by blackness first is no clearer than defining blackness by its opposite. An example of the third is the statement when defining "fire," that it is "the element which is similar to the soul". As is well known, the concept of "soul" is more obscure than that of "fire"; ~~then, how~~ how, then, can the latter be known through the former? An example of the fourth is the definition of something by what is made known only by it. For example, the definition of "sun": A star which shines during the day. The word "day" is mentioned in defining "sun", though it is understood only after understanding the word "sun". For the real definition of "day" is; the time during which the sun is over the earth. We must be careful of these important things in our definitions. From what has been said above, it follows that the essential is divided into three classes: genus, species and difference; and the accidental into two classes: property and general characteristics. It is thus established that the parts of the incomplex universals are five in number and are called the five incomplex terms. They are: genus, species, difference, accident and property.

THE THIRD CHAPTER---CONCERNING THE combining of the incomplex and the kinds of propositions: Incomplex words may

~~we~~ combine to form sentences. We shall be concerned only with one kind of sentence - that which makes a statement. It is called a proposition or an enunciative sentence, truth and falsity being applicable to it. The statement "The world was created", may be true, and the statement "Man is a stone" may be false. Or when you say "if the sun rises" then the statement "the stars are invisible" is true, and the statement "The stars are visible", following the same condition, is false. The statement "The world either was created or is eternal" is true. But the statement "Reuben is either in Bedersh or in Narbonne" is false because he may be in Montpellier. These are kinds of propositions. But the statements "explain a problem to me", or "will you join me in a journey to Mecca?" cannot be either true or false. This is the subject matter of the proposition. It will be explained when we discuss the kinds (in detail).

FIRST SECTION: The propositions may be divided into the categorical, e.g., "The world was created"; the conditional, e.g., "If the sun shines then it is day"; and the disjunctive, e.g., "The world is either eternal, or was created." The first, the categorical, consists of two terms: One is the subject. It is that about which - e.g. "The world" - something is stated. The second is the predicate. It is that which is stated, e.g., 'created', in the statement "The world was created." Sometimes both predicate and subject are incomplex words, as we have stated, and sometimes they are complex words, though they may also be expressed by incomplex words - e.g., "The rational animal goes on foot." Now "rational animal" is the subject, it takes the place

of the word "man" which is incomplex; "goes on foot" is the predicate and takes the place of the word "goes". The conditional also consists of two parts, but each one contains a proposition. The first part, e.g., "if the sun rises", is called the protasis. And even though the conditional particle, i.e., "if" may be missing, "the sun rises," which is a proposition, remains. But the conditional particle bars it from being a proposition subject to truth or falsity. The second part "then the stars are invisible," is called the apodosis. Even though the apodictic particle, which is the Arabic fa and the Hebrew hinne, may be missing, "the stars are visible," which is a proposition, remains. The difference between this proposition and the categorical is apparent in two ways. One is that the two parts of which a conditional is composed are each of them sentences, it being impossible to express each part by an incomplex word, whereas the two parts of which a categorical proposition is composed, are terms. The second is that in a categorical proposition, it is possible to ask of the subject if the predicate is its essence. For we say, "Man is an animal" and we may ask, "Is man an animal"? But the apodosis is not the essence of the protasis. The apodosis may be other than the protasis, except that it is necessarily connected with the latter and its existence follows from the existence of the latter. The conditional differs from the disjunctive in two ways. One is that the disjunctive consists of two parts, each one being a proposition even when the disjunctive particle is missing. But there is no fixed order between the two parts outside of the order of the statement itself. For if you had changed the statement "The world was either created or is eternal" to "is either eternal or was

created" the meaning is not altered. But in the conditional if the apodosis is put in place of the protasis the meaning is altered; so that while in the proper order it may be true, in the reverse order it may be false. The second distinction is that the apodosis agrees with the protasis, in the sense that it is connected with it, is necessary to it and does not contradict it; while one of the two parts of the disjunctive contradicts the other and is distinct from it. For the existence of one of them requires the non-existence of the other.

ANOTHER SECTION: The proposition, from the standpoint of its predicate may be divided into the affirmative, e.g., "The world was created" and into the negative, e.g., "The world was not created". "Not" is a negative particle. Negation in the conditional negates the conjunction (between protasis and apodosis) e.g., "not" in (the sentence) 'If the sun rises, it is not night'. Negation in the disjunctive negates the disjunction, e.g. "not" in the sentence "The ass is not either male or black, but either male or female". Or "The world is not either eternal or material but either eternal or created". The protasis and apodosis may negate, then the condition composed of them affirms, e.g., "If the sun does not rise then it will not be day". This proposition is affirmative, since we have affirmed the conjunction of the non-existence of the day with the non-existence of the sun's rising. That is the meaning of affirmation in this proposition. This is a stumbling block. In like manner one may err in a categorical proposition and think that the sentence, "Zaid is non-voyant" is negative, though it actually is affirmative, because its meaning is that he is blind. We may say, in Arabic, "Zaid is non-voyant" and

think it negative though it is affirmative, "non-voyant" being a term signifying blindness. It is a predicate which may be either affirmed or negated. For example, "Zaid is not non-voyant." This negates the "non-voyant" of Zaid. This kind of proposition is called equilibrated, i.e., it is in reality affirmative though negative in form. It indicates that a negation may be true of a non-existent thing. We may say "The companion of God, Blessed Be He, does not see", and ~~xxxx~~ "the absurd is not knowledge." But we may not say "the companion of God is non-voyant" just as it is impossible to say "The companion of God is blind," for that affirms the existence of God's companion. This is even more apparent in Persian.

ANOTHER SECTION: The proposition, from the standpoint of its subject, may be divided into the singular, e.g. "Zaid knows" and into the non-singular; the latter being divided into the indefinite and the quantified. The indefinite is that to which no sign is attached indicating that the proposition is predicated of all or part of the subject, e.g., "Men are righteous" because it also admits of meaning "some". The quantified is that in which the sign is stated. There are four quantifications: universal affirmative, e.g., "Every man is an animal"; universal negative, e.g., "No man is a stone"; particular affirmative, e.g., "Some men write"; particular negative, e.g., "Not every man writes" or "Some men do not write". From this standpoint there are eight kinds of propositions, (the four mentioned and the following four); singular negative, singular affirmative, indefinite negative, indefinite affirmative. These four are not employed in the sciences because the problem of the particular

individual is not investigated in the sciences. It is not the problem of Zaid that is investigated, but rather the problem of man. The force of the indefinite is that of the particular, since at the very least it deals with the particular. Its universality is a matter of doubt because it may be reduced to less. Therefore, it must be rejected in the sciences. There remain the four quantifications: universal affirmative, particular affirmative, universal negative, particular negative. The conditional may also be divided into a universal, e.g., "Whenever the sun rises it is day." and into a particular, e.g., "Sometimes when the sun rises, it is day." In the disjunctive, too, there is a universal, e.g., "Every material substance is either in motion or at rest," and a particular, e.g., "The man is either on the ship or drowned in the sea." This alternative is applicable to man only at certain times, e.g., when he is at sea and not on land. We must also add an example of the particular negative and the universal negative of the conditional and disjunctive.

FOURTH SECTION: The proposition, from the standpoint of the relation of its predicate to its subject, is divided into the possible, e.g. "Man writes," "Man does not write;" the impossible, e.g., 'Man is a stone' 'Man is not a stone;' and the necessary, e.g., "Man is an animal," "Man is not an animal." The relation of writing to man is a possible relation. We do not take into consideration the difference effected by the negative and affirmative expressions. For that which is negated is as much a predicate in a negative proposition as that which is affirmed is a predicate in an affirmative proposition. The relation of stone to man is an impossible relation, while the relation of animal to man is a necessary relation. The possible is an equivocal with



two meanings, because it may mean whatever is not impossible, so that it also includes the necessary. From this standpoint, propositions are of two classes: possible and impossible. It may also mean what may be existing at a certain time or may be non-existing. This is the particular usage. From this standpoint, there are three classes; necessary, possible and impossible. In this case the necessary is not included in the possible, but in the first case it is included in the possible. However, the possible in the first case does not necessarily imply the possibility of nonexistence. But sometimes non-existence is impossible, like the necessary, which is impossible. So the possible in this case only means that it is not impossible. The possible, then is only an expression for the not impossible.

FIFTH SECTION: Every proposition may have an apparent contradictory, which disagrees with it either in the affirmative or in the negative. But if the true and the false are involved in it they are called contradictory and we say one of them is the contradictory of the other, which means that it is false when the proposition is true, and true when it is false. The contradiction is true only under five conditions. First: the subject of both should be the same in reality as it is in name, if not, there will be no contradiction. For we say, "The dog will die;" "The Dog will not die", meaning by the latter the dog-star, so that there will be no contradiction, or we say "The ram will be slaughtered and fried", "The Ram will not be slaughtered or fried", meaning by the latter the constellation, Aries. Second: their predicate should be the same, if not there will be no contradiction, e.g., "The fire consumes", "The fire does not consume". The first

denotes perishability, the second, eating, Since the word shilah is a homonym there is no contradiction, like the word "dog", above. Third: the whole and the part should not be interchanged, for when we say, "Someone's eye is black", by which we ~~mean~~ mean the pupil of the eye, then saying "His eye is not black" will be no contradiction, if we mean the absence of black coloring from the whole eye. Fourth: the potential and the actual should not be interchanged. For when we say, "The wine in the barrel is intoxicating" and we mean that potentially it intoxicates, saying, "The wine in the barrel is not intoxicating" will be no contradiction because what is meant by the latter is the absence of actual intoxication. Fifth: they should bear the same relation to all their correlatives. Thus, our saying "Ten is half" does not contradict saying "Ten is not half", "it is half" in relation to twenty and "it is not half" in relation to thirty, etc. The two statements "Zaid begets", "Zaid does not beget", are true in relation to two different people. (Sixth: they should be the same in time and place) In general, the two propositions should differ only in negation and affirmation. One proposition should negate of the subject what the other affirms of the same subject in the same manner, without change. If the subject is universal and not singular, a sixth condition is added, namely: they must differ quantitatively, in so far as one of them is universal and the other particular. For if both are particular, both may be right in the possible mode, e.g., "Some men write", "Some men do not write." If both are universals they may both be false in the possible mode, e.g., "All men write", "All men do not write."

SIXTH SECTION: Every proposition is apparently convertible.

Conversions are divided into those whose truths necessarily follow from the truth of the original proposition, and into those whose truths do not necessarily follow, and are false. By conversion is meant the transposing of predicate and subject. If the truth remains the same, we say this proposition is convertible. If it does not necessarily follow, we say that it is not convertible. We have already stated that there are four quantified propositions: universal negative, which is convertible per se, as a universal negative. For if the statement "No man is a stone," is true, the statement "No stone is a man" is also true. If it were not true, its contradictory would be true, i.e., "Some stones are men" and this "some" would refer to "men" and "stones." But this contradicts the statement "No man is a stone", which is the proposition we assumed to be true in the first place. This shows that the universal negative is convertible per se. The particular negative, however, is not convertible at all. For while the statement "Not some men write" is true, it does not necessarily follow that the statement "Some who write are not men" is true. The universal affirmative is convertible into the particular affirmative but not into the universal. For if "Every man is an animal" is true, "Some animals are men" is certainly true and "Every animal is a man" is not true. The particular affirmative is also convertible per se. For just as "Some animals are men" is true, "Some men are animals" is also true. This is the enquiry concerning kinds of propositions.

THE FOURTH CHAPTER: Concerning the composition of propositions to form a syllogism. This is the purpose of the entire enquiry. But

first in thought is last in deed. The investigation of the syllogism consists of two parts, ~~and~~ ~~and~~ form and matter. The first principle concerns the form of the syllogism. It has ~~x~~ already been mentioned that knowledge is either conception or judgement. Conception is arrived at through definition, and judgement through argumentation. Argumentation may either be syllogistic or by means of induction or analogy. The investigation of the unknown by the known is called analogy. All these are employed in argumentation, especially the syllogism, particularly the demonstrative syllogism. We must, however, first give a general definition of the syllogism, which will be divided into the demonstrative and the non-demonstrative. The syllogism is a term used for propositions so combined that from their essential assumption a third proposition (e.g., that "The world was created") necessarily follows. The same is true if only one of them is a necessary proposition. For example, "The world has form" and "Everything that has form was created." From the assumption of these two combined propositions, a third proposition, e.g., that "the world was created", necessarily follows. Similarly, when we say, "If the world has form, then it was created," and "It has form," the conclusion "The world was created" results from the assumption of the two premises. Similarly, when we say "The world was either created or is eternal," but, "It is not eternal," the necessary conclusion is that "it was created." The syllogism is divided into that which is called categorical and into that which is called hypothetical. The categorical combines two propositions, which have one common term. For every proposition necessarily contains a subject and predicate. And the two propositions include four elements. Had they not one element in common no conclusion

statement, "The world was formed" and the statement, "The soul is a substance." But if the (second) proposition were connected to the first by one of its parts, e.g., "The world has form", and "Every form was created", then the sum of the parts of the proposition is reduced to three, called terms. Thus, the syllogism above is concerned with three terms, "world", "formed" and "created". What the two propositions mention twice, and have in common, is called the middle term. The subject of the conclusion, "world" is called the minor term, and the predicate "created", is called the major term. "The world was created" is the conclusion resulting from the syllogism. When the proposition is made part of the syllogism it is called a premise. The proposition which ~~contains~~ contains the minor term is called the minor premise. That which contains the major term is called the major premise. Neither premise can be designed by the middle term, because it is found in both premises. The minor term is contained in only one of them as is the major. The resultant of the syllogism is called a conclusion after it has become a resultant, and is called a postulate before that. The relationship of the two premises is called combination and the form of the combination is called figure. Three figures result: the middle term may be the predicate of one of the two premises and the subject of the other is then called the first figure; it may be the predicate of both, and is then called the second figure; it may be the subject of both, and is then called the third figure. The rule for antecedent and consequent in the conditional is the same as the rule for subject and predicate in the categorical in that the conditional is divided into these figures. The three figures are similar in that no

syllogism can result from either two negatives, or two particulars, nor can the minor premise be negative with the major premise particular. Every figure will be defined by the characteristics we have mentioned.

THE FIRST FIGURE: This figure differs from the other two in two ways. One is that in yielding its conclusion, it need not be reduced to another figure, while the other figures are reducible to this figure to make the necessary conclusion appear - It is therefore called the first figure. The other is that it yields the four quantified propositions, universal and particular affirmative, universal and particular negative, as conclusions.

The conclusion of the second figure can never be affirmative, and the conclusion of the third figure can never be universal. The first figure, to be conclusive, is subject to two conditions: the minor premise must be affirmative and the major, universal. If (one of) these two conditions is wanting then, though the premises may be true, no conclusion will result from postulating their truth. It follows from this figure that when you have postulated an affirmative proposition which is true, then whatever is asserted as true of the predicate is necessarily true of the subject. It cannot be otherwise. It is the same whether what is asserted as true of the predicate is negative or positive, or whether the subject is universal or particular. From this, four conclusive moods result, and the necessity of this conclusion is apparent. For if "Men are animals" is true, then everything which is truly asserted of animals - which is the predicate - their being sentient, or their not being stone, must be true of "men" since "men" are necessarily included

in "animals." And if the proposition concerning all animals is true, then it is necessarily true of some. This follows from the first figure. We shall now state the four different moods: the first contains two universal affirmatives, e.g. "All matter is composite," and "Everything composite was created." Therefore, of necessity, "All matter was created." The second mood contains two universals, the major premise being negative. It is essentially like the first, except that it substitutes "is not eternal" for the word "created" so that it becomes negative, e.g., "All matter is composite", "Nothing composite is eternal." Its conclusion is, that "No matter is eternal." The third mood is essentially like the first, except that we make the subject of the first premise particular. This does not necessitate a conversion of the proposition, because each particular is universal in relation to itself and whatever is asserted of the predicate of the particular is true of that particular. For example, we say "Some beings are composite", and "Everything composite was created." Therefore, the necessary conclusion is, "Some beings were created." This has been constructed from two affirmatives, the minor premise being particular. The fourth mood is essentially like the third, except that we make the major premise negative, thus substituting e.g., "Some beings are composite", "Nothing composite is eternal." The conclusion is that, "Not all are eternal." This has been constructed from a minor particular affirmative premise and a major universal negative premise. There are twelve other combinations, which do not yield conclusions, making sixteen combinations in each figure. The minor premise may be a universal or particular affirmative, or a universal or particular negative, making four. To each one of these

four major premises are added. Multiplying four by four, sixteen (moods) are obtained. Since we have laid down the condition that the minor premise must be affirmative, two negatives and their conclusions are excluded. Thus eight are invalid and two affirmatives remain. But four major premises are added to the minor universal affirmative premise; two of the former necessarily being particulars, and these two are invalidated, since we have laid down the condition that the major premise in this figure must be a universal. Thus, the number of moods is reduced to six. But neither the particular negative, nor affirmative, of the major premise may be combined with the particular affirmative of the minor premise, or no syllogism is possible from two particulars. Two more combinations, of the remaining six, are eliminated, leaving four. This is how the table now appears: When the minor premise is <sup>a</sup>universal affirmative, "Every C is B" and "Every B is A" it yields a conclusion. If the major premise is a universal negative, "No B is A", it yields a conclusion. But if the major premise is a particular affirmative, "Some B is A" it does not yield a conclusion because the major premise is a particular. So, too, if the major premise is a particular negative, "Not every B is A" it does not yield a conclusion. When the minor premise is a particular affirmative, if the major premise is a universal affirmative, "Some C is B" and "Every B is A", it yields a conclusion. But if the major premise is a particular negative, "Not every B is A" it does not yield a conclusion, because the major premise is particular. Thus we have combined with every minor universal affirmative premise and minor particular affirmative premise

But the negative predicate is dissimilar from the subject, and



what is asserted of it cannot be carried over to the dissimilar subject. So if we say, "Man is not a stone," and then make an assertion, whether negative or positive, with regard to "stone" that assertion does not carry over to "Man". For you have clearly marked out the dissimilarity between "stone" and "man" by the negative. This is the reason for the conditions we have laid down, and the reason that the conclusion is limited to four out of the sixteen moods.

THE SECOND FIGURE: The middle term is the predicate of both premises. It follows that every premise that asserts of its predicate what may not be found in its subject is a negative and not an affirmative premise. For if it were affirmative then what is asserted of the predicate would be asserted of the subject, as in the first figure. We said that whatever is asserted as true of the predicate of the affirmative premise is necessarily true of the subject. Then we found that what can be asserted of it with regard to the predicate cannot be asserted of it with regard to the subject, so that we know that the proposition is negative. If it were affirmative the judgement with regard to the predicate would be present in the subject. The conditions which make this figure conclusive are that the two premises shall be different in quality,

one of them being negative, the other affirmative, and that the major premise shall be universal in every mood. These two conditions also reduce the conclusive moods to four, as in the first figure.

THE FIRST MOOD of a minor universal affirmative and a major universal negative: e.g., "Everything material is divisible" and "No soul is divisible", therefore, "Nothing material is soul." The necessity of this conclusion is explicable by a reduction

to the first figure in a conversion of the major premise. For it is a universal negative and is converted per se., "Nothing divisible is a soul" the 'divisible' becoming the subject of the major premise which is already the predicate of the minor premise. Thus it becomes reducible to the second mood of the first figure.

THE SECOND MOOD of two universals, the minor premise being a negative: e.g., "Nothing eternal is composite;" and "All matter is composite", therefore, "Nothing eternal is matter". This is explicable by converting the minor premise and then making the major minor, and the minor major, "All matter is composite", and "Nothing composite is eternal," therefore, "Nothing material is eternal," as above in the second mood of the first figure. This conclusion is convertible since it is a universal negative. The result is, as we have stated, "Nothing eternal is material."

THE THIRD MOOD of a minor particular affirmative and a major universal negative. This is similar to the first mood of this figure, except in that the minor is made a particular, e.g., "Some creatures are divisible," and "No soul is divisible", therefore, "Some creatures are not souls", because when we have converted the major it is reducible to the fourth mood of the first figure.

THE FOURTH MOOD: of a minor particular negative and a major universal affirmative; e.g., "Not every creature is composite," and "Everything material is composite;" therefore, "Not every creature is material." This cannot be reduced to the first figure by conversion. If we were to convert the major affirmative, it would become particular and there is no syllogism for two particulars. But it can be made true in two ways, one of them being called assumption, the other apagogic. It is assumption when we say

"Some creatures are not composite". This "Some" assumes "Every"; assume that it is "Every" and we may call it "Some" or "Every". Then it will conform with the second mood of this figure. By apogoge is meant that, if, e.g., "Not every creature is matter" is not true, then its contradictory, "Every creature is matter", is true. Now it is known that "Everything material is composite," therefore, it necessarily follows that "Every creature is composite." But we have already assumed, in the minor term, that "Not every creature is composite" is true, then how can its contradictory be true. This (apogoge) is absurd, and what leads to it is absurd. What led to it was the assumption of a false conclusion.

THIRD FIGURE: the middle term is the subject of both premises. It follows that every minor premise is affirmative, so what is asserted of its subject may be asserted of part of its predicate, whether the assertion is negative or affirmative, or whether the minor premise is particular or universal. That is perfectly plain. It has two conditions: that the minor premise shall be affirmative: that one of the two premises shall be universal, whether it be the minor or the major. There are six conclusive moods in this figure.

THE FIRST MOOD of two universal affirmatives: "Every man is an animal" and "Every man is rational", therefore, "Some animals are rational", since the minor premise is converted as a particular. It is as though you said, "Some animals are men" and "Every man is rational" therefore, "Some animals are rational". This is similar to the third mood of the first figure.

THE SECOND MOOD of two universals, the major being negative; "Every man is an animal" and "No man is a horse," therefore, "Not

every animal is a horse." This is due to the fact that when the minor is converted it becomes a particular affirmative. It is thus reducible to the fourth mood of the first figure.

THE THIRD MOOD of two affirmatives, the minor being a particular; "Some men are white," "Every man is an animal", therefore, "Some, who are white, are animals". For the minor particular affirmative is convertible. Thus it is reducible to the third mood of the first figure.

THE FOURTH MOOD of two affirmatives, the major being a particular: "Every man is an animal" and "Some men write", therefore, "Some animals write", for when the particular major has been converted and has been made a minor it becomes, "Some who write are men," and "Every man is an animal" and it necessarily follows that "Some who write are animals." The conclusion is then convertible, and it becomes "Some animals write."

THE FIFTH MOOD of a minor universal affirmative and a major particular negative: "Every man is rational" and "Not every man writes", therefore, it necessarily follows "Not everyone who is rational writes." This is explicable by way of assumption.

THE SIXTH MOOD of a minor particular affirmative and a major universal negative: "Some animals are white," and "No animal is snow," therefore, "Some white is not snow." This is apparent in the conversion of the minor, for it is reducible to the fourth (mood) of the first figure. These are the details concerning categorical syllogisms.

#### CONCERNING HYPOTHETICAL SYLLOGISMS

Hypothetical syllogism are of two kinds: conditional and disjunctive. An example of the conditional is, "If the world were

created, then it has a creator." If we affirm the condition in the antecedent the consequent follows as it is, i.e., if we say, "And it is known that the world was created," that is the antecedent as it is, the consequent as it is follows, "It has a creator." But if we affirm the contradictory of the consequent the contradictory of the antecedent will follow, e.g., when we say, "It is known that it has no creator," it will follow that "It was not created." But if you affirm the contradictory of the antecedent, neither the consequent, as it is, nor its contradictory will follow. For were we to say, "It is not created," this will not yield a conclusion, as when we say, "If this is a man, then he is an animal, he is not a man," it does not follow from it that "He is an animal," or that "He is not an animal." Similarly, if we affirm the consequent as it is, it will not yield a conclusion. For when we say, "And it is known that the world has a creator," no conclusion will follow. For when we say, "If this prayer is acceptable, the one who prays is pure." and "He is pure." It does not follow that the prayer is accepted or that it is not accepted. Of these four affirmations only two yield conclusions, i.e., the antecedent as it is, which yields the consequent as it is, and the contradictory of the consequent, which yields the contradictory of the antecedent. But the contradictory of the antecedent and the consequent as it is yield a conclusion only when it is established that the consequent is equal to and is not more universal than the antecedent. In this case, the four affirmations (alternants) yield four conclusions. For we say, "If this is matter, it is composite", "And it is matter, therefore, it is composite." Or, "And it is composite, therefore, it is matter." Or, "And

it is not matter, therefore, it is not matter." But when the consequent is more universal than the antecedent, as "animal" in relation to "man", then, when the more universal does not exist, the particular does not exist. For the non-existence of "animal" includes the non-existence of "man". But the non-existence of the particular does not include the non-existence of the universal. For the non-existence of "man" does not include the non-existence of "animal". But the existence of the particular includes the existence of the universal. For the existence of "man" includes the existence of "animal", but the existence of "animal" does not include the existence of "man".

THE SECOND KIND The disjunctive: e.g. "The world is either eternal or was created." Four arguments are constructed from this, either smaller or larger. If the parts are not all included, e.g. "Zaid is either in France or Spain or elsewhere or  
"This number is either five or ten or more, then the affirmation hence it was created." Therefore, the affirmation of either one, categorically, will yield the contradictory of the other, and the affirmation of the contradictory of either one will yield the other categorically. These are its conditions: the disjunctive contains two parts. If there are three, the categorical affirmation of only one would yield the contradictory of the other two. For example, "This number is either smaller or larger or equal," and "it is larger"; hence that "it is smaller or equal" is invalid. If the contradictory of one were affirmed, one of the remainder would follow, but not categorically, i.e., "And it is not equal," hence it follows that it is  
either smaller or larger. If the parts are not all included, e.g. "Zaid is either in France or Spain or elsewhere or

"This number is either five or ten or more, then the affirmation of each one, categorically, would result in the falsity of the other two. But the affirmation of the contradictory of the one will not yield a conclusion because not all of the remainder is included in the other. These are the principles of the syllogism. We shall complete the treatise by stating the four kinds of syllogism: apagogic, inductive, analogical and combined.

The apagogic syllogism is also hypothetical, since we assume the contradictory of the conclusion, and by then, affirming it in combination with a premise whose truth is apparent, and then we affirm the contradictory. The form of the apagogic syllogism is such that we substantiate your opinion by invalidating its contradictory and its contradictory is invalidated by the fact that falsehood follows from it. And that is done when we combine with it a premise whose truth is apparent and which yields a conclusion whose falsity is apparent. Then we say that the false conclusion results only from a syllogism whose premises contain a falsehood. And since the truth of one of the two premises is apparent, the falsity is to be marked in the second premise which is the opinion of the opponent. An example of it is when one's opponent wishes to assert that "Every soul is material". You contradict him by forming a syllogism: "Every soul is material", "All matter is divisible." Therefore, "Every soul is divisible". The falsity of this is apparent by the nature of the soul of man. There must be something false somewhere in the premises for them to yield this conclusion. But we have said that the truth that "All matter is divisible" is apparent,

so that the falsity rests in our saying "Every soul is material." When this is invalidated, it is substantiated that the soul is not material.

**INDUCTION** refers to transferring the x judgement concerning k many particulars to the universal which contains those particulars, e.g., "Every animal moves its lower jaw while chewing". We have seen man, the horse, the cat and other animals do so. Therefore, this is true if it is possible to complete an investigation of all animals. Then a syllogism in the first mood could be constructed.

"Every animal is either horse or man, etc." "Every horse and man, etc. moves his lower jaw while chewing." Hence it follows that "Every animal moves his lower jaw." But if even one is omitted - like the crocodile, which moves its upper jaw - the truth will not be affirmed. It is not far-fetched to assume that a judgement will be true in a thousand cases save one. Dependence on induction is sound in matters of fiqh, but not in things which require demonstration. In matters of fiqh, the more induction is based on exact investigation and the closer its approach to completeness the more certain it is to put opinion out of court.

**THE ANALOGICAL** - The jurists and Mutakallims call the analogical by the name Qiyās, which is the transference of the judgement from one particular to another which resembles it in some respect. When one looks at a house and sees that it was created and has form, then at the heavens and sees they have form, he extends his judgement to it and says, "All matter that has form was created, the heavens have form, therefore, they were created",



in analogy to a house. This will not yield certain knowledge. But it is suitable for soothing the mind and convincing the listener in discussions and so is employed in rhetoric. By rhetoric is meant the discussions current in disputes namely: complaints and apologies, blaming and praising something, expressing revulsion or disgust at something (and things of that sort). A sick person is told, "Drink this medicine because it will benefit you," and he asks, "Why?", and is told "Because so and so, who was sick, drank it and it did him good". He is, therefore, inclined to take it without asking that it be demonstrated as beneficial to every sick person, or that his sickness is similar to the other's and his condition as far as age, strength, weakness, etc., are similar to his. And because the dialecticians felt the weakness of this method they invented a new one; they said it is clear

that in the original proposition the judgement was arrived at in this way. So they proceeded to establish the (meaning and the) cause in two ways. One of them was called a proposition of general application which may be inverted; the other, investigation~~enunt~~ and division. In relation to the proposition of general application which may be inverted, they said it means that "whatever has form was created." And "whatever has no form was not created." This goes back to induction and does not yield certitude on two counts. First, a complete enumeration with none omitted is impossible. Second, in the investigation, the heavens were or were not investigated. If they were not investigated, then a complete investigation was not effected. And if an investigation was made of a thousand cases save one, it is not far-fetched to assume that

the one judgement out of the thousand may be different, as we mentioned in the case of the crocodile. Now, if the heavens were investigated and it is known that they were created because they have form, the question is already solved, since it was clear before establishing the truth of the premise of the syllogism. The syllogism is not needed to affirm it, since it is already plain. The other method is investigation and division. We say, for example, let us investigate all the attributes of "house". It exists, is material, self-sufficient and has form. But it is fallacious to say that it is created because it exists, or because it is self-sufficient, or it is this or that, as if every existent thing or self-sufficient thing had to be created.

Therefore, it is established that it was created because it has form. But this is fallacious on four grounds. FIRST, it admits of being said that the judgement in the original proposition was not arrived at through any of these causes, which include more than "house", but through a cause which is limited to "house" and therefore does not extend beyond it. Even if it be established that something other than the house was created, it will be caused by a quality that includes "house" and that thing in particular and does not extend to the heavens. SECOND, this is valid only when all descriptive attributes of the matter under consideration are investigated. Now, a complete account and full investigation can never be proved, some attribute may have been omitted and that might be the cause. So the majority of dialecticians do not consider completeness, but say, "if there be another cause, show it." Or, they say that if there were, you and I would certainly have perceived it, just as if there were an elephant before us we

would perceive it. If we did not perceive it, we would assert that it does not exist; but this is weak since the inability of the two conflicting parties to perceive it immediately, or however long the inability exists, does not indicate non-existence. This case is not like that of the elephant; it is not possible for an elephant to stand before us and for us not to see it immediately. Yet there are many matters we have investigated which we could not understand immediately, but only after some time.

THIRD, even if the investigation were completed,

if there were four attributes the invalidating of three does not affirm the soundness of the fourth, since the parts in combination are more than four. It admits of being regarded as created because it is existent and material, or because it is existent and self-sufficient or because it is existent and has form. And it admits of being created because it is material and self-subsisting or material and has form. And it admits of being created because it is existent, material and self-subsisting. And it admits of being created because it is existent, self-sufficient and has form - or other combinations, either of two and two or of three and three. There are many judgements which cannot be established as long as many elements are not brought together, like the blackness of ink in which gall, vitriol and soot are combined with water. Most judgements are caused by elements in combination. So that the invalidating of the separate qualities cannot suffice to invalidate them in combination. FOURTH, assuming that your investigation is complete and sound and assuming that three are invalid, while the fourth remains, this indicates only that the judgement is not caused by the three nor by anything other than the fourth, but it does not indicate that it is necessarily dependent on the fourth

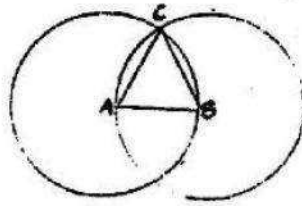
as a whole. It admits of the fourth being divided into two parts and of the judgement being dependent on one of the two parts and not on the other. So the invalidating of the three demonstrates that the cause is not found in anything other than the fourth but does not demonstrate that the whole fourth is the cause. This is a stumbling block. For if it were first divided and described as being

existent, self-sufficient, material and having this or that form, the invalidating of three will not necessitate the dependence of the judgement on "form" in general, but on one of the two parts of "form". This, these dialectical proofs are clear. But it does not become a demonstrative proof as long as it is not said, "Everything that has form was created". "The heavens were formed", therefore, "They were created". But if we divide the first statement into particulars, a universal cannot be derived from it. So the statement of the universal, "Everything that has form was created" must first be established. And that cannot be established by showing one thing that has form and was "created", not even by showing a thousand things that have form and were created. But this is the desired premise, so its validity must be proved by two sound premises or by one of the ways which have been mentioned. There is no getting away from it. This is the analogical judgement.

COMPOSITE SYLLOGISMS: Be it known that the general fashion in books and teachings is not to proceed by the building of syllogisms in the way we have been building them. They are found however, in a confused way, in books, either with some addition which could have been dispensed with or with the omission of one of the two premises which must appear - both making for error. If the confusion is caused by lack of order which may be restored, it

is a conclusive syllogism. But that which is outwardly constructed in the proper order and is not accompanied by its conditions is not conclusive. An example of the proper order is the first figure of Euclid: when on a line AB we wish to construct an equilateral triangle and prove that it is equilateral, we say, take point A as the center and place the end of the compass upon it and draw an arc from it to point B and complete the circle around point A. Then, on point B as a center, place the end of the compass and draw an arc to point A completing the circle, with its center at point B. We then have two similar circles, since they both have the same radii and will necessarily intersect at some point, C. From the point of intersection, a straight line proceeds to A, thus producing line CA. From C another straight line proceeds to B, thus producing line CB. This is the triangle of three equal sides which results from ABC. Its demonstration is that the two lines, AB and AC, are equal, because they are drawn from the center of the same circle to its circumference. The two lines AB and BC are equal for the same reason. And lines AC and BC are equal because they are exactly equal to the same line, AB. Therefore, the conclusion is that the triangle is equilateral. This is the way in which these premises are constructed. If they are properly constructed, the conclusion will really result from four complete syllogisms no premise being suppressed and each syllogism consisting of two premises. The first is, that the two lines, AB and AC are equal because they both proceed from the center of the circle to its circumference, and every two straight lines from the center to the circumference are equal. Therefore, these two are equal.

a) Text has the following diagram:



The second syllogism is that the two lines, AB and BC proceed from the center to the circumference, and they are also equal, as shown in the previous syllogism. The third syllogism is, that the two lines, AC and BC, are equal, because they are equal to line AB, and every two lines exactly equal to the same thing are equal to each other. The fourth syllogism is that the figure ABC is bounded by three equal lines, and every figure bounded by three equal lines is an equilateral triangle. Thus, figure ABC, constructed on line AB, is an equilateral triangle. This is its proper form. But it is easier to omit some of the premises. This is the definition of the form of the syllogism.

THE MATTER OF THE SYLLOGISM - The matter of the syllogism is the premises.

If they are apodictically true, the conclusions are apodictically true; If they are false, their conclusions will not be true; if they are matters of opinion their conclusions will not be apodictic. And just as gold is the matter of the dinar and roundness is of its form, and just as the dinar may be spoiled either through distorting its form and destroying its roundness by making it long, so that it is no longer called a dinar, or by the adulteration of its matter, it being iron or copper, so too the syllogism. It may be invalidated because of the distortion of its form, i.e. when it

does not coincide with one of the three above-mentioned figures, or because ~~is~~ of the invalidation of its matter, even though its form may be sound, i.e., when the premise is a matter of opinion or is false. Gold has five degrees of purity; pure and unadulterated; containing some dross, which is perceptible only to the keen-eyed; containing enough dross to be apparent to the keen-eyed and also discernable to those who are not keen-eyed, when their attention is called to it; adulterated with copper, but so skillfully counterfeited that even the keen-eyed may almost mistake it for gold even though there is no gold in it; so adulterated that its adulteration is apparent to all. The premises, similarly, have five principles; that they be apodictically true, without doubt or question,

(A syllogism so constructed is called a demonstrative syllogism); that they approach certainty in such a manner that it is hard to conceive of the possibility of deception though the possibility arises during the investigation. (The syllogism constructed from them is called dialectic); that the premises are considered the prevailing opinion but the soul is aware of their contradictions, which expand with the awareness of their deception, (The syllogism ~~is~~ so composed is called rhetorical); that the form is deceptively like the apodictic, (the syllogism which results from it is called deceptive or sophistic); that it be known that it is false, but the soul is inclined to it, by a kind of fancy, (the syllogism resulting from this is called poetic). All these premises need explanation. Premises out of which the syllogism is constructed, which were not established through argumentation but are assumed because they are accepted as admitted are limited to thirteen kinds of judgements: "first principles": judgements of perception;

judgements of experience; opinions generally accepted; propositions whose middle terms are not negated by the intellect nor by their syllogism; estimative opinions; customary beliefs; authoritative statements; admissions; semblances; opinions which appear to be generally accepted; presumptions and imagined things.

FIRST PRINCIPLES are judgements which are made necessary by the very nature of the mind as pure intelligence, as when we say that two is more than one; that the whole is greater than the part; and that things equal to the same thing are equal to each other. For he who supposes he was born a thinker and that he learns only through the abstractness of the intellect, and does not know how to distinguish quantity and difference in nature but imagines that he was created a thinker all at once and that these judgements occurred to him and that he himself formed their concepts after having conceived the meaning of the whole and the meaning of the part, and the meaning of the lesser and the more, surely, it would be impossible for him not to say correctly that the whole is greater than the part. This is true of every "whole", whatever it may be. It does not come from the senses, for the senses grasp only one or two particulars or a limited number of things, but this judgement is established in the intellect as a universal and it is impossible for the intellect ever to be separated from it

JUDGEMENT OF PERCEPTION: when we say that the sun shines and sets, and that the light of the moon increases and decreases, etc.

JUDGEMENT OF EXPERIENCE: that which results from the combination of the intellect and the senses, as when we say that fire burns and



that cathartic is a laxative and that wine intoxicates. For the senses perceive that ~~the~~ drunkenness is a consequence of drinking wine repeatedly, so that the intellect takes note of it as involving a necessary consequence. For if it were accidental it would not consistently follow. Thus, a knowledge of that about which it is quite sure, is engraved on the mind.

OPINIONS GENERALLY ACCEPTED: those which are known through the information of many people, as our knowing of the existence of Mecca and Egypt, even though we have not seen them. And when doubt concerning them ceases, they are called generally accepted beliefs. But it is impossible to infer one from another and to say to one who doubts the miracles of a prophet that he should believe in them because the information about them is as persistent as is that about the existence of the prophet, because he will say, "I cannot doubt the prophet's existence, but I can doubt the miracles. Had they been as evident to me as that, I would certainly not have been able to doubt them." Therefore, he must wait until it becomes an acknowledged fact for him. Then, doubt will cease.

PROPOSITIONS CONTAINING IN THEMSELVES SYLLOGISMS BY THEIR VERY NATURE

are propositions which are not established in the soul, but in their middle terms, though the middle term is not foreign to, that is, it is not separated from, the intellect. Therefore, people think that it is a major premise which is known ~~x~~ without a middle (term), while in truth the proposition is known only through the middle term. We have but to find the middle term of the syllogism. The major and the minor terms are already found in the thesis itself, e. g., we know immediately that two is half of four. But we know this only through the middle term, as in

the following syllogism: "Two of four parts is one of the two equal parts of a whole", "One of two equal parts of a whole is a half", Therefore, "Two of four parts is a half". The proof

is that if we were asked what part of thirty-four is seventeen we would not immediately know that it is half, but would have to divide thirty-four into two equal parts and then examine each part to find that each is seventeen. Then we would know that it is a half. If this also is present in the intellect, test with many numbers, or change the half to one-tenth or one-sixth of something else. That is the point of the example. It is not strange that the proposition is derived from the middle term, and yet the intellect does not notice that it derived it from the middle term of a syllogism.

Though one may achieve knowledge in a particular way he may not be aware of that way. For establishing knowledge of a thing is one thing, and awareness of how that knowledge was arrived at is another.

ESTIMATIVE OPINIONS are premises which are invalid, but have been established in the soul with sufficient strength to prevent the possibility of doubt in them because of the judgement of the estimative faculty concerning things which are derived from sense objects. For the estimative faculty accepts as true only what habitually agrees with sense objects, as for example, the judgement of the estimative faculty that "Everything that has no place, either in the world or outside of it, is impossible;" or the judgement of the estimative faculty that "Everything will either perish or continue to exist," i.e., outside of the world, or the judgement that matter does not increase, nor become larger of itself, but only when increase is added to it from the outside. The cause of the judgement of the estimative faculty lies in the fact that these matters do

not agree with perceptions and are not conceived of by estimative faculty. Their falsity is known from the fact that if everything which is not conceived of by the estimative faculty were false, then the estimative faculty itself would be false, for the estimative faculty itself is not conceived of by the estimative faculty; only knowledge and potential knowledge are. Now, any attribute which is not grasped by the five senses is not grasped by the estimative faculty. Its error, in these specific questions, is apparent in so far as they are the necessary results of syllogisms constructed from first principles, which the estimative faculty accepts. And we will admit that when the premises of the syllogisms are constructed from first principles the conclusion is true. Therefore, when after we arrive at the conclusion the estimative faculty still refuses to accept it, we know that its refusal is due to its nature, which refuses to accept what is not derived from sense objects.

CUSTOMARY BELIEFS are propositions which are believed in because of popular belief alone. The masses and the pseudowise consider them to be necessary first principles of the pure intellect, e.g., "Falsehood is improper", "The pious man ought not to speak falsely, nor to enter the bathhouse without his cloak in a way that would reveal his privy parts", "Justice is necessary and injustice improper", etc. These notions have been multiplied in one's hearing since youth, and people agree to them in order to improve their lives. The soul hastens to accept them, through habit. They may be strengthened by the gentle virtues. But if one could suppose that he was born a thinker and was not trained to goodness nor attached to virtue nor accustomed to be friendly, and these propositions were brought to his intellect, it might be possible for him to refrain from accepting them. It is not like our saying two is

more than one. Some of these premises may be true, but only on the grounds of close examination or of evident truth, though people think they are absolutely true, as they think the statement "God is omnipotent" is true. That is a customary belief and its denial is unworthy, but it is not absolutely true, for He cannot create one like Himself. What one should say is that He is able to do everything that it is possible for Him to do. So, too, our saying "He is omniscient" when He is not omniscient, for He does not know of another Existence like Himself. These customary beliefs may vary in strength and weakness according to the varied customary beliefs, customs and habits. They may vary in different countries and among different professions. A customary belief among physicians is not the same as among carpenters, and vice versa. A customary belief does not contradict falsehood, it contradicts the improper, while truth contradicts falsehood. Truth may be improper and falsehood may be a popular customary belief. There is no doubt that first principles and some judgements of perception, opinions generally accepted all, and judgement of experience are customary beliefs. But we are dealing here only with beliefs based on custom.

AUTHORITATIVE STATEMENTS are judgements received from excellent men, the greatest in wisdom, and from elders of (ancient) times. When these, received from them through their books and repeated, are combined with sound judgement, they become established in the soul.

ADMISSIONS are those which are admitted by the opponent or are accepted as conventions by the two opponents alone.

For it is used only against an opponent but not against anyone else. Admissions and customary beliefs differ as to their being universal or particular. For the latter are admitted by all, while an admission is admitted by the opponent alone.

SEMBLANCES are those which are confused with first principles or with judgements of experience, or with customary beliefs because of their semblance, but in truth they are only outwardly similar.

OPINIONS WHICH APPEAR TO BE GENERALLY ACCEPTED are those which are accepted by whoever hears them and is satisfied with a first view and a cursory glance. But when he investigates them more thoroughly he finds them unacceptable and perceives that they are false, like the statement "Help your brother the robber or the robbed." The soul at first accepts it, then investigates and only then realizes that to help the robber is not a logical consequence.

PRESUMPTIONS are acquired by opinion, but allow for the possibility of their contradiction, as it is said of him who goes out at night that he is a robber, for if he were not a robber he would not go out at night; or "If someone has saved our enemy, he too is our enemy," even though it admits the interpretation of his having saved him through the trickery and stratagem of one of our friends.

IMAGINED THINGS are premises which are known to be false but influence the soul to desire to antipathy. like calling sweetness wormwood, provoking the soul to reject it ~~which~~ as knowing it to be false.

We shall now discuss the manner in which they are employed.

### EXPOSITION OF THE DIVISION OF THESE PREMISES into syllogisms:

The first five are suitable for demonstrative syllogisms. They are: first principle judgements, perception, judgements of experience, opinions generally accepted, propositions containing in themselves syllogisms by their very nature; The value of proof is that it is used to reveal the truth and to achieve certainty. Customary beliefs and admissions are premises of the dialectical syllogism. Were the first principles and the others of the five and those which accompany them used in dialectic, it would have been stronger. But only customary beliefs and admissions are employed in dialectic because they are popular admissions. For the art of dialectic does not require stronger arguments than these. The advantages of dialectic are four in number.

EXPOSITION OF THE FOUR ADVANTAGES OF DIALECTIC: First, to train every beginner and everyone who does not proceed in the way of truth and whose understanding of the method of proving truth by demonstration is insufficient. They therefore turn him towards customary beliefs which he accepts as being necessarily true. And thus his false opinion is disproved by dialectic. Second, he who wishes to understand truth, and is intellectually superior to ordinary people and cannot be satisfied by mere rhetoric and persuasion, but yet cannot grasp the method of judgement, to be able to grasp the conditions of demonstration, may nevertheless acquire truth by means of dialectical syllogisms. This is the method of most jurists who seek knowledge. Third, it is impossible for students to know, through demonstration, the premises and principles of the doctrines of a particular science like medicine, geometry, etc., at the very beginning. Were they

to begin with these premises it would not be easy for them to grasp them. Therefore, they are suited to dialectical syllogisms constructed of premises which are commonly held opinions until it is possible to teach them by demonstration. Fourth, the nature of dialectical syllogisms makes it possible for the investigator to arrive at two contrary conclusions in one thesis. If he does so, and investigates the place of error, he may discover the truth through this investigation. This consideration of the art of dialectic will suffice. If it does not, there is a separate book dealing with it; further preoccupation with this exposition is unnecessary.

ESTIMATIVE OPINIONS AND SEMBLANCES: are premises of sophistic syllogisms, they are of no use whatsoever. We must know them to avoid them. Sometimes they are employed to test whether one's knowledge is defective or perfect. Therefore, it is called a testing syllogism. It is sometimes employed to reveal the disgracefulness of one who pretends ~~kk~~ before the masses that he is wise and thus seeks to attract them. For he can be refuted by these premises and his ignorance revealed. After they truly know how he has erred and recognize his lack of knowledge they will not pay him any heed. This is called an eliminating syllogism.

BELIEFS WHICH APPEAR TO BE GENERALLY ACCEPTED: presumptions, and authoritative statements are suitable for premises or rhetorical and juridical syllogisms and wherever certitude is not sought. The advantage of rhetoric in influencing man's soul to desire truth and reject falsehood is well known. The same is true of the advantage of figh. The exposition of rhetoric is a book in

itself. There is no need for its exposition.

IMAGINED THINGS are premises of the poetic syllogism. First principles, like the premises that are usually employed in rhetoric or poetry, are used only by way of poetry and imitation. What is other than that; their apodictic character, is not needed except for investigation in the demonstrative syllogism and the avoidance of error in the sophistic syllogism. We shall make its exposition brief.

THE CONCLUSION OF THE EXPOSITION OF THE SYLLOGISM: we shall now mention the places of error concerning which we must be cautious. They are ten in number.

FIRST: dialectical arguments come in confused form and many an error arises from them. It is proper for the student to become accustomed to arrange them in the above stated order so that he may know whether it is a syllogism or not. If it is, then of what type, of what figure of the type, and of what mood of the figure. until the place of error is revealed, should there be one. SECOND: the middle term must be understood and studied sufficiently to denote the same thing in both premises. For if it should be even slightly changed by some addition or subtraction the syllogism would be destroyed and would result in error. We have mentioned an example of this, when the universal negative is converted per se. If the statement "No jug contains wine" is true, then its converse, "No wine is in a jug", is not true, because the conditions of conversion are not understood. The conversion of the proposition, "No jug contains wine" should be "Nothing that contains wine is a jug". This, too, is true. The place of error



in the false conversion lies in the fact that the predicate of the original proposition is the word "contains wine" and not simply "wine". The entire predicate should become the subject of the conversion. When you understand its conditions, the conversion will be true. THIRD: the minor and major terms must be understood so there should be no change in meaning between them and the two extremes of the conclusion. For the syllogism requires the bringing together of the two terms with no change in meaning. This is made clear by what we have stated concerning the conditions of the contradictory. FOURTH: the three terms and the two extremes constituting the conclusion must be investigated so that they do not contain a homonym. For frequently the term is one and the meanings many, and so the syllogism would not be a true one. This, too, has been made clear by the condition of the contradictory. FIFTH: ~~KNOWER OR KNOWN~~ the pronominal particles must be considered very carefully, for the direction of their predicate may change and cause error. Were we to say, "Whatever the knower knows hu is like what he knew," our saying hu may refer to the knower or to the known, since we might say, what he already knew was the stone. Therefore, hu refers to stone. SIXTH: indefinite premises should not be considered to be true universally. Were they considered universal, the intellect would recognize their falsity. Thus, when it is said, "Men are in Egypt," the intellect accepts and believes it. But when this proposition is made universal, e.g., "All men are undoubtedly in Egypt," the intellect recognizes the fact that the proposition is not necessarily a universal. When it is said, "The friend

of your enemy is also your enemy", the intellect accepts it. But when it is made universal, e.g. "Everyone who loves your enemy must also be your enemy", then the intellect recognizes the fact that the proposition is not necessarily a universal.

SEVENTH: when we assert the truth of the premise of a syllogism and the reason for the truth of the assertion is that we sought a contradictory for it and did not find it, this will not necessarily affirm the truth of the assertion. It will be true only when we know that the thing itself has a contradictory that is true, not that we could not find it, for it may exist even though we cannot find it immediately, as the assertion of the statement that "God is omnipotent." For it would not occur to us that there might be something over which He did not have power until we realized that He could not create another like Himself. Then we became aware of the error of your assertion. But the true assertion is that "He is able to do everything that it is possible for Him to do." This has no contradictory that is true.

EIGHTH: the premise should be outside of the conclusion, so that the thesis should not be put as a premise of the syllogism, in which case we would be begging the question. It would be like saying that the proof of the statement, "Every movement requires a mover", is that nothing moves by itself. But this is the very point of the claim. He only changed the wording and made it appear as proof.

NINTH: a thing should not be proved by something else whose proof depends on the very thing you want to prove, as when it is said "The soul is immortal because it is eternally active". We cannot know that the soul is eternally active as long as we do not know that it is immortal. For it is only through its being immortal that we can establish

that it is eternally active. TENTH: to guard against imagined things, common opinions and semblances and to regard as true only first principles, judgement of perception and their like. When we have observed these conditions, our syllogism will, without doubt, yield a true conclusion and we will attain certainty. Then, even should we wish to doubt this being true, we should be unable to do so.

to adduce three examples of fallacious reasoning by which a very wise Roman tested me, and I shall bring their solution as he taught me. He said to me, "You ate what you bought." "What you bought is a live fish." Therefore, "You ate a live fish." The two premises are correct, yet the conclusion is wrong. The solution is as follows: "What you bought" refers to substance only, while "live" is a quality. Therefore, this syllogism is a fallacy of the second type. He further said, "You gave only one plain coin." "What you gave was yours." Therefore, "Only one plain coin was yours." The solution is as follows: "Plain coin is the subject of the minor premise, as "only one" is of the middle term, which is suppressed in the major premise. So that he might have had a million gold coins. This, too, is a fallacy of the second type. He further said, "If time ceases now, it will not be day." "Whenever it is not day it is night." Therefore, "Now that time has ceased it is night." The repeated middle term "It is not day" does not have the same meaning in both premises. In the first premise it means absolute absence of time while in the second premise it means different periods in time. This syllogism is a fallacy of the fourth type.

FIFTH SECTION OF THE BOOK CONCERNING the derivation of

the syllogism and demonstration. There are four chapters.

THE FIRST CHAPTER concerning the scientific problems to be investigated and their divisions: we refer to the questions which may occur in the sciences. There are four. The first problem, "whether" concerns the existence of the thing; the second, "what", concerns the essence of the thing; the third "which", concerns what differentiates the thing from others which are included in the same genus; the fourth, "why", is the question of cause. The problem "whether" is two-fold in character. Part concerns the very fact of existence, as when we say, "Does God exist?", "Does the void exist?"; and part concerns the mode of existence, as when we say, "Does God will?", "Was the world created?" The problem "What" is also of a two-fold character: first, it transmits the meaning of the speaker by giving his words the meaning he intended, e.g., when he said "oheres" and was asked "What do you mean by it?", and said "The sun". Second, the question is asked concerning the essence of the thing, e.g., "What is wine?" and the answer is "It is an intoxicating drink pressed from grapes". The problem "what" in the first sense has precedence over the problem "whether". For he who does not know what thing is meant cannot ask about its existence. But in the second sense it must come after the problem "whether", because as long as the fact of the existence of a thing is not known the question of its essence cannot be raised. The problem "which" is a question concerning differential or distinguishing properties. The problem "why" is two-fold in character. Part concerns the cause of existence, as when we say, "Why was this cloak burned?" and we answer "because it fell into the fire". Part is a question concerning the cause

of the assertion, e.g., that we ask "Why did you say that the cloak fell into the fire?" You answer "Because I found it burnt". The problems "what" and "which" refer to conceptions. The problems "whether" and "why" refer to judgements.

THE SECOND CHAPTER concerning the demonstrative syllogism is divided into that which reveals the cause of the existence of the conclusion and that which reveals the cause of the judgement concerning the existence of the conclusion. The first is called the demonstration of the cause of the fact, the second the demonstration of the cause of the judgement. For example, one who asserted that there is smoke in a certain place, and when he was asked, "why did you say that in that place there is smoke?" said, "Because in that place there is fire, and wherever there is fire there is smoke, therefore, in that place there is smoke". So this demonstration has revealed the cause of the fact that "In that place there is smoke", and the cause of the existence of the smoke. But when he said, "In that place there is fire", and he was asked, "Why (did you say that," and he answered, "Because in that place there is smoke", and "Wherever there is smoke there is fire," therefore, "In that place there is fire", - - he revealed the cause of his judgement concerning the existence of the fire. But it does not reveal the cause of the existence of the fire, nor what caused it to reach that place. In general, the effect indicates the cause, and the cause also indicates the effect. But the effect does not necessitate the cause, while the cause necessitates the effect. This is the point. One of the two effects may indicate the other when their inseparable connection is established, both being the effect-

facts of one cause. In the demonstration of the cause of the fact (the middle term) does not have to be the cause of the existence of the entire major term. If it is the cause of the connection between minor and major terms, it is enough that the middle term should cause the major term to be in the minor premise. Therefore, when you say, "All men are ~~some~~ animals", and "All animals are matter", therefore, "All men are matter", this is a demonstration of the cause of the fact because the middle term is the cause of the inherence of the major term in the minor. For man is matter because he is an animal, e.g., "matter" is an essential attribute of "animal". It follows that man is matter because he is an animal, not because of a more general attribute, e.g., his existing, and not because of a more particular attribute, e.g. his writing, or being tall.

THE THIRD CHAPTER concerning things around which the demonstrative sciences revolve. There are four: subjects, essential accidents, theses and axioms.

SUBJECTS: By this is meant the subjects whose judgements are investigated in the sciences, for every science without exception has a subject matter which is investigated. And we inquire as to the judgements in that science, e.g., man's body in relation to medicine, magnitude in relation to geometry, number in relation to arithmetic, melody in relation to music and the actions of responsible beings in relation to jurisprudence. (In each one of these sciences) it is not incumbent on the one occupying himself therewith to prove the existence of these subjects (in his science). The jurist does not have to prove that man acts, nor do the geometers have to prove that magnitude is an accident which exists. The proof of this

is attempted in another science. It is incumbent upon him to understand these subjects with their limits by way of conception.

THE ESSENTIAL ACCIDENTS: By this is meant the distinguishing properties which occur in the subjects of that science but do not occur outside of it, like the triangle and the quadrilateral in certain magnitudes, the curved and the straight in others.

These are essential accidents of the subjects of geometry, as even and odd are of number,

and harmony and disharmony of melody, that is, relation (of sounds), and sickness and health of the animal. But it is necessary at the beginning of the investigation of every science to understand these essential accidents, with their limits, by way of conception. Their existence in the subjects only follows the demonstration of that science. For the purposes of the science is to demonstrate their existence in it.

THE  $\chi$  THESES: "Thesis" is an expression for the combination of these essential accidents with the subjects. They are the problems of each science. Questions in it are asked concerning them, and in so far as questions are asked concerning them, they are called theses of that science. In so far as they are investigated, they are called problems. And in so far as they are conclusions of a demonstrative syllogism, they are called conclusions. But whatever the name, all refer to the same thing. These names change with the change of the viewpoint. The subject of every demonstrated thesis in science will be either the subject of that science or some of the essential accidents of the subject of that science. If its subject is the subject of the science it may be the subject itself, as it is said in mathematics, every magnitude is  $\chi$  either commensurate with another magnitude which is homo-

geneous with it, or is not commensurate with it. This is the thesis investigated. As it is said in arithmetic every number will be a half of another number if it is equidistant from the two ~~x~~ ends of the other number, e.g., five is half of the sum of six and four, and three and seven, and eight and two, and one and nine. Or the subject will be the subject of the science with an essential description,

i.e. an essential accident. As it is said in geometry, the magnitude incommensurate to a thing is incommensurate to every magnitude which is commensurate with it. So what was taken was the incommensurate magnitude, not mere magnitude, seeing that the incommensurate is an essential attribute of the magnitude.

And as we say in arithmetic, if you multiply one-half of a number - which is divisible into halves - by the other half, the product will be one-fourth of the square of the number. Here we take a divisible number, not number in general. Or the subject will be one of the species of the subject of the science, as it is said in arithmetic, "six", and "six" is a species of number. Or the subject will be one of the species of the subject of science with a description of an essential accident, as we say in geometry, a straight line drawn to another straight line will yield two angles whose sum is equal to two right angles. The line is a species of magnitude which is the subject of the science, and straight is an essential accident in it. Or the subject will be only description, as you say in geometry, the angles of every triangle are equal to two right angles. for triangles are essential accidents in some magnitudes. Therefore, the subject of the demonstrated theses in the sciences must be one of these five. But their predicates are particular



essential attributes in that subject.

AXIOMS: By this is meant the admitted premises in that science by which theses are demonstrated. These premises are not demonstrated in that science. Either they are first principles, which are called axioms, as it says in the beginning of Euclid, if equals are taken from equals or added to equals equals remain. Or if they are not first principles but admissions of the student of that science, then if the student admits them and is satisfied, they are called hypotheses. If some doubt remains in his soul they are called postulates. He will admit them (to the one who advances them) only when they are demonstrated to him by another science, so that in the meantime he can build his proof on them as it is said in the beginning of Euclid, that we must admit that every point may become the center of a circle to be drawn around it, though some people deny the conception of a circle, i.e., that the radii from the center to the circumference are equal. But it is admitted at the beginning of the science.

FOURTH CHAPTER concerning the conditions of the premises of demonstrations. There are four conditions: They must be true, necessary, immediate and essential. By true is meant the certain, as for example first principles, perceptions and their like. This condition has already been mentioned. By necessary we mean that the relation between subject and predicate should be a necessary one, like the relation of "animal" to "man", not like the relation of "writing" to "man" whenever a necessary conclusion is being sought. For if the premise is not necessary it will not compel the thinker to assert the necessity of the conclusion. By immediate we mean that the predicate of the premise should

exist in the subject because of the subject, e.g., when you say "every animal is corporeal" it means that it is corporeal because it is an animal and not because of a more universal attribute, not as when you say (in the conclusion) "Man is corporeal". For "He is corporeal" not because he is a man but because he is an animal, which is more universal. After we know that he is an animal we know that he is corporeal. Corporeality is first asserted of animals then through the animal it is extended to man, and it is corporeal not because of a more particular attribute than it, e.g., "animals write". It writes not because it is an animal but because it is man. And man is a particular animal. So the first term is that predicate which has no middle term between it and its subject. Therefore, that predicate will be immediately true of that middle term. Then this idea will be extended by means of the middle term to the subject. This is the condition of the major premise. This condition does not hold in premises which are conclusions

of other syllogisms and are made premises of a new syllogism. But they must be necessary and essential. The essential guards against irrelevant accidents, for the sciences do not deal with irrelevant accidents. It is of no concern to the geometer whether the straight line or the circle is more beautiful, or whether ~~xx~~ roundness is the contrary of straightness, because beautiful and its opposite are irrelevant to the subject of his science, i.e., magnitude. These attributes follow from magnitude not because they are magnitude but because of an attribute which is more universal than magnitude, i.e., because it exists etc. The physician does not inquire whether or not the wound is circular or not, for roundness is not characteristic of the wound because

it is a wound but because of something more universal than the wound. And when the physician says this wound is slow in healing because it is circular and circles are the widest of figures he is not stating (anything in) the science of the physician and it does not testify to his knowledge of medicine but of geometry. Therefore, the predicate must be essential in the thesis of the sciences and in the premises.

But there is a slight difference between them, namely, that the essential is applied in two meanings. One of them is that the predicate is a part of the definition of the subject, e.g., "Man is an animal". For the predicate "animal" is essential because it is included in the definition "man", since the meaning of "man" is that he is an animal with certain attributes. (The second is that the subject is part of the definition of the ~~subject~~ predicate, and the predicate is not part of the definition of the subject) e.g., the crookedness of the nose, and the straightness of a line. For the crookedness of the nose is an expression used for the possessor of the nose with the special attribute "crooked". The nose is part of the definition without a doubt. The essential in the first sense cannot become the predicate of the conclusion in theses which are investigated in the sciences because the subject is known only by it, and the knowledge of it precedes the knowledge of the subject. Then how would its existence in the subject be investigated? For he who has no conception of the triangle as it is defined will not investigate its laws. After he knows that he may investigate whether or not its angles are equal to two right angles. But he cannot investigate whether or not a triangle is a figure because he must first understand what a figure is, and then he must understand that it may be divided into a figure bounded by three

sides, i.e., a triangle, or by four sides, i.e., a quadrilateral. So the knowledge of the figure precedes the knowledge of the triangle.

PREMISES: The predicates of the premises, too, must be essential. The predicates of both premises may be essential in the second sense, but may not be essential in both premises in the first sense. For the conclusion then will be known before the premise because the essential is the very essence of that subject. We cannot say "Every man is an animal" and "Every animal is corporeal", "Therefore every man is corporeal", so that this should be a problem to be investigated for the knowledge of corporeality precedes the knowledge of being a man. And since the subject of the question is "man" we must first have a conception of him before we investigate the laws about him. The conception of man is necessarily preceded by the conception of animal and matter. Since we know matter, we know that it is divided into animal and non-animal, and that animal is divided into rational and non-rational. But the predicate of the minor premise may be essential in the first sense and the predicate of the major premise essential in the second sense, and vice versa. This is what we wished to explain about the rules of logic, (15) and praise be to God alone. The science of metaphysics follows.