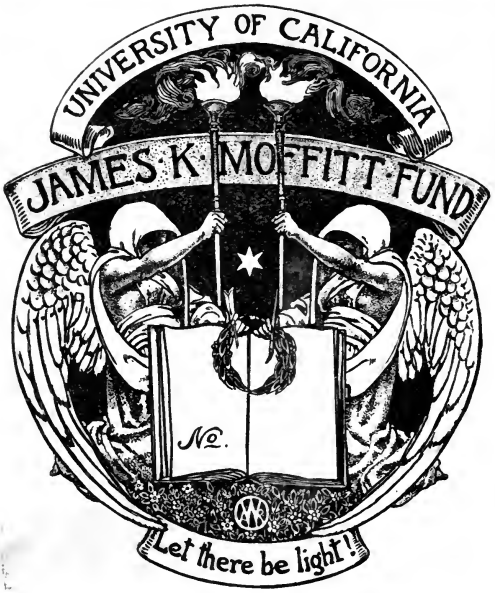
UNIVERSITY OF CALIFORNIA
JAMES K. MOFFITT FUND
No.
Let there be light!

ELEMENTS OF LOGIC.

TRANSLATED FROM THE ORIGINAL SPANISH

OF

REV. J. BALMES,

BY

JAMES M. SPELLISSY, M. A.

ADOPTED BY THE BROTHERS OF THE CHRISTIAN SCHOOLS

O'SHEA & CO., 10 BARCLAY STREET

INTRODUCTION.

LOGIC, or the Art of Reasoning correctly, is the most important discipline that can mark a school or a college. The Greek and the Latin, the modern tongues, geometry, the calculus, natural philosophy in each of its parts, and several other branches easy to be mentioned, are all highly useful studies; but their utility is far inferior to that of Logic; and it must be declared to be an unfortunate mistake to give them precedence over it. A principal end of education is to train the scholar so as to be successful in life. The whole success of life, however, essentially depends on having an understanding capable of reasoning well on the occasions which life presents. But Logic, and Logic alone, whether natural or acquired, confers this faculty. Logic, therefore, should be the leading study, a *sine qua non* even, wherever the young are educated. Man is a rational being. Therefore, let him know how to exercise his reason. No accomplishment can balance a deficiency in this respect.

Thus far, Logic has been a greatly neglected study in the United States. Mathematics, chemistry, geography, the languages, ancient and living, have put it out of doors in the majority of schools and colleges. It is an insane procedure against truth and intellect, and even morals, for which adequate reparation can never be made. The act has kept away from tens of thousands of noble minds the nourishment and the inspiration, the grace and the finish, to which, certainly, they had a most sacred claim, and with which in society they might have done great things.

Let it not be said that Logic is a difficult study. It is less difficult than the material branches for which it has been unwisely expelled. Four years are required for the mathematics; the Greek and the Latin demand seven; German, French, and Italian need a very long term; Algebra itself cannot be mastered in a short period. Logic can be quite successfully studied in one year. All are born endowed with natural

Logic; and, therefore, all are born with an innate capacity for an easy acquisition of it. Of what other branch can such a statement be made? Of *one* only—which is Ethics, for a natural Ethics comes into the world with all men. The real difficulty with the most useful and most noble art of Logic is, that, hitherto, it has been persistently excluded from the schools. It has been made a stranger in its own household, and the mention of its name excites groundless conceits and opposition.

The book now presented is a translation from the Spanish of the masterpiece of BALMES, one of the most able philosophers of modern times, and one of the saintliest priests Catholic Spain ever produced. He, endowed with the highest gifts of mind and disposition, made St. Thomas his exemplar in learning and virtue; and there is a common admission that, among the followers of the Angelic Doctor, there are but few names which are more eminent than that of BALMES. His work on "*Catholicity and Protestantism in their Effects on European Civilization*," is the most esteemed work of the kind in print. His two volumes on transcendental metaphysics is without a superior in eloquence, depth, and completeness. His minor works on the philosophy of grammar, on mathematics, etc., etc., are all unexcelled. But his chief work is his Logic, the same which is now for the first time presented to the public in the English language.

BALMES wrote his Logic when in the prime of his experience, learning, and talents. He devoted to it all his gifts and erudition. All who are acquainted with the work, and who are well versed in the writings of other authors on the same subject, hold it to be much the best that can be found. It contains every thing that is essential, within the convenient limits of one hundred and thirty-one pages, 12mo. Most other Logics are confined, it may be said, to the training of the reason alone; in general, they are harsh and dry; but few of them are fervid in their style; every one of them is uselessly large; and, as a rule, they all fail to cast seeds of ambition in the student's mind, and to make him feel his dignity as an intellectual and moral being. Not so, in any degree, with the present work. It completely trains the whole man, in his senses as well as in his understanding, for the function of reasoning correctly in all the career of life; in style it is sufficiently terse, yet glowing and eloquent; being only a hundred and thirty-one pages in size, it makes an easy course; and, from end to end, it carries the scholar with it, brightening and strengthening all his faculties, giving him a full exhibition of his endowments, and igniting in him the ambition to make the TRUE, which is the first object of Logic, and Honor,

which is the natural rule of the will, the guiding stars of his existence. This is no overdrawn picture of BALMES' Logic. The student who masters this book—and it is easy to master it—acquires an eminent conception of life, and he is *trained* in intellect and sense.

Let it not be supposed that this Logic is suitable for senior students *alone*. The illustrious author avoided that unfortunate exclusiveness. The work is designed alike—and, being a Logic, it is properly so designed—for the advanced boys and girls in the upper classes in grammar schools, and for the Sophomores, Juniors, and Graduates in colleges and universities. Whoever can study the ordinary text-books of English grammar, can study BALMES' Logic; and it is not more certain that the former are indispensable in acquiring a true knowledge of the English tongue, than it is that the latter is without an equal in the art of training the reason and the sense.

The publisher humbly conceives that he is doing an important good to Catholic education in issuing this book. Hitherto no adequate or suitable text-book of Logic was available. The opportunity of introducing the very best is now afforded. Let it be generally embraced. The good fame of institutions, the true good of scholars of each sex, and high interests of the Church and nation, are all here at stake in no small degree. All branches are useful. But, over and above all, let our youth, rational, responsible beings as they are, with an untried world before them, know how to reason when they leave school. This is essential, it is so universally; and it is so for ever.

The Christian Brothers have examined this translation, and they have declared their readiness to introduce it at once into all their schools and institutions. The Brothers are keenly, honorably, and ambitiously alive to the justice and necessity of giving the natural and invigorating discipline of Logic to the young minds under their charge. As far as their great opportunity and unexcelled spirit of self-sacrifice can accomplish it, the Roman Catholic boys of America will terminate their school-days, not with crammed, but with trained, intellects. An unfading crown already awaits the devoted sons of LA SALLE. They have eighty thousand scholars in the United States. Their Commencements now each year show twenty thousand of these boys well finished in grammar and figures, in geography and mechanics, and many in Latin and Greek. Hereafter, their Commencements will exhibit this great number of youths adorned with the noble and essential art of knowing how to exercise their reason for the whole career of life. It is a magnificent design in education. It contains an infinitude of benefit for

families, for society, for the Church, for the students themselves. The Order that achieves it becomes entitled to the tribute of universal recognition. But the Christian Brothers should not be alone in this matter. They have not a tenth of the Catholic scholars of America. All schools that aim at any excellence, that appeal to parents for their patronage, should have the purpose and the capacity to teach the pupils intrusted to them the proper way to use their understandings. As the young man who does not know his trade when his apprenticeship is ended may be said to have had a bad master; so the education, which leaves the grown boys and girls ignorant of the way to *reason*, may well be put down as wretchedly deficient. Hitherto there has been some excuse for the neglect complained of, for the Logics in the market have all been unsound, cumbersome, exceedingly forbidding. This excuse is now removed. BALMES was a genius of the first order. He wrote the highest things in the tersest and most engaging way; and he wins the faculties and excites the ambition of his students at a stroke. There is no other Logic of which such merits can be asserted. At present our schools, academies, and colleges give Logic to about three hundred pupils. What a cloud over young minds that shows! Henceforward the number should be a hundred thousand. BALMES, now in English for the first time, gives the opportunity. Let him be tried. He will give the natural reward to professor and to pupil, to parent and to college, to school and to academy.

Office of the "SAINT PETER," *N. Y.*, 1873.

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BOOK THIRD.

METHOD.

CHAPTER II.—(*Continued.*)

LOGIC.

PREJ IMINARY REMARKS.

THE OBJECT AND UTILITY OF LOGIC.

1. The object of logic is to teach us how to know truth.

Truth is reality. As St. Augustine has said: *Verum est id quod est*—It is that which is.

It may be considered in two ways: in things, and in the understanding.

Truth in a thing is the thing itself. Truth in the understanding is the knowledge of a thing such as it is in itself. The first is called real or objective truth; the second, formal or subjective.

The sun exists: this is a real truth, or truth in the thing. I know that the sun exists: this is a formal truth, or truth in the understanding.

Knowledge without truth has no value. What is the use of a multitude of thoughts to which nothing corresponds? The understanding should place us in communication with objects: if it does not apprehend them such as they are in themselves, the communication is at fault; for, then, the knowledge acquired does not correspond to the real object, but to a different matter.

2. Natural logic is the capacity nature has given us for knowing truth. This capacity can be perfected by means of rules founded in reason and experience.

There are rules to direct the understanding to the knowledge of truth, and there are principles in which these rules are founded. The union of these rules and of these principles constitutes artificial logic.

Logic, inasmuch as it lays down rules, is an art; inasmuch as it explains such rules, it is a science.

For example: Art gives the qualities of a good definition; science explains the reason of what is contained in the rule; art settles what argumentations are legitimate; science supplies the wherefore of their legitimacy.

Art is a body of rules for doing a thing well; and it is possible to form a body of rules for arriving at the knowledge of truth; for, truth being the object of the understanding, to arrive at truth, there ought to be a way which it is in the power of reason to discover. If we form this way into a body of rules, we shall have logic as an art.

The understanding is not a blind faculty. When it follows a way it knows, at least it is capable of knowing, why it follows it; therefore, it can give the reason of the rules which it observes in coming to the knowledge of truth. The union of these rules is logic as a science.

Artificial logic, then, may be defined to be the body of the rules which guide us in knowing truth, and of the reasons in which those rules are founded.

It is a useful study; for, if the understanding directs the other faculties, it is clear that it can direct itself, for itself, by means of reflection.

THE FACULTIES OF THE MIND, WHICH SHOULD BE GUIDED BY LOGIC.

3. There are different classes of truths; for, truth being the thing itself, the difference which is between things implies a difference between truths.

The difference which is between truths demands a difference in the means to find them out. This is a most important and fundamental rule. To treat the moral and the mathematical sciences in the same way, to investigate truth in letters and in the fine arts as in the exact studies, is to fall into the gravest errors. Each order of truths requires a special method, which it is necessary to follow.

4. Man, besides his understanding, has other faculties which put him in relation with things. Hence, a good logic cannot be confined to the understanding alone; it is necessary to apply it to all the faculties, as far as they can assist us in knowing things such as they are in themselves.

The faculties on which logic should be employed, are external sensibility, the imagination, internal sensibility, or the faculty of sentiment, and, finally, the intellect.

5. External sensibility is that which is exercised by the five senses,—the sight, the hearing, the taste, the smell, and the touch. These place us in communication with the material world.

6. The imagination is the faculty of reproducing in our interior the impressions of the senses independently of their exercise, and of combining them in a variety of ways without the necessity of subjecting them to the

order in which we have experienced them. Although I have not before me a pyramid which I once saw, I can reproduce its image in my mind: this is an act of the imaginative faculty, which is exercised independently of the sense. I have seen mountains, I have seen gold, but I have never seen a mountain of gold; still, I can very well imagine one. In which case, I unite the two sensations, gold and mountain, but without any necessity of having found them joined in reality. I have seen animals, and I have seen a railway locomotive: if I imagine a living monster of the size and form of the locomotive, converting the noise of the latter into a bellowing, and changing the smoke of the engine into a flame of fire issuing from the mouth and nostrils of the monster—in this instance, the union of two sensations forms a being which does not exist in reality.

7. It is difficult to explain in words what is understood by internal sensibility. We say, however, that it is that delicate faculty which places us in relation with objects, independently of the particular nature of external sensation, of the imagination, and of knowledge. This definition will be better understood by the aid of an example:—

A man is dangerously wounded; many see the same wound, they know its cause, they conjecture the result. The sense, the imagination, the knowledge, are alike. In the meantime a woman comes up, and at once a shriek is heard: has she seen, imagined, known any thing which the others have not seen or known? No; but she has *felt* something which they have not felt; she is the mother of the victim: here we have sentiment. In this faculty are contained all the passions.

8. The intellect, taken in general, is the faculty of knowing things. Things may be known in one and

the same way, and still be the objects of very different sensations, imaginations, and sentiments.

9. Let us unite in one single illustration the exercise of the four explained faculties:—

We suppose a reservoir of water within view of several persons.

The water of the reservoir is the object: first, of *external sensibility*, that is, of the sight; secondly, of the *imagination*,—for one who turns away his eyes from the reservoir, but holds it present in his mind; thirdly, of *internal sensibility*,—for one of the spectators who remembers having seen a beloved friend drowned in the reservoir, or who experiences from it some other feeling, pleasant or disagreeable; fourthly, of the *understanding*,—or for the mathematician who calculates the superficies of the reservoir, for the naturalist who examines the properties of the water, or for the physician who considers the influence of the vapors of the water on the health of the inhabitants of the district.

10. The knowledge and the judgment of truth are in the understanding alone. The other faculties assist the understanding, by presenting to it exterior objects, or the feelings of the soul itself; but, in themselves, these faculties do not know. Nature has given them to us as means by which to make a communication with objects, by which to consider objects under certain forms, and by which to be affected in various ways; but always reserving true knowledge for the superior faculty, the intellect, because it has the office of presiding over all the internal and external acts of man.

11. But so great and so constant is the necessity which the understanding has of these faculties, that, if

we did not know how to properly direct them, we would fall into many errors.

Hence, although the understanding is the faculty which logic principally proposes to direct, the other faculties cannot be disregarded.

As these auxiliary faculties have immediate communication with material objects, and as the understanding has need of this communication—for it exercises by it the act of knowing—it is a necessity for the understanding to be presented by these faculties with material things, or to be excited by them in some way. The consequence of this is, that we are frequently exposed to error by the equivocal conceptions which the auxiliary faculties offer to our minds. The same faculties are, so to speak, certain witnesses whose fault as to reality puts the understanding astray.

And, hence, before treating of the principal faculty, let us endeavor to settle the rules that prevent those faculties, which have been given to us as a means for knowing truth, from being obstacles on the way to it.

BOOK FIRST.

CHAPTER I.

RULES FOR THE PROPER DIRECTION OF THE SENSES.

12. THE immediate purpose of the five senses is to put us in communication with the corporeal world; but their utility is not confined to this, for, when our mind is excited by sensible impressions, it acquires knowledge of incorporeal things.

To use the senses properly, it is necessary to observe the following rules:—

I.

13. The organ of sense ought to be in a normal state.

The experience of every day tells us what changes illnesses produce in our sensations. To a disordered palate, every thing is bitter; a man in a violent fever experiences an intolerable heat or cold in a temperate room.

II.

14. It is necessary to observe the relation that exists between the organ of sense and the object; which relation should be that which corresponds to the laws of each,—of sense and object.

A cylindrical body, looked at from the side, presents its length; seen in such a way that the line of vision is

perpendicular to one of its bases, it appears to be a circle. We find water, the temperature of which is unchanged, to be hot or cold, according to the disposition of our hand. One and the same object has different appearances, according as we see it through glasses of new configurations. A field appears to have colors more or less vivid, according as the atmosphere is more or less transparent.

III.

15. Each sense should be confined to its own object. The senses have characteristic objects: the sight, colors; the smell, smells; and so the rest. When a sense is made to give testimony on objects that do not belong to it, it is very easy to fall into error.

We have eaten many times of a dish which has the smell *A*, the color *B*, and the taste *C*. Here are three senses—each one with its own object. Suppose that we experience the smell *A*, without seeing the object from which it arises, and that then we attribute to that object the color *B* and the taste *C*. It is clear that, doing this, it would be very easy for us to be deceived, for, doing it, we extend the testimony of a single sense to three different objects; that is, from having found these different qualities united in a remote case, we infer that they should be united in the actual one. It is evident that the same smell *A* may emanate from a source which has neither the color *B*, nor the taste *C*, but a different color and a different taste altogether.

The sight judges principally of colors; and, in its way, and under certain circumstances, it also enables us to discern sizes and figures.

It must be observed, however, that the sight is not always a competent judge of sizes and figures. We have knowledge of this from the variation under which

distances present to us one and the same size; from the differences of figure which an object assumes according to the point from which we see it; and, also, from the illusions which we suffer from perspective. At a certain distance we see an object which appears to be a projection, a moulding, for instance, or some such thing; but there is, in reality, before us only a smooth surface on which the painter has exercised the genius of his art; the shade is distributed with such perfection, the effect of the light in the given place has been so accurately calculated, that the object has all the appearance of arising out of the surface, and we take for a real body that which exists only in perspective. Our eyes, however, have not deceived us; they have done their part in strict correspondence with the laws of light and vision,—laws, which are fixed and known, as is evident from the use the painter has made of them in calculating the effect of his work. Therefore, the deception does not come from the sight, but from not confining it to its sphere,—light and colors. How could the deception be avoided? By assisting the sight with the touch.

Seen afar off, a quadrangular tower appears to be round. Here there is no deception from the sight, it presents the object as it should present it; but we ourselves require of it that, at too great a distance and from an inconvenient point of view, it should distinguish between a round and a quadrangular figure.

The hearing, in many cases, indicates with sufficient approximation the distance of an object; but it is always in subjection to the laws of acoustics, which, like those of the sight, are fixed and constant. In listening to a ventriloquist, we think that the voice is from a point much more distant than it is in reality. Does the hearing deceive us? No; it gives evidence, as it ought to give it, in accordance with the

law of its nature; but we ourselves, ignorant of the exceptional circumstances of the object that sounds, or, if not ignorant of them, yet not accustomed to them, experience a complete illusion, attributing to deception from the sense that which emanates from our own precipitation in judging.

IV.

16. The senses should assist each other; and their testimony is all the more worthy of belief, the greater the number of them we employ on the same object. The food which has the smell *A*, the color *B*, and the taste *C*, has disappeared from the table, and another dish, which gives the same smell, takes its place. Here the testimony of the smell is not enough to make us certain as to identity. But if the sight assists the smell, and we find the same color as well as the same smell, then, in place of one witness, we have two that agree, and, consequently, the probability is increased that the food is the same. If, to their testimony, there is added that of the taste, in place of two witnesses there are three; and in such a case we may be certain of the identity of the object.

V.

17. The testimony of the senses is worthless, when they are in contradiction among themselves: if, in such a case, any sense is to be credited, it is the one which judges the object in the most natural way, and with the least derangement of means.

A straight staff put obliquely into water appears to be curved; the hand continually finds it straight. Judgment ought to be for the hand, because it is applied immediately to the object; and the sight should not be

credited, for it operates through water, which is not its accustomed medium.

VI.

18. The testimony of the senses should not be admitted, when it is in contradiction with the laws of nature.

A person alone in a remote place sees bodies mounting up in the air, without there being any cause whatever which could produce such a phenomenon; it should be believed to be all the effect of imagination, or of momentary derangement.

Here we treat only of the natural order, and touch not on miraculous events.

VII.

19. The testimony of our senses should not be admitted, when it is in contradiction with the testimony of other men.

Of several persons in the same room, one sees a spectre passing the house. If the others present see nothing, the apparition is purely fantastical; in reality, it is a work of the imagination.

VIII.

20. The testimony of the senses should be suspected, when it is in opposition to the regular course of things.

At a certain distance we see a person who appears from his dress to be a cardinal; but, as there are no cardinals in the country, it is very probable that we are deceived by our eyes. Otherwise, the testimony of the sight would be less equivocal.

IX.

21. The testimony of the senses should be confined to the relations objects have with our sensibility, and should not be applied to the internal nature of things.

An uneducated man is shown a sheet of white paper. A prism is then brought into operation, and at once the paper is covered with beautiful colors. The uneducated man says: "This is not light: they have acted on the paper with some ingredient: this piece of glass could not produce such a variation."—The man deceives himself. And why? Because, instead of limiting himself to the natural object of sight, he has proceeded to judge on the internal nature of things: by simple vision he pretends to know enough of the nature of light to say that it is impossible for it, by passing through a prism, to produce the phenomenon that has surprised him. An object produces in us the sensation of smell; we are not deceived as to the relation of the organ with the object; but if we desire to determine the way in which the organ is affected, and the means by which the impression is transmitted, the organ of smell has nothing to say on these things.

In general, the testimony of the senses is insufficient for the act of knowing the internal nature of corporeal objects. Sensibility has been given to us for perceiving phenomena: the determination of the laws to which the world is submitted, and the knowledge of the essence of objects, belong to another faculty,—to the understanding.

X.

22 The senses should operate without any preoccupation.

Experience teaches that the senses make objects

different to us, according to the preoccupation of the mind. A timid person, on a dark night, easily converts into a menacing ghoul a tree, the branches of which are agitated by the wind. He sees two of the branches larger than the others, and from between them there juts up a prominence which is only a part of the trunk, or a branch thicker and shorter than its neighbors. Who can doubt that the prominence is a head, and the two branches two arms? Your timid person is certain of it, for the thing, he is sure, is before his eyes. But it is all the work of the terror under which he is suffering; the terrible spectre is the most harmless thing in the world. If the timid man, thus in alarm, were joined by others who were like him in his craze, they would see as he did, and verify all he should tell them. In such a case, and if no sensible person came up to explain the cause of the consternation, the idea of the apparition would remain a fixed fact.

Opinions, desires, authority, exercise much influence on our senses. It cannot be doubted, for instance, that the favorable judgment in which an orchestra is unanimously held depends greatly on the preconceived opinion that the same orchestra plays the best music, or on the fact that intelligent people, or those esteemed to be so, have given it their praise. At the end of a performance all are enchanted; and it may be that there are some who are really good judges of the entertainment; but there are many whose tympanum is as thick as the parchment of a drum, and yet who believe, with the best of good faith, that they have duly appreciated the melody.

An irritable man sees, with all clearness, a leering insult on the lips of his enemy, when the latter has no desire to offend, and is only compressing his lips to save himself from violating politeness by a solemn

yawn. Demosthenes, when he ran from the battle-field, believed he was overtaken when it was a thorn that stuck in him.

XI.

23. To perfect the senses, it is necessary to cultivate them with much and well-directed exercise.

All men have need of this cultivation, even for the most common objects. In all that is really necessary for us, nature cultivates our senses in proportion as our organization develops and strengthens. It is probable that, when we commence to see, we do not see well: and it must be the same thing with the other senses. Experience rectifies our errors; and when we are capable of reflecting on them, nature has already educated us in a manner sufficient to enable us to avoid them.

The perfectibility of our senses extends to an indefinite degree, as is attested by the delicacy acquired by the blind in hearing and feeling. Those who are employed on one class of objects obtain, from practice, a promptitude and perfection of sense, which are surprising to strangers. The musician accurately perceives many little things which entirely escape others, who have from nature as good a faculty of hearing as himself. It is the same thing with the painter. He can point out trifles which are not only of merit in art, but are also real objects for the sight, which persons, with much better eyes than he has, can hardly see. The taste, the smell, the touch, are also perfected by exercise. He who has experience in delicate dishes easily notices the smallest changes made in them. A man practised in aromas, distinguishes between them rapidly and correctly.

CHAPTER II.

THE IMAGINATION.

24. THE imagination has two functions, 1*st:* To reproduce in our mind sensations experienced before; 2*d:* To combine these sensations in various ways. The first constitutes the imaginative memory; the second is the inventive faculty of the imagination.

SECTION I.—*The Imaginative Memory.*

25. The perfection of the imaginative memory consists in representing past sensations promptly and faithfully. Here beauty of combination has no place: the imagination should portray, and the perfection of the drawing consists in exactly copying the original.

26. The imaginative memory is perfectible, like all the other human faculties: order is its best auxiliary.

This rule is founded in an ideological principle, namely, that impressions are produced in our mind according to the way in which we have received them, or according to the art and reflection with which we have coördinated them.

We make a visit to a large manufactory. In one of its departments the raw material is prepared; in another, various elaborations are carried out; in a third, the finishing hand is given; finally, in a fourth, the fabrics are arranged for buyers to examine them. If the visit be made with disorder, passing from one object to another, moving over and hither, now

admiring this, and then wondering at that, and continuing in this way without any rule, a great many things, no doubt, will be seen; but it will be difficult to remember them. But, if the visit be made with method, forming, at first, a general idea of the edifice, of its principal parts, and of the uses to which they are destined; fixing then the divisions and subdivisions of fabrication, following the order of procedure, etc., etc.: by this means every thing will be deeply settled in the memory; the recollection of one object will call up that of another; and, with little trouble, an account can be given of all that has been seen, even after a long time.

27. It is necessary to practise the act of putting things in order in the memory, as in a book of registration: by this means the most complicated is simplified, and one retains without difficulty that which otherwise would be easily forgotten. All do not control the time and patience which are necessary to cultivate the science of mnemonics, but all can employ those means of order which require no scientific study, and which are easily acquired with a little care and reflection.

28. To record with facility and exactitude, it is convenient to bind objects in the memory with some relation. This relation may be that of space, of time, of cause, of likeness, according to the things desired to be retained.

The Relation of Space or Place.

29. Experience teaches that, to remember a place, it is advisable to make use of the things contained in it. Hence, it is certain that if we desire to record various objects, it can be done all the better and the more

easily, if we connect them with one and the same place. The topography of a country is easily and exactly retained in the memory, if we take a chain of mountains, or the direction of a river, or some elevated peak, or any other particular thing, to which to refer for guidance.

The Relation of Time.

30. Events are put in the order of time by taking those which are the most prominent links in the chain of their occurrence. This is the foundation of the useful custom of dividing history into grand epochs, referring them to the beginning, or to the fall, of an empire, or to any other event very great by its nature or consequence.

31. We can also distribute the ordinary course of life into points notable by certain events, public or private, remote or near, which by their special circumstances make a deep mark in our mind; as the commencement or conclusion of a war, a plague, the enthroning or the death of a prince, the decease of a person beloved, a journey, a change of fortune or of social position, a new condition of the family, and other such things.

It is evident that, if we unite the two relations of time and space, the mark in the memory is engraved with increased force; for it is clear that we recollect with more facility a series of events which relate not only to a much distinguished locality, but also to a very remarkable event.

Relation of Cause and Effect.

32. The relation of cause and effect, as an aid to memory, should not be factitious, but founded in the

very nature of things. It is easy to forget,—because the mere production of the imagination is easily lost sight of,—that which is not founded in reality.

33. As far as possible, it is necessary to build on the reality of things: fictions, however ingenious they may be, have not the value of facts.

It is often said that liars, to escape contradicting themselves, should have a great memory; and this is confirmed by the contradictions into which those persons are constantly falling. The surest way to escape contradiction is to speak of things just as they took place, neither adding to them, nor taking from them, any thing. The true witness always attests the same thing. The perjurer falls into many evidences against himself. Here comes in the skill of the judge, to discover the truth in the midst of the impostures with which crime surrounds it.

Relation of Likeness.

34. The recollection which arises from likeness is one of the most natural. In regard to it the preceding rule is to be observed. The likeness ought to be true, and not a simple stroke of our fancy. An acute intellect discovers resemblance between things that are most different from each other. But, when the resemblance is not real, there is a bad foundation for memory, unless there is some prominent single feature present, which, by its strangeness or beauty, deeply impresses the mind.

35. The imagination sometimes presents to us as real, things that exist only in our own brain. Persons suffering from intense fever, have numerous delusions of this kind.

To avoid the deceptions of the imagination, the subjoined rules should be followed:—

I.

36. The testimony of the imagination of the sick is not certain.

The experience of every day attests this, not only in cases of violent fever, which produces a true delirium, but also in the instance of persons greatly exhausted from the want of food, or from insufficient sleep, or by other causes.

II.

37. The testimony of the imagination, to be worthy of credit, should be clear and unchanging.

Fantastic illusions are generally obscure and confused, mixed with a thousand incoherent things, liable to variation, and seldom firm enough to withstand a change of place or of time.

III.

38. The imagination is disentitled to belief, when it is in opposition to the laws of nature.

These laws are constant; they change only by miracle; whereas, the human imagination is subject to the influence of many causes which may derange it. Hence, prudence dictates that, in cases of doubt, it is safer to suspect the imagination, than to accept a change in the laws of nature.

IV.

39. The testimony of the imagination should be discredited when it contradicts the regular course of things.

In confirmation of this rule, the observations given in regard to the senses may be adduced.

V.

40. The testimony of the imagination is not to be accepted, when it conflicts with the testimony of others.

In general, it is easier for one to be deceived than for many; and if in many we find the generality of men, it may be held for certain that it is the individual who is deceived.

VI.

41. To judge with certitude of the testimony of the imagination, we should consult, in case of doubt, reason, the senses, the laws of nature, the regular course of things, the testimony of others, employing these means in accordance with the circumstances of the objects which the imagination presents to us.

SECTION II.—*The Inventive Faculty of the Imagination.*

42. The inventive faculty of the imagination consists in the power of *combining* various sensible impressions, independently of the way in which we have received them.

The following is the fundamental rule for properly directing this faculty:—

43. The *combination* should correspond with the end for which the work of the imagination is designed.

The principal end of the useful arts is utility; of the fine arts, beauty: the faculty to invent should be subordinated to these ends. It is good to unite the two things, utility and beauty, when it is possible; but the particular end should never be lost sight of.

In a dwelling-house beauty should be subordinate to utility — understanding, by this word, *convenience*, in its application to dwellings. In a building intended for a museum of paintings, utility should be subordinate to this object, by making the edifice in the way best calculated to secure for the pictures their proper artistic effect.

44. The inventive faculty of the imagination has two principles to guide it: science and taste. We understand here by science the knowledge of the laws of nature; and, by taste, that indefinable impression which pleasant or unpleasant objects make on us. A gallery is constructed by science, when the architect observes the laws of weight and equilibrium sufficiently to give the work the needed strength; it is built by taste, if the architect considers only the effect which it will have on the sight.

45. It is clear that in no case can we put ourselves in contradiction with the laws of nature, sacrificing the principles of science for the inspirations of taste. A palace may be very beautiful and attractive; but its beauty and splendor would be of little value, if it were likely to tumble down on the heads of its owners.

46. In every work, it is necessary to distinguish between the parts of science and of taste. In the former, the laws of nature must be strictly observed. In the latter, the inspirations of sensibility should operate, tempered, however, and directed by the councils of sound reason. For the one, there are geometry, mechanics, and all the natural sciences; for the other, the study of good models, and application, so as to give as much culture and delicacy as possible to the fancy and to the heart

47. The preference for the scientific should be resolved according to one's profession: the engineer has, principally, need of science; the painter, of beauty.

A work constructed according to the true principles of science, has a natural beauty of its own, which, by its simplicity, cannot fail to be agreeable. The simple observance of the scientific principles gives to edifices two qualities which of themselves give beauty: unity of plan, and regularity in the parts. Such a structure is as beautiful in itself as a regular geometrical figure perfectly delineated.

48. The beautiful, well understood, is not in contradiction with the rules of science. A marble statue, sculptured in such a way that, according to the rules of mechanics, it cannot stand on its feet, is far from being a fine one. On canvas, the figures are out of order, when they are in contradiction with the physical laws. The artist, who despises the laws of nature, pays for his temerity by the loss of his reputation.

49. Art does not always follow a beaten track; it sometimes ascends on the wings of fancy, and roams through new spheres. In such cases the artist cuts himself loose from mechanical rules; but he enjoys this privilege only when he is engaged on objects which are independent of the conditions of the corporeal universe. Who would require a painter to represent a sublime apparition according to the laws of mechanics? In cases like this, every thing becomes cloudy, aerial, fantastic; bodies may be said to be spiritualized; the grossness of matter disappears beneath the power of ideas and sentiment.

In all matters, but especially in those that are connected with the imagination, the following rule should be observed: —

50. No one should engage in a profession for w' ich he has no natural fitness.

Experience teaches that, while there are some men who are well calculated for mechanical pursuits, there are others who have but a very slight capacity for them. Extremes in ability are as common, as, in inability, they are hard to be found. It is but very few that deserve to be ranked with Mangimele (an Italian boy who was a prodigy in figures); but very few also are they who are altogether unable to understand the rudiments of arithmetic. Between extremes, there is an immense field which can be taken advantage of. It is impossible to measure the grades of this field with mathematical precision, but a prudent estimation of one's talents and disposition is, in general, a true guide in choosing a profession.

CHAPTER III.

INTERNAL SENSIBILITY, OR THE FACULTY OF FEELING.

51. THE feelings should be considered as a species of spring for moving the soul. Man without feelings would be without much of his activity, and, in some cases, he would have none. The will, when moved by the intellect alone, is as cold as the reason which directs it.

52. Feeling, notwithstanding its utility as an impulsive cause, is very equivocal as a criterion: a thing is neither good, nor bad, simply because it is agreeable or unpleasant to us; nor is it in existence, or out of existence, because it may be conformable or repugnant to our desires; many bad things cause us pleasure, and many good things displeasure; at one time, that which we desire takes place; at another, the very contrary occurs. He who takes his tastes for his rule of life, is on the way to inconstancy and turpitude; he who judges of the being or non-being of things by his desires, deeply deceives himself. Time dispels such illusions.

To direct this faculty well, the following rules should be observed:—

RULES FOR DIRECTING INTERNAL SENSIBILITY.

I.

53. A sentiment in favor, or not, of an event, proves nothing either for or against the existence of that event.

They who forget this rule and decide upon the reality of things by their wishes, expectations, or fears, flatter themselves with the idea of favorable results, or torment themselves with the apprehension of misfortune: persons, like these, are neither capable of forming an exact conception of what has happened, nor of foreseeing what is to come.

II.

54. A sentiment, approving or condemning an act, proves nothing for or against its morality.

A revengeful person experiences a strong feeling to murder his enemy. If we judged of the act by the feeling, we would justify the assassination.

The covetous man has a strong feeling that he is under no obligation to restore the wealth which he has unjustly acquired. Should we judge by the feeling, we would condemn the right. The whole life of the virtuous man is a contest with his passions.

III.

55. Sentiment, taken as a simple natural fact, can sometimes be a probable indication, and little less than certain, of another fact.

An injury or a danger to a person, put before the eyes of some women, would reveal which of them was the true mother. No one calls into doubt the wisdom of the famous judgment of Solomon.

IV.

56. Sentiment serves in deciding on the merit of works in letters and in the fine arts, when the subject naturally belongs to it.

Tenderness, delicacy, and, in many cases, beauty, have no other judge than sentiment; in such matters,

unfortunate is the critic who, abounding in talk, is incapable of sentiment.

V.

57. In all the acts of life, sentiment should be guided by morals.

This is the only sure means to save the heart from evil. Sentimentalism, abandoned to itself, is a perennial spring of extravagance and corruption.

VI.

58. Even in things that do not belong in a special manner to the jurisdiction of sentiment, it is indispensable to listen to the dictates of reason and of sound morals.

An act may be very beautiful, sentimentally, and yet be profoundly immoral. Who will deny that, in the novel and in the theatre of our day, there are passages and scenes which are not better calculated to enchant the heart than to overthrow its innocence? The beauty that belongs to the passions is not always absolute beauty. Sentiment presents us things in accordance with our particular disposition: but, to judge these things properly, it is necessary to consider them as they are in themselves, both in their own nature, and in their relation with other objects.

VII.

59. To act with energy, it is convenient to excite the sentiment favorable to the thing at stake.

We all know by experience, that, when we are agitated by one passion, we proceed with greater activity and energy, and that our forces acquire a large increase.

VIII.

60. When we desire to avoid an act, we should stifle the sentiments that are favorable to it.

To propose avoiding an act, and, at the same time, to conserve and foment in our heart the inclination which impels us to it, is equivalent to giving force to a machine while desiring that it should not move. It is said of certain passions, that the only remedy against them is flight: this maxim can be applied to all the sentiments whose consequences we ought to shun. Man is so very weak, that, to triumph over himself, he preëminently needs the recourse of the weak,—dexterity; and the great secret of this consists in guarding himself from himself, in shunning and encountering himself face to face.

IX.

61. The assistance of sentiment is of much utility in works purely intellectual.

Study prosecuted with enthusiasm, is all the more intense and the better sustained. The fire, calm but glowing, which burns in the heart, multiplies the forces of the understanding, increases their light, fecundizes them with its heat, and causes to germinate in them sublime inspirations which change the face of the sciences. There is no man of genius without this exquisite sentiment, which belongs in a special way to the sphere of reason: all great thinkers have moments of eloquence.

X.

62. Sentiment, like all the other faculties of the soul, is susceptible of cultivation.

Experience attests that the hearts of men are

according as they have been formed by parents, by masters, and by the various circumstances of life. It is well known that those who make much use of the sentiments in reading, or in the study of artistic objects, acquire a delicacy which others have not.

XI.

63. The extreme delicacy of sentiment is not synonymous with its perfection, and much less with its morality.

There are persons excessively sensitive and deeply corrupt. There are certain women to whom the groan of a patient is insupportable, but who, for all that, would allow their neighbors to die in misery. And there are others, less sensitive, who would divide all they had, and give consolation to every unfortunate creature that came to their door. How many weep compassionately for the sickness of a poodle, and look without any distress on the misfortune of a human being? Sometimes we encounter associations of sentimental persons whose object is to hinder bad treatment to animals, but who, with the greatest serenity imaginable, suffer their fellow-creatures to perish in distress.

It may, perhaps, be said that, in these cases, there is no delicacy of sentiment but affectation. This, however, is not exact. The sentiment is true: but it is misguided; because, when it reaches an excessive refinement, it is converted into a refined egotism.

XII.

64. All sentiment which is confined to individual complaisance, and which does not impel to an act noble in the eyes of reason, is a blind, egotistical instinct, against which we should be on our guard.

BOOK SECOND.

THE PRINCIPAL FACULTY—THE UNDERSTANDING

CHAPTER I.

THE UNDERSTANDING IN GENERAL.

SECTION I.—*The Object of the Understanding.*

65. THE understanding is the faculty of knowing. Its object has no limits. It is confined neither to the impressions of bodies, like the sense; nor to the internal representations of bodies, like the imagination; nor to the determined relations of objects, like the sentiment; it extends to every thing knowable, and, consequently, to every thing that exists or that can exist.

SECTION II.—*Attention.*

66. Besides the matter known, attention should be given to the form of cognition, or, in other terms, to the mode in which the understanding acts on the thing known. From this arises the classification of the intellectual acts, and the various rules of which they are susceptible. We will commence with the condition

most universal and indispensable in all operations of the understanding.

67. Attention is the application of the mind to an object.

68. The first means to think well is to attend well; without this condition it is impossible to advance in any study, because, without attention, no act of the understanding is duly exercised.

69. Attention should be firm, but calm; distraction and disturbance must be avoided. It is necessary to endeavor to acquire sufficient flexibility to pass from object to object, as the course of things demands. No work, however serious and profound it may be, should make us forget that we are men and that we live in the midst of men.

70. The secret of securing an attention firm without being rigid, and flexible without weakness, consists in studying with method, in taking things in good order, and in discharging obligations with a tranquil and composed mind.

71. Fault in method is, of itself, a series of distractions; and disorder in the conduct of things is a continual fountain of disconcertment; for, summoning attention to many sides at one and the same time, it debilitates the faculty. Disordered passions trouble the heart, and render it impossible for the understanding to engage itself on objects in the proper way.

72. All the rules of attention may be reduced to the following: love of truth; method in study; order in all occupations; a conscience, pure and tranquil.

SECTION III.—*Division of the Acts of the Understanding.*

73. The acts of the understanding are three: perception, judgment, and reasoning.

74. Perception is the act by which we know a thing, without affirming, or denying, any thing of it. If I think on a color, without affirming that it is black or white, or ugly or beautiful, limiting myself simply to thinking on the color, I have a perception.

75. Judgment is the act by which we affirm or deny one thing of another.

If I do not confine myself to thinking on a color, but affirm interiorly that it is clear or obscure, agreeable or unpleasant, etc., etc., I form a judgment.

76. Reasoning is the act by which we infer one thing from another.

If, in thinking on this same color, and in examining its qualities, I infer from these the ingredients which compose the coloring matter, and the way in which they have been combined,—this is a process of reasoning.

CHAPTER II.

PERCEPTION.

SECTION I.—*Definition and Division of Perception and of Ideas.*

77. OBJECTS, to be perceived, must be represented in our mind. This representation we call an idea. The act by which we know a thing, without affirming or denying any thing of it, is denominated perception.

78. It is essential not to confound the representations of the understanding with those of the imagination: the latter are an internal reproduction of sensations; the former are of a higher order, and they form the object of intellectual acts. If I remember a circle which I have seen in some situation, limiting myself to the reproduction in my mind of what my eyes saw, this internal representation belongs to the imagination; but if I take that circle as a geometrical figure whose properties I consider, then the representation is intellectual. To comprehend the difference between these two ideas, observe that the geometrician and the uneducated man have the simple representation of the circle in the same way. Even the brutes have simple representation. The dog has it of his master; the bird of its nest; and so all other animals, in a way conformable to their instincts.

79. Ideas, considered under different aspects, are divided into various classes.

80. The clear idea is that which represents an object with lucidity; and the obscure, that which is deficient in this quality.

81. A distinct idea is that by whose clearness we are enabled to distinguish the various properties of a thing; the confused, that which does not confer this advantage.

82. The idea which presents to us all the properties of a thing, is called complete; in the contrary case, it is incomplete.

83. An idea is exact when it contains, with entire precision and to the exclusion of every thing else, all the properties a thing has; it is inexact, when it fails in any of these qualities.

84. It is to be observed that the characters of distinctness, completeness, and exactness, are nothing but degrees of clearness; for it is evident that, the greater the clearness with which an object is presented to us, the better we can see it in every thing that appertains to it.

85. The simple idea is that which cannot be decomposed into another. Thus, among imaginative ideas, the ideas of color, of smell, etc., etc., are simple; and, among intellectual ideas, there is that of being. To those who have not these ideas, it is impossible to explain them in words.

The compound idea is that which consists of various simple ones, and it is known in this that it can be explained with words. Such, for instance, is the idea of a triangle which is composed of the ideas of three right angles united and enclosing a surface; and such is that

of man, which contains the ideas of mind, body, and union.

86. The abstract idea is that which represents the property of a subject, without inherence in it, as wisdom, virtue, beauty; the concrete idea is that which represents the property as inherent in the subject, as wise, virtuous, beautiful.

87. The universal idea is that which has application to many subjects; as that of man, which belongs to all men. The individual idea is that which is confined to an individual.

88. Universal ideas are also called species and genera.

89. Species, or the specific idea, is that which contains many individuals; as horse, which takes in all the individuals of that species.

90. Genus, or the generic idea, is that which embraces many species; as animal, which embraces the species of the horse, of the lion, and of all other brutes.

Genus is divided into the highest, lowest, and subaltern ideas.

The highest idea is that which is not contained in another; as the idea of being, which is the most universal idea.

The lowest idea is that which does not contain another; as metal.

The subaltern idea is that which is contained in higher ideas, and, in its turn, contains others; as body.

It is clear that different classifications of ideas give different classifications of genera. For instance: sup-

posing that the idea of reptile represents a classification of animals under which alone we place the different species of reptiles, the genus of reptile will be the last, or lowest; but, if we admit a classification of serpents into various species, the idea of reptile itself will be a subaltern genus.

91. The classification of a genus into various species cannot be done without founding it in something. This is called the difference. The genus of animal embraces man and brute: the foundation of this classification is that man is rational, and the brute irrational. The genus, animal, joined with the difference, rational, constitutes the species of man; the same genus, with the difference, irrational, constitutes the species of brute. Hence we say that the difference is the characteristic idea which confines the generic idea to a smaller number of individuals.

92. The individual idea is called singular, when it refers to a determined individual, as Socrates; and, particular, when it represents an indetermined individual, as some philosopher.

93. The collective idea is that which expresses a body of individuals, united by some bond; as society, nation, army, academy.

94. The absolute idea is that which does not of necessity excite another idea; as being. The relative idea is that which of necessity does excite another idea, as effect that of cause; father, that of son; equal, that of another equal; greater, that of less.

95. The essential idea is that which is necessary for the thing; the accidental, or modal, that which does

not imply this necessity. A man without a rational soul is not man: hence, the idea of rationality is essential to man. But a man can be learned or ignorant, virtuous or vicious, handsome or ungainly, without ceasing to be man; consequently these ideas are accidental or modal in the conception of man.

Section II.—*Rules for Perceiving Well.*

96. Perception can be on objects real or possible. In the case of real objects, the perfection of perception consists in perceiving them such as they are in themselves. With regard to possible objects, the perfection is found in perceiving them such as they ought to be, according to the matter on which the thinker is engaged, and the conditions to which it is subjected. This will be better understood by an example:—

97. Take, for instance, a real circle, the wheel of a machine. Here the perception will be perfect, if it take in with exactitude the circular form of the wheel such as it is, even with the imperfections of its construction. If the circle of the wheel were not perfect, conceiving it as perfect would be an imperfection of perception. If we speak of a possible circle, then the perfection of perception consists in putting into the idea of circle every thing that is necessary for its essence.

98. It is to be inferred from these considerations, first, that the knowledge of reality is so much the more perfect, the more closely it is approached; and, secondly, that the knowledge of things in the order of possibility is all the greater, the better are fulfilled the established conditions in the respective cases.

To perceive well, the following rules should be observed:—

I.

99. Attend to the object before you, giving no consideration to any other thing.

II.

100. If the idea comes by the medium of words, fix the sense of the words with all exactitude.

Confusion in words produces confusion in ideas. Innumerable disputes would be resolved with more satisfaction, or they would be avoided altogether, if more care were used in fixing the true sense of terms.

III.

101. The understanding should be assisted by the faculties best calculated to place it in relation with the object we have to perceive.

In literature and the fine arts we could not perceive well, if we did not make good use of imagination and sentiment.

IV.

102. When perception is employed on a single object, it is advisable to isolate it from every thing else, so as to contemplate the idea purely alone.

V.

103. If the object is compound, it is necessary to analyze it, and to form a clear and exact idea of its various parts.

VI.

104. In the examination of parts, sight should never be lost of the compound thing to which they belong.

A bad idea would be formed of the parts of a watch,

if they were considered without paying any regard to the places intended for them in the article, or to the functions they exercise in it.

VII.

105. To be certain that perception is true, it would be well to prove it by expressing interiorly with words the thing perceived.

Very often we form the illusion of having properly perceived an object, although we are unable to express it with clearness. In general, want of propriety in words indicates a confusion in ideas.

There can be more or less culture in language according to one's education, and more or less propriety, according to the greater or less knowledge of the idiom; but it is certain that, when the knowledge of a thing is clear and exact, the expression will manifest it in an unequivocal way. "I understand it, but I do not know how to explain it," is a great refuge for vanity and ignorance.

VIII.

106. We should avoid precipitation with the greatest care.

Precipitation often arises from perceptive facility itself,—a thing which has the power of deceiving its owner, making him believe he has seen a thing to the foundation, when he has not yet passed the surface. But, very frequently, we precipitate ourselves, at one time, by natural impatience, at another through haste to get quickly emancipated from an employment, and again by a puerile vanity, which hinders us from commencing anew, lest we should discredit our own penetration.

IX.

107. The act of perception should be neither pre-

ceded nor accompanied by any thing which could make us form a mistaken conception.

In books and things, we find every thing as we *wish* to find it: preoccupation and the passions are, to the understanding, what a stained glass is to the eyes. we see every thing in the color of the glass.

X.

108. It is good to consider a thing at different times, under various dispositions of the mind, in order to be certain that we have perceived it well.

This is an excellent kind of counter-proof for discovering truth.—At night, moved by conversation or other circumstances, we see an object in one way; but, we retire, and we sleep tranquilly; with rest the body is relaxed, the passions are calmed, the mind is relieved; at waking we think the subject over afresh; and, at once, the whole thing has a new appearance.

Illness, disgusts, inconveniency, food, the temperature—in a word, every thing which affects our body directly or indirectly, also affects our perceptions; and, therefore, it is always necessary, in acts of perception, to keep in view the disposition of mind and person in which we may be.

XI.

109. When perception is on objects that can be submitted to experience, this touchstone should be applied.

We have much inclination to convert our ideas into facts. This is the spring of many extravagant systems in the sciences, and of many equivocal judgments in the ordinary course of life. Thought does not alter facts which are independent of it, but impatience induces us to give to things the form represented in our thought.

SECTION III.—*Expression of Ideas and of their Objects*

110. The word with which we express a conceived thing is called a term, or a vocable. To express objects we must have ideas of them; but it is to be noted that words do not express ideas themselves, but the things represented by ideas. In the word *sea*, the idea of the sea is not signified, but the sea itself. Thus we say, the sea is agitated; but we do not say that the idea of the sea is agitated.

111. The common or universal term is that which expresses a property belonging to many, as wise; the singular term is that which declares only one thing, as Plato.

112. The collective term is that which announces a body of beings, as nation, academy, congress.

113. The common term is divided into the univocal, the equivocal, and the analogous. The univocal is that which has the same signification for many, as man. The equivocal is that which has diverse significations, as lion, which expresses an animal as well as a sign in the heavens. The analogous is that which has a signification in part identical and in part diverse, as *sound;* which, always expressing a relation to health, is applied to the man who has health, to the food that conserves it, to the advice which restores it.

114. To be brief, we observe that terms, although they express things themselves, signifying them through the medium of ideas, are, in the same manner as ideas, susceptible of various divisions. Hence they are called universal, generic, specific, individual, particular,

singular, collective, absolute, relative, abstract, concrete, etc., etc., according as they express ideas of each respective class.

115. Ideas are expressed with words, and the use of words is not external alone; it is internal too: before speaking to others we speak with ourselves; all of us experience that internal language with which the mind gives an account to itself, of what it knows, or feels. Ideas bind themselves with words; and words are a kind of register to which we entrust the order, and the memory, of ideas.

116. Hence it follows that the care can never be excessive which we bestow in fixing with propriety and exactness the sense of words; not only of the words which we employ with our fellowmen, but also of those which we use with ourselves. It is difficult to understand those who do not understand themselves. Not understanding ourselves is a much more frequent thing than we imagine.

117. Among words it is necessary to distinguish the most important, those which are, as it were, the pivot on which the question turns. In most matters there is some term which is specially influential, and whose signification is the key for resolving all the difficulties they contain. It is known by expressing the principal issue of the question; and it occurs at each step of the dispute, or examination, entering as subject, or predicate, of the proposition discussed.

AUXILIARY OPERATIONS FOR GOOD PERCEPTION.

SECTION I.—*Definitions.*

To perceive well, it is very important to define and to divide well.

118. Definition is the explication of a thing. Its name indicates its object: *to define*, to mark the limits, the *ends*.

119. Definition is of two kinds: one, the explication of things; the other, of the sense of words. The first is called real definition—*definitio rei*; the second is called nominal definition—*definitio nominis*.

120. Definition, to be good, should express and explicate all that is in the thing defined, and *nothing more*. *All*, because, otherwise, it would be incomplete; and *nothing more*, because if it contains any thing more, the defined thing would be confounded with things distinct from it.

The following is a definition of the rectilinear triangle: a superficies enclosed by three right lines. Here, if the word *right* were left out, the definition would be imperfect, because then it would not express *all* that is contained in the idea of a rectilinear triangle, and hence it would be equally applicable to the mixtilinear and curvilinear triangles. And if, to the same definition, we should add the word *equal*, it would be also imperfect, for in that case it would express *more* than is contained in the idea of rectilinear triangles in general: and this would make the definition applicable only to *equilateral* triangles.

It is a bad definition of man to say that he is a being composed of body and soul: because, by not intimating

that this soul is spiritual, we do not express all that is contained in the nature of man; and, again, if we should say that man is a being composed of a body and a virtuous soul, we would say *more* than belongs to the nature of the thing defined; and the definition would not be applicable to man in general, but only to a virtuous man.

121. To be certain that a definition is perfect, it should be proved, applying it to the thing defined, according to the following rule:

The definition should correspond to all the thing defined and to nothing more.

It is a good definition of man to say that he is a rational animal, because it is applicable to all men and to nothing else but man.

To define him a living thing, is to define him badly, because brutes and plants are living things, as well as men.

To define him as an intellectual being is no better. because the pure spirits are also intellectual beings.

To define him a virtuous rational animal is wrong, for such a definition does not embrace all men, but the virtuous alone.

122. Definition is essential and descriptive. The essential is that which explains the essence, or the internal nature, of a thing. The descriptive is that which treats of a thing, not by its essence, but by some distinctive properties. If we knew the internal nature of the sun, we could give an essential definition of it But as we do not, we must be satisfied with a descriptive definition of it: for instance, it is the star whose light constitutes what we call day. Here there is enough to discriminate between the sun and all other objects, but the definition is not essential.

123. The small knowledge which we have of the essence of objects restricts us much in essential definitions; and from this it follows that, in the majority of cases, we should content ourselves with definitions of the descriptive class.

124. Definitions given at the opening of questions, should be sufficient to make known to us the point at stake, and they should determine well the meaning of the words employed. The perfect definition comes in at the end of an operation; because, as its office is to explain, it must be the result of investigation. Defining a thing at the outset is equivalent to supposing what is yet to be discovered, to confounding the seed with the harvest.

125. With these observations it is easy to understand the sense and the reason of the rules usually given for defining well.

RULES FOR DEFINING.

I.

126. The definition should be clearer than the thing defined. It is evident that, as its object is to explain, it ought to clear up what it proceeds to explain.

II.

127. The thing defined should not enter into the definition.

128. When the thing defined enters into the definition, no advance is made, because then in our act of explaining

we make *use* of the very thing that needs itself to be explained. For instance: defining *obligation* by saying that it is that which *obliges* us to do, or to omit, a certain thing, violates the rule; for, if we are ignorant of what *obligation* is, we are also ignorant of what it is to *oblige*.

III.

129. Definition should contain the proximate genus and the ultimate difference.

Defining man as a rational substance breaks this rule, because the genus, substance, is not the immediate one, while the genus, animal, is.

130. Some writers lay down that definition should be brief; and, in truth, provided that the words are clear, the fewer of them employed the better. But care should be taken to avoid the rock, "*Brevis esse laboro, obscurus fio*,"—by love of brevity I make myself obscure.

131. Redundant words, if they express any thing foreign to the thing defined, make the definition bad, because they express more of the thing than it is; and if they only declare what the other terms declare, they are useless, and, from this, they help to embarrass when they do not confuse.

132. Let us terminate by observing, that in definitions it is necessary to guard as much as possible against metaphorical or figurative expressions in every sense whatever. In cases of definition, the imagination is much more frequently an obstacle than a good auxiliary: it is calculated to sacrifice terseness to the gleam of a comparison, or the ingeniousness of a contrast.

Section II.—*Division.*

133. The limited nature of our understanding hinders us from embracing many things at one time. Hence we employ a means for considering them separately. And this is necessary not only when objects are really separated, but also when they are united, and, sometimes, even when they are identical. Even in simple things we distinguish various aspects, after the manner of parts. Hence, division is one of the most important operations.

134. Division is the distribution of a whole into its parts.

135. As are the parts, so should be the division. When they are real, or exist in reality, and are separable, the division should be real, or physical. When the parts are not separable, but are properties inherent in the subject, the division should be metaphysical. When the parts are logical, or exist only in our understanding, the division should be logical.

Man is really composed of two distinct and separable things, body and spirit. If we divide man into these two parts, we have a real division. In man there are the two properties,—animal and rational; but not two subjects, because in man that which is animal is the same as that which is rational; and, consequently, by dividing man into what is animal and rational, we make a metaphysical division. In the genus of animal are contained men and brutes, or rational and irrational beings. But here the word *contain*, that is, the word contain in relation with the genus of animal, does not signify that there is in reality a being composed of these two parts, or of these two properties; that is, it does not mean that there is a being, which, as a being, is at

one and the same time rational and irrational: that is a contradiction; it only means that the idea of animal can belong to different species. Hence, these two parts are found only in our understanding; and so the division of animal into rational and irrational gives a logical division.

If we divide the rectilinear triangle into its three lines, the division is real: because these lines are distinct and separable parts. If we divide it into the two parts, the enclosed figure and the three lines, we have a metaphysical division: because, although these two properties are constitutives of the triangle, they are not separable in the same way that the enclosed figure is separable from the three lines. Finally, saying that the triangle is divided into the equilateral, the isosceles, and the scalene, the division is logical; for although these qualities united do not exist, and cannot exist in any triangle, we have still the general idea of triangle which is applicable to the different species of the same genus.

RULES ON DIVISION.

I.

136. In division all the parts should be enumerated. Dividing the human body into flesh and bones, or into the head and trunk, is making an incomplete division, for it omits other parts.

II.

137. In division, one part should not be contained in another.

Dividing the world into its various parts, counting Europe among them, and then adding Spain, the division is defective, for Spain is already contained in

Europe. Were we dividing Europe into its parts, then it would be proper to bring in Spain.

In like manner it is making a bad division of an animal being, to divide it into the sensitive and rational; for the sensitive being is already contained in the animal being.

III.

138. The parts of a division ought to be of one and the same species.

The division of the human body into its members, as into the head, the trunk, the arms, etc., etc., should not be mixed up with the division into the various species of parts, as the flesh, the bones, the blood, and so on.

IV.

139. In division, the natural order of things, and of ideas, should be followed.

It would be making a bad division of Europe to jump from country to country, in a way really at variance with the order in which the nations lie in regard to each other.

Dividing a living thing into rational and irrational, is out of rule; for the idea of sensibility is passed over. Hence, a living thing is properly divided into sensitive and insensitive; and, therefore, the living thing, or animal, is correctly subdivided into rational and irrational.

V.

140. Too many subdivisions should not be made.

Doing this, far from clearing up, confuses. To form a just idea of things, it is not necessary to grind them to powder.

CHAPTER IV.

JUDGMENT AND PROPOSITION.

SECTION I.—*Definition of Judgment and of Proposition*

141. A JUDGMENT is the intellectual act by which we affirm or deny one thing of another. In the first case, the judgment is called affirmative; in the second, negative. The sun shines,—is an affirmative judgment; the moon has no light of its own,—is a negative judgment.

142. The expression of a judgment in words is called a proposition. The internal act with which I affirm that the day is beautiful, is called a judgment; the words in which I express it, form a proposition. The explanation of the various classes of judgments and of their rules, is also the explanation of propositions. Hence, what is here said of propositions will be understood as said of judgments, and conversely.

143. In every judgment there is relation of one thing to another: that which affirms, or denies, with that of which there is affirmation or negation.

That of which we affirm or deny something, is called the subject; and that which we affirm or deny, is known as the predicate, or attribute.

The expression of the relation of the predicate with the subject, is called the copula; and the copula is contained in the verb *to be*, expressed or understood:—

Treason is a crime: *treason* is the subject; *crime*, the predicate; *is*, the copula.

144. In many propositions the verb *to be* is not expressed, but it is always understood. Crassus has great wealth; Cicero excels in eloquence; Cæsar distinguishes himself by his political ability: these propositions are equivalent to the following: Crassus *is* very rich; Cicero *is* excellent in eloquence; Cæsar *is* an able politician.

And the subject and predicate are not always found expressed. I exist,—is equivalent to this: I am existing.

SECTION II.—*Division of Propositions.*

145. Propositions may be considered in themselves, and in their relations with each other. Let us consider them under each aspect.

146. By reason of the copula, propositions are divided into affirmative and negative. This is called their quality. The affirmative is that which affirms; the negative, that which denies.

147. To make a proposition negative, the negation must affect the copula: poverty *is not* a disgrace. But, if the negation does not affect the copula, the proposition is not negative. The law *does not command* to do this, is a negative proposition. The law *commands* not to do this, is an affirmative proposition. The difference arises from the difference of place which the negation occupies.

148. By reason of the subject, propositions are divided into universal, particular, indefinite, and singu-

lar, according as the subject is universal, particular, indefinite, or singular. This is called their quality. QUANTITY

149. Every tree is vegetable. The proposition is universal: because its subject, as the term *every* indicates, is universal.

150. Some bodies are elastic. The proposition is particular: because the subject is confined to the limits in the word *some*.

151. Germans are speculative. The proposition is indefinite: because the subject, Germans, is not determined, for it does not express either all or some.

152. Newton is an eminent mathematician. The proposition is singular: because the subject is so. To have a proposition singular, it is not necessary for the subject to be a proper name; a pronoun effects this purpose. For example: if, in regard to a piece of metal which I have in my hand, I say, this metal is silver, the proposition is singular, through the pronoun *this*. And, in place of a pronoun, some characteristic property may be used. For instance: the man who conducted the building of the Escurial, was an eminent architect. The engineer who constructed the London tunnel, is worthy of a statue.

153. Some divide the universal proposition into distributive and collective. The distributive is that in which the predicate agrees separately with all, that is, with each one of the subjects. All Spaniards are Europeans. This is a universal distributive proposition, because being a European, is a thing that belongs to each Spaniard in particular. The Spaniards are fourteen millions: this is collective, because each Spaniard

is not fourteen millions, but all Spaniards, taken together, are. But collective propositions, it will be seen, cannot be reduced to a species of universals; for there are collective particular, collective indefinite, and collective singular, propositions.

For example, if we say, the expenses of the state are ten millions—the proposition is collective, because it is understood of the expenses *united*; and it is singular, because it refers to a determined collection.

The expenses of any state whatever should come within the twelfth part of the rents of the country. The proposition is collective, because it speaks of all the collections of expenses of all countries.

The expenses of some states do not exceed two hundred millions. The proposition is collective, for the reason assigned above; and it is particular, because it speaks only of some collections of expenses, for it speaks only of some states.

The expenses of states are excessive. The proposition is collective, for the same reason; and it is indefinite, for it does not say whether the excessiveness is in all states, or in some.

Hence, it is clear that collective propositions are of such a nature that they cannot be considered as a species of universals. Their distinctive character is in the *mode* in which the subject is taken. And it is also evident, that the collective term should not be classified among common, or universal terms.

SECTION III.—*Rules on the Extension of the Subject.*

154. There is no difficulty as to the extension of the subject in universal, particular, or singular propositions: for it is plain that, in universals, all are spoken of without exception; that, in particulars, some are spoken of indeterminately; and that, in singulars, the assertion is of one or many, but without determination.

But it is not the same thing in indefinite propositions. As in this—the Germans are speculative: here it is a question whether it is all, or some, that are meant. This is a very important point, because the proposition is true or false, according to its extension.

The following two rules are a key to indefinite propositions:—

RULES ON INDEFINITE PROPOSITIONS.

I.

155. In matters belonging to the essence of things, or to their necessary properties, the indefinite proposition is equivalent to a universal.

The diameters of a circle are equal: this is understood of all diameters. The orbits of the planets are elliptical: this is understood of all orbits of planets. It is evident that the proposition will be more or less rigorously universal, according as the necessity expressed is intrinsic or natural. In the examples given, the universality of the first is necessarily absolute, without possible exception, for it is founded in the essence of things; that of the second is not universal with perfect rigor, because it rests only on a natural law known by observation.

II.

156. When the proposition does not speak either of the essence of things, or of their necessary laws, the universality is moral; that is, it embraces the greater part of things. Thus, in the example on the Germans, it is not understood that all the Germans are speculative: what is understood is, that this is the character of that nation, and that, hence, there are many who have it. Moral universality is more or less ample, according to

the nature of the matter considered. And here no rule can be fixed, excepting that judgment should be prudently made according to circumstances.

157. It is sometimes said that, in contingent matters, the indefinite proposition is equivalent to the particular. This is not exact. In every indefinite proposition there is a certain universality. Thus, in a country where the greater part of the inhabitants had red hair, it could be indefinitely said that they had black hair, provided there were some exceptions in this sense.

SECTION IV.—*Rules on the Extension of the Predicate.*

158. We have seen that the subject of the proposition can be taken in different ways (Sections II and III); let us see now how it is with the predicate, or attribute.

In this part of logic, some things difficult to be understood are encountered. But this arises from not sufficiently observing that the dialectical rules are only a brief and precise formula of common, and even vulgar, ideas.

159. The manner in which the term is taken in a proposition is called, in scholastic terms, the supposition. The application of a term to a greater or less number of subjects, is called its extension. To say that a term supposes universally, is the same as saying that it has a universal sense, or extension.

160. Every man is a rational being. Here the subject is taken universally. But how is the predicate taken? Is it understood that the word rational is taken universally?

It is evident that each man is not all rational beings,

but some rational being; and, therefore, the predicate, rational, is taken particularly.

These considerations give the following rules for predicates:—

RULES FOR PREDICATES.

I.

In every affirmative proposition, the predicate, or attribute, supposes particularly.

161. No metal is a living thing. In what extension should the predicate be taken? It is clear that the quality of being a living thing, *in toto*, is denied of every kind of metal; so that the proposition would not be true if there were any kind of metal whatever which could be called a living thing. And, therefore, the predicate is taken universally. This is expressed in another rule:—

II.

In every negative proposition the predicate supposes universally.

162. The comprehension of a term means the number of the properties which it signifies: for instance: those of the term, animal, are life and sensitiveness; and those of man, rational animal. The difference between extension and comprehension is in this, that extension refers to the *subjects* to which the term corresponds; and comprehension to the *properties* which it declares.

163. Man is an animal. In this proposition all the properties of the predicate animal are affirmed of man, and it would not be a true proposition if man lacked any one of these properties. Hence it is that plants, although they have one of these properties,

which is that they have life, or are living things, cannot be called animals, for they have no sensibility And from this we establish the subjoined rule :—

III.

In affirmative propositions, the predicate is applied to the subject in all its comprehension.

164. Plants are not metal. Here metal, in all its extent, is denied of plants. But *all the properties* contained in the idea of metal, are not denied of plants; as for example, that they are bodies, that they are visible, and so on. From this we have another rule:—

IV.

In negative propositions, the predicate is not denied in all its comprehension of the subject.

165. Summarising these four rules, we say that, in affirmative propositions, the predicate is taken in all its comprehension, but not in all its extension; and that, in negative propositions, it is taken in all its extension, but not in all its comprehension.

SECTION V.—*The Conversion of Propositions.*

166. The conversion of propositions is the transposition of their terms, putting the subject in the place of the predicate, and the predicate in the place of the subject. There are three kinds of conversion, the *simple*, the *per accidens*, and that by *contraposition*. In the first, nothing of the terms is altered but their place; in the second, the quantity of the terms is changed; in the third, they are taken in a negative sense, in contraposition to that they held before, or, according to the expression of the schools, they are made infinite: for instance, if the term were body, it is said to be not body.

167. Dialecticians have a way of converting propositions, or rather of so making the transposition that, the primitive proposition being given, a new legitimate one should be the result. For this operation they mark the quantity of propositions with letters, designating a universal affimative with *A*, a universal negative with *E*, the particular affirmative with *I*, and the particular negative with *O*. This mode is expressed in the following verses:

Asserit *A*, negat *E;* verum generaliter ambo.
Asserit *I*, negat *O;* sed particulariter ambo.

The rules for the conversion of propositions are conveyed in this formula:

E, *I* simpliciter convertiter; *E*, *A* per accid.
O, *A* per contra: sic fit conversio tota.

This means that the universal negative proposition designated by *E*, and the particular affirmative designated by *I*, are simply converted; that the universal negative *E*, and the universal affirmative *A*, are converted *per accidens;* and that the particular negative *O*, and the universal affirmative *A*, are converted by contraposition. This will be better understood by examples:—

168. *E Simpliciter:*—No metal is a living thing.—No living thing is metal.—The simple conversion is legitimate; because, as in negative propositions, the predicate is taken universally, all living thing (all that has life in it) is denied of all metal; and, consequently, all that is metal can be denied of all, that is. of every living thing.

169. *I Simpliciter:*—Some living thing is an animal. Some animal is a living thing.—The simple conversion is legitimate; for, in both cases, the predicate is taken particularly. Thus, the first proposition is equivalent

to this: some living thing is some animal; from which, evidently, results the second,—some animal is a living thing, that is, some living thing.

170. *E per Accidens:*—No European is an American. Some American is not a European.—The conversion is legitimate, because, if we hold (166) that no American is a European, with greater reason may we hold that some American is not a European.

171. *A per Accidens:*—Every planet is a body. Some body is a planet.

As in the first, the predicate taken in particular applies to all the subjects; so the same predicate in particular can be subject for the predicate planet; but it would not be a legitimate conversion to say, every body is a planet.

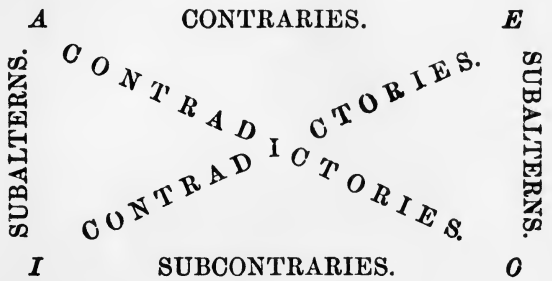
172. *O per Contrapositionem:*—This conversion, although legitimate, is strange, and of little or no use: and we give it only to complete the explanation of these formulas. Some body is not a planet. Some no planet is a body; or, rather, some no planet is not no body.

Some body is denied to be every planet; but from this it does not follow that the predicate body can be denied of every planet, or even of some planet. Hence, to verify the conversion, it is necessary to recur to the foreign idea of making a term negative, thus: Some no planet is a body; or, as in this: Some no planet is not no body.

Section VI.—*The Opposition of Propositions.*

174. The opposition of propositions consists in this, that, having the same subjects and predicates with equal, or different, quantity, one is affirmative, and the other negative.

175. There are different kinds of opposition, according to which propositions take different names; for instance, contradictories, contraries, subcontraries, and subalterns. Propositions thus named are generally exhibited in the following scheme, giving to the four letters *A*, *E*, *I*, *O*, the same signification conferred on them above (165).



176. The interpretation is :—

A contradictory of O :—The universal affirmative and the particular negative are contradictories. All metal is body; some metal is not body. In the first it is affirmed of all (every) metal, that it is (a) body; in the second, it is denied of some metal that it is body. Hence, they contradict themselves.

E contradictory of I:—The universal negative and the particular affirmative are contradictories. No planet is a comet; some planet is a comet. In the first it is denied of all planets that any one of them is a comet; but in the second it is asserted that some planet is a comet. This is the contradiction.

It results from this that the contradictory propositions are those in which what one affirms the other denies. This is rigorous opposition. The other kinds of opposition deserve this term only in a broad sense; in some cases there is not even the appearance of opposition.

177. *A contrary of E:*—The universal affirmative and the universal negative are contraries. All Africans are black; no African is black.

In this there is no contradiction. The two propositions are false. And to make them false, it is enough that some Africans are black, and others not.

178. *I subcontrary of O:*—The particular affirmative and the particular negative are subcontraries. Some living thing is sensitive; some living being is not sensitive. Both are true; because plants are living things, and yet have no sensibility, and animals are living and sensitive things, or beings.

179. *I subaltern of A:*—The particular affirmative is the subaltern of the universal affirmative. All wise men have been studious; some wise man has been studious.

There is no opposition between these propositions; on the contrary, there is a connection, for the second is inferred from the first.

180. *O subaltern of E:*—The particular negative is the subaltern of the universal negative. No vicious person is esteemed; some vicious person is not esteemed. The observation made in the anterior case is applicable here.

RULES ON THE OPPOSITION OF PROPOSITIONS.

I.

181. Two contradictory propositions cannot be both true or false: if one is true, the other is false. The reason is: it is impossible for a thing to be in being and out of being at one and the same time.

II.

182. In subaltern propositions, if the universal is true, the particular is true; but not conversely.

If all virtue is laudable, it is clear that some virtue is laudable. If no vicious person is estimable, it follows that some vicious person is not estimable. But, from the fact that some body is a planet, it does not follow that all bodies are planets: and from having some learned man not virtuous, it cannot be inferred that no learned man is virtuous.

III.

183. The contraries can be both false, but both of them cannot be true.

All Europeans have visited America; no European has visited America. Both are false. That both cannot be true is thus shown: the universal affirmative, if true, makes the particular affirmative true (182). If, then, the universal negative were also true, there would be two contradictory truths, which is impossible.

IV.

184. The subcontraries can be both true, but not false.

Some African is black; some African is not black. Both are true.

If both the subcontraries were false, the falsity of the particular affirmative would make true its contradictory, the universal negative; and the falsity of the particular negative would make true the universal affirmative. This would give us two contradictory truths, which is impossible.

Section VII.—*Equivalence of Propositions.*

185. Propositions are equivalent when they have the same value, or express the same thing.

186. The contradictories are made equivalent by putting a negation to the subject of either of them:—

Every man is wise; some man is not wise. These are contradictory. But they become equivalent by the use of the negative particle: not every man is wise; and, in the second case, no some man is not wise. But the first form is the most common and natural.

187. The contraries are made equivalent, by putting the negation after the subject of one of them:—

All body is metal; the contrary of this,—no body is metal,—is equivalent to saying: all body is not metal. The second is also made equivalent to the first by saying, no body is not metal.

188. In these examples the negation is placed immediately before the predicate. Sometimes it is placed between the subject and the copula, but this form is not so clear.

Section VIII.—*Compound Propositions.*

189. Propositions are simple and compound. The simple are those which express the relation of one single predicate to one single subject. We have considered them in the preceding sections. The compound are those which contain more than one subject or than one predicate. In every compound proposition, various simple ones are contained. The compound are of many kinds; but, as we shall see, all are not compound in the same sense, and some can be reduced to simples.

COPULATIVE PROPOSITIONS.

190. The copulative proposition expresses the connection of various affirmations or negations. It has three forms: when it announces one single subject with many predicates,—one single predicate with many subject,—and many subjects and many predicates.

Anicetus is virtuous and wise, is equivalent to these two: Anicetus is virtuous, Anicetus is wise.

Anicetus is neither virtuous nor wise, is equivalent to these two: Anicetus is not virtuous; Anicetus is not wise.

Peter and Anthony are rich, is equivalent to these two: Peter is rich; Anthony is rich. Peter and Anthony are not bad, is equivalent to these two: Peter is not bad; Anthony is not bad.

Peter and Anthony are neither studious nor educated, is equivalent to these four: Peter is not studious; Peter is not educated; Anthony is not studious; Anthony is not educated.

Rule on Copulative Propositions.

191. To have the copulative proposition true, all the simple ones into which it can be decomposed must be true.

II.—DISJUNCTIVE PROPOSITIONS.

192. The disjunctive proposition is that which affirms one fact of various things, by implicitly denying the existence of a middle or third thing between them.

Actions are either good or bad: this is equivalent to saying, that there is no action which does not belong to one of these classes. If a middle, or third kind of actions, indifferent actions, for instance, be supposed, the proposition is false. This metal is either gold or silver The proposition is true, provided the metal is

not lead, or copper, or any other kind of metal, but either gold or silver: otherwise it is not true.

193. If the disjunctive proposition be properly examined, it will be found to be equivalent to the enumeration of the classes of things to which an object can belong. This plate is of iron, of lead, of copper, or of bronze: this is equivalent to saying: the classes of metal of which this plate can be formed are the four mentioned ones. The matter should belong to one of them.

194. This observation is confirmed by common sense. All would understand the proposition to be false, provided any other class of metal could be introduced, or if some circumstance indicated that some one of the mentioned metals were not present.

195. This shows that the disjunctive proposition does not contain various affirmations or negations, but that it is the expression of a simple judgment, for all simple judgments are embraced in this disjunctive formula:—
To such a subject belongs this, or that, or the other predicate.

196. Disjunctive propositions, therefore, cannot be called compound in the sense of copulatives, for they do not, like the latter, embrace various simple propositions expressive of so many other judgments (190).

Rule on Disjunctive Propositions.

197. To have the disjunctive proposition true, no third or middle object can be introduced between the members of the disjunction.

III.—CONDITIONAL PROPOSITIONS.

198. The conditional proposition is that which affirms, or denies, one thing under the condition of another. If the atmosphere is warm, the mercury will rise in the thermometer. Here there is affirmed neither the warmth of the atmosphere, nor the ascent of the mercury: what is affirmed is the relation of the ascent with heat.

199. Reflection will show that the conditional proposition is improperly classed among the compounds. Strictly speaking, it is simple; for, that which is affirmed in it, is the relation of one thing with respect to another. Thus the preceding proposition can be expressed in this form: the rising of the mercury depends on the heat of the atmosphere; or, in this one: the heat of the atmosphere causes the ascent of the thermometer.

200. Conditional negative propositions confirm this observation. If it does not rain, there will be no harvest. In this proposition we express the necessary dependence of the harvest on the rain. Therefore, this proposition is no more than a simple one: it has one sole subject—harvest; and one sole predicate —dependence on rain.

201. In conditional propositions the part in which the condition is, is called the antecedent; and the conditional is called the consequence. If it rains, there will be a harvest. *If it rains*, is the antecedent; *there will be a harvest*, is the consequence.

Rule on Conditional Propositions.

202. For these propositions to be true, it is necessary

that, the antecedent being given, the consequence shall follow it, for it is the consequence alone that affirms.

IV.—CAUSAL, EXCLUSIVE, EXCEPTIVE, RESTRICTIVE, REDUPLICATIVE, PRINCIPAL, AND INCIDENTAL PROPOSITIONS.

203. There are causal, exclusive, exceptive, restrictive, reduplicative, principal, and incidental propositions. Their names indicate their nature.

204. Causals are those which express the cause by which the predicate belongs to the subject. They are of various kinds, according as they signify different species of causality. Cæsar crossed the Rubicon through the provocations of his enemies: here there is a moral impulsive cause. Cæsar crossed the Rubicon, in order to control the state: here is a final cause. Cæsar defeated Pompey by the superiority of the troops with which he fought in the Gauls: this gives us an efficient cause. Cæsar defeated Pompey through Pompey's want of foresight: this shows a preparatory cause.

205. It is to be noted that in each of these examples there are two propositions: one which affirms a fact; and one which gives the cause of it. It is easy to decompose them into others—as the following: Cæsar was conqueror; the cause of Cæsar's victory was the superiority of his troops. It is easy to see that these propositions are reduced to copulatives (190).

206. There are causal propositions in which the fact is not expressly affirmed, its cause alone being given, in the supposition that the fact has been or will be verified. For example: Rome would have been saved, if its ancient customs had been preserved.

But causal propositions are reducible to the class of conditionals in which there is affirmed only the dependence of one thing with respect to another. Thus the preceding proposition is equivalent to this: If Rome had preserved its ancient customs, it would have been saved.

207. Exclusive propositions are those which affirm something, while excluding something else. In some the exclusion touches the subject, in others the predicate:—

The young only are agile; which can be decomposed into the following: the young are agile; and those who are not young, are not agile. Here it is the subject that is concerned. Archimedes is only a mathematician; equivalent to these: Archimedes is a mathematician; Archimedes does not know the other sciences. The exclusion here touches the predicate.

208. This shows that exclusive propositions are equivalent in some way to copulatives, for they contain two simples, one of which is affirmative, and the other negative:—

209. The exceptive propositions affirm, or deny, by excepting.

All the soldiers, excepting one, are obedient; equivalent to these two: one soldier is not obedient, and all the rest are obedient. Here the exception affects the subject.—This soldier has all the military qualifications excepting obedience; which is equivalent to the following: this soldier has not obedience, and, he has all the other military qualifications. In this example the exception affects the predicate.

210. It is evident that exceptive propositions include two propositions, one positive and one negative. And

hence the remarks made on exclusives (207) are applicable to them.

211. Restrictive propositions are those which affirm, or deny, the predicate of the subject, bringing in another property of the same subject:—

The magistrate, as judge, has nothing to do with the recommendations of friends. The magistrate, as a man, compassionates criminals.

These propositions are decomposed into two: the magistrate does not give attention to the recommendations of friends; when the magistrate administers justice, he is not guided by the recommendations of friends.

Here it is clear that, in restrictive propositions, there is a certain limitation of the predicate to another property of the subject.

212. Reduplicative propositions are those in which the predicate is applied to the subject, in a way limited to the property expressed by the name of the subject:—
The soldier, as a soldier, has no will but that of his chief.

213. The principal proposition is that which contains the subject and the predicate, and an incident which explains some property of either the one or the other. The soldiers of Cæsar that won at Pharsalia were valiant. The principal is—the soldiers were valiant; the incident—that they won at Pharsalia. Hannibal conquered the Romans who waited for him at Cannæ. In this the incident affects the predicate.

214. Reflection will discover that here there are not two propositions, but only complex terms; for the incidents are only parts which complete the sense of the predicate, or subject.

Section IX.—*The False Supposition.*

215. Propositions which falsely suppose the existence of a subject are called *de subjecto non supponente.* For example: Centaurs are terrible creatures. Here it is supposed that centaurs, which are fabulous monsters, really exist. The circle described by Saturn is greater than that of Mars: this also is a proposition *de subjecto non supponente,* because it supposes that the orbits of the planets are circular, whereas they are elliptical. Prodigality is the most laudable vice: this is another instance, for it supposes that there is some laudable vice, while such is not the case.

216. When a proposition is called *de subjecto non supponente,* the meaning is that it conveys a falsity in the subject. But the false supposition can also enter the predicate. The Isthmus of Suez is greater than the one between England and France: the supposition is false; for it supposes that England is united to France by an isthmus, which is not the truth.

The false supposition can find its way into compound propositions. It is easy to give examples illustrative of this.

217. In the schools, when a conflict is made with this kind of proposition, *nego suppositum* is the usual answer.

Section X.—*The Order of Terms.*

218. The logical order of terms in propositions is the following: the subject, the copula, the predicate, or attribute. But the logical order is not always the most natural, because, following the mode in which objects affect us, we express in distinct order the ideas which represent them. Dexterity in the transposition of words is one of

the resources of poets and orators. A word highly forcible and impassioned in one place, is languid and cold in another. But this is a point that does not belong to Logic.

219. All propositions, simple and compound, whatever may be their form, and the order of the collocation of their terms, can be reduced to one or more simple ones, in which the terms can be placed in rigorous logical order. To do this in simple propositions, it is enough to discover what is the subject, or the thing of which there is affirmation or negation; it is done in compound propositions by finding out the component parts. Preceding examples illustrate how this decomposing is done.

SECTION XI.—*Truth, Certitude, Opinion, Doubt.*

220. Truth in the understanding, or formal truth, is the conformity of the understanding with the thing (2). But it is to be noted that formal truth, properly speaking, is not in perception, but in judgment. Because, as in perception we neither affirm nor deny, there can be neither conformity nor opposition between the intellectual act and the object. If we conceive a giant of a hundred yards in stature, without affirming that such a being exists, we have a representation to which nothing corresponds; and here there is no error. But if we interiorly affirm that a giant a hundred yards in stature exists, then there would be an error.

221. When a judgment is conformable with the reality, or the thing, it is called true. When this is not the case, it is called false, or erroneous. These designations are given to propositions according as they express a true, or false, judgment.

222. Certitude is a firm assent to a thing. It is of

four kinds: metaphysical, physical, moral, and of common sense.

223. Metaphysical certitude is that which is founded in the essence of things: three and two make five; the diameters of a circle are equal: these are instances of metaphysical certitude.

224. Physical certitude is that which rests on the stability of the laws of nature.

That the sun will rise to-morrow, is certain with physical certitude. But it is *possible* for the sun not to rise to-morrow, because God can change the laws of nature, by stopping the stars in their career.

225. Moral certitude is that which rests on the regular order of things. It is morally certain that the magistrate whom we see discharging his duties on the bench, is the acknowledged lawful dignitary; but, without changing either the essence of things or the laws of nature, it would be possible for the supposed magistrate to be an impostor who deceived the public, through an adroit personation of the proper man, and by false documents.

226. The certitude of common sense is that which is founded neither in the essence of things, nor in the laws of nature, but which makes our assent as secure as physical certitude itself. Such, for example, is the certitude with which we hold that a book can never be made by throwing a font of types at random on a table.

227. Judgments in which the assent is firm are called certain; and they are certain metaphysically, physically, morally, and by common sense, according to the certitude which surrounds them.

228. When there are weighty reasons in favor of a judgment, but yet not sufficient to produce complete certitude, it is called a probable judgment, and, more frequently, it takes the name of opinion. It is clear that opinion can be founded in reasons more or less grave, according to which its probability will have more or less certitude. But, in opinion, it is always necessary not to give a too firm assent; doing this, opinion ceases to be opinion, and is elevated to the rank of certitude.

229. Doubt is the suspension of the understanding between two judgments. If the suspension arises from a deficiency of reasons, *pro* or *con*, the doubt is called negative. When the suspension comes from an equality of reasons, the doubt is called positive. On the question whether it rains more in New York than in Philadelphia, there being no means to settle it, the doubt is negative. When two witnesses, equal in intelligence, veracity, and every thing else that can give weight to words, take opposite grounds, one affirming what the other denies,—in a case like this, the doubt engendered is positive.

230. The rules for judging properly are in part explained in what we have said (96, 97), in regard to good perception: for it is evident that when we perceive things well, we attribute to subjects their proper predicates. Still, there are some more observations which asist much in avoiding error and in discovering truth, nd these will be expounded in the proper place.

CHAPTER V.

REASONING.

SECTION I.—*Reasoning in General.*

231. REASONING is the act of the understanding by which we infer one thing from another.

232. For this illation we need a means, which is called an argument. The form in which we express a reasoning is called an argumentation. A series of argumentations is denominated an essay, or a discourse. The propositions in which the comparison of the extremes is made with the means, are called premises; and that in which the consequence is expressed, is called the conclusion.

233. Strictly speaking, a distinction ought to be drawn between the consequence and the proposition in which it is expressed: this gives us, first, the connection of the proposition with the premises; and, secondly, the proposition purely in itself. Some metal is precious therefore, gold is precious. This last proposition, considered in itself purely, is true; but, as a consequence, it is false: for, from some metal being precious, it does not follow that gold is precious any more than lead, or iron, or any other metal in the catalogue. Hence it is that consequences are called neither true, nor false, but

legitimate, or illegitimate. A true proposition can be an illegitimate consequence, as the example given shows; and a false proposition can be a legitimate consequence. Every mineral is vegetable: therefore, gold is vegetable. The proposition is false, but the consequence is perfectly legitimate.

234. The fundamental principle of all reasoning is the principle of contradiction: namely, that it is impossible for a thing to be and not to be at one and the same time. The conclusion ought to be already contained in the premises, and, therefore, implicitly affirmed in one of them. Reasoning is the act by which we discover that one judgment is contained in another, and in this discovery we use what is called the means. The judge knows that it is his duty to inflict a certain punishment on all thieves: but, as he does not know that a given subject is a thief, he does not know that he ought to inflict the punishment on him. The judgment, *this subject deserves a certain punishment*, is contained in the other general one: all thieves deserve a certain punishment; but to have this judgment discovered, a determining judgment is necessary, namely, a judgment that the subject is a thief.

235. This doctrine will be better understood by applying it to the various forms of argumentations, which are: the syllogism, the enthymeme, the epicherema, the dilemma, the sorites, or gradation, induction, and analogy.

Section II.—*Definition and Division of the Syllogism.*

236. The syllogism is an argumentation in which two extremes are compared with a third to discover the relation which they have between them.

Every virtue is laudable;
Prudence is a virtue:
Therefore, prudence is laudable.

Here the two extremes, prudence and laudable, are compared with the third,—virtue; and hence it is deduced that the attribute, laudable, belongs to prudence.

237. The compared extremes are called terms: major, the most general; minor, the other and less general. The point of comparison (the means) is denominated the middle term. In the example given, laudable is the major term; prudence, the minor term; virtue, the middle term.

238. The premise in which the major term is found, is called the major; that in which the minor is found, the minor. In general the major is the first premise of the syllogism: but change of place does not vary the nature of either premise.

239. Syllogisms are divided into simple and compound. The simple consist of simple propositions alone (237); the compound contain compound propositions.

Section III.—*The Rules of simple Syllogisms.*

240. As the fundamental principle of syllogisms is, that things which are identical to a third are identical among themselves (237), it follows that all the rules of syllogisms can be reduced to a single one: the comparison should be made of the *same* extremes with the *same* middle term. But, in the schools, various rules are given, which may be regarded as explanations of the fundamental one.

241. These rules are expressed in the following Latin verses:—

1. Terminus esto triplex: medius, majorque, minorque.
2. Latius hos quam præmissæ conclusio non vult.
3. Aut semel aut iterum, medius generaliter esto.
4. Nequaquam medium capiat conclusio fas est.
5. Ambæ affirmantes nequeunt generare negantem.
6. Pejorem semper sequitur conclusio partem.
7. Utraque si præmissa neget, nihil inde.
8. Nil sequitur geminis ex particularibus unquam.

EXPLANATION.

I.

242. Every syllogism ought to consist of three terms and no more: major, minor, and middle; otherwise, there can be no comparison of the two with the third.

To make a syllogism vicious, it is not necessary for it to have expressly more than three terms; it is enough for this pupose if one of the terms is taken in a different sense in the different propositions: for then, although the name, or term, is the same, the signification is not. A soldier is valiant; a coward is a soldier; therefore, a a coward is valiant. The middle term, *soldier*, is one and the same, in so far as it is a word, but not in signification; because the soldier spoken of in the major is not the same as the one given in the minor. All the rules can be reduced to this one (235).

II.

243. The terms should not be taken in greater extension in the conclusion than in the premises.

This rule is reducible to the first, because, increasing the extension, the terms are changed.

III.

244. The middle term, when it is not singular, should be taken distributively in one of the premises.

If the middle term is not taken distributively in one of the premises, but is taken in particular, the application is made to different subjects in the different premises, as is evident in the example (242). But if the middle term is singular, the syllogism will be conclusive. Cæsar was assassinated by Brutus; the conqueror of Pharsalia was Cæsar; therefore, the conqueror of Pharsalia was assassinated by Brutus.

IV.

245. The middle term should not enter into the conclusion. The middle term serves for comparing the extremes; and in the conclusion there should be nothing but the result, that is, the relation of the extremes between themselves.

V.

246. From two affirmative propositions, one negative one cannot be inferred.

From the identity of two terms with a third, it does not follow that they should be distinct.

VI.

247. The conclusion should follow the weaker part: that is, if one of the premises is particular, or negative, the conclusion should be particular, or negative.

When a premise is particular, the conclusion should be also particular.

This appears from previous remarks (243).

From having one extreme identical with a third, and the other extreme not so identical, it can never follow that one extreme is the other; and, therefore, the

conclusion cannot be affirmative, if one premise is negative.

VII.

248. From two negative propositions nothing follows.

In the first place, from two negatives an affirmative cannot be inferred. Two terms may be not identical with a third, and yet be not identical among themselves: therefore an affirmative cannot be inferred from two negative propositions. Cæsar is not Pompey, Cicero is not Pompey; but from this it does not follow that Cæsar is Cicero.

The non-identification of two terms with a third does not prove that they are not identical with each other: and, hence, from two negatives one negative cannot be drawn. Alexander is not Cæsar; the conqueror of Darius is not Cæsar: but from this it does not follow that Alexander is not the conqueror of Darius. Homer is not Virgil; the author of the Iliad is not Virgil: but from this it does not follow that Homer is not the author of the Iliad.

VIII.

249. From two particulars nothing follows.

If the two are affirmative, all the terms are taken in particular: and consequently, the middle term is neither universal, nor singular (244). If one is negative the conclusion ought to be negative (247); in which case the predicate is universal (161). When there is in the premises but one term which is taken universally, it must be either the extreme, or the middle: if it is the middle, the syllogism violates Rule II (243); if it is the extreme, it breaks Rule III (244).

Section IV.—*Figures and Modes of the Syllogism.*

250. According to the place which the middle term occupies, syllogisms are divided into four classes, called figures.

In the first, the middle term is subject in the major, and predicate in the minor. In the second, it is predicate in both. In the third, it is subject in both. In the fourth, it is predicate in the major and subject in the minor.

To fix these figures in the memory, the schools use the following formula: *prima*, SUB PRÆ; *secunda*, PRÆ PRÆ; *tertia*, SUB SUB; *quarta*, PRÆ SUB.

251. The combination of the propositions of a syllogism, according to their universal or particular, or affirmative or negative character, is called the mode of the syllogism.

The modes are divided into direct and indirect: in the direct, the major term is the predicate of the conclusion; in the indirect, it is the subject.

252. Representing the quantity and the quality of propositions by the vowels *A*, *E*, *I*, *O* (167), and combining them by threes, there are formed 64 combinations. But only 19 of these are legitimate, which in the schools are generally expressed in the following well known mnemonic verses:—

Barbara, Celarent, Darii, Ferio, Baralipton,
Celantes, Dabitis, Fapesmo, Frisesomorum,
Cesare, Camestres, Festino, Baroco, Daripti,
Felapton, Disamis, Datisi, Bocardo, Ferison.

253. In these mnemonic lines the *vowel letters* express the propositions. This will be better understood with examples:—

254. *Barbara.* As in this word the vowel ***A*** is repeated three times, it (the word Barbara) indicates a syllogism composed of three universal affirmative propositions. *Ferio* indicates a syllogism in which the major is a universal negative, *E;* the minor a particular affirmative, *I;* and the conclusion a particular negative, *O.* When the mnemonic word has more than three vowels, it is only the three first that are considered: for the others are added only for the cadence of the verse, as in Friseso-*morum.*

255. *Barbara.*

A. All metal is body:
A. All lead is metal:
A. Therefore, all lead is body.

Celarent.

E. No metal is vegetable;
A. All lead is metal:
E. Therefore, no lead is vegetable.

Darii.

A. All metal is body;
I. Some mineral is metal:
I. Therefore, some mineral is body.

Ferio.

E. No metal is a living thing;
I. Some body is metal:
O. Therefore, some body is not a living thing.

The four preceding kinds belong to the first figure, because the middle term, metal, is subject in the major, and predicate in the minor. They are also of the direct mode.

256. *Barali.*

A. All metal is body;
A. All lead is metal:
I. Therefore, some body is lead.

Celantes.

E. No metal is a living thing;
A. All lead is metal:
E. Therefore, no living thing is lead.

Dabitis.

A. All metal is body;
I. Some mineral is metal:
I. Therefore, some body is mineral.

Fapesmo.

A. All metal is body;
E. No living thing is metal:
O. Therefore, some body is not a living thing.

Friseso.

I. Some mineral is metal;
E. No living thing is mineral:
O. Therefore, some metal is not a living thing.

These five modes belong to the first figure for the reason assigned (250); and they are indirect, because the major term is not the predicate, but the subject of the conclusion.

257. *Cesare.*

E. No living thing is metal;
A. All lead is metal:
E. Therefore, no lead is a living thing.

Camestres.

A. All lead is metal;
E. No vegetable is metal:
E. Therefore, no lead is vegetable.

Festino.

E. No vegetable is metal;
I. Some body is metal:
O. Therefore, some body is not vegetable.

Baroco.

A. All lead is metal;
O. Some body is not metal.
O. Therefore, some body is not lead.

These four modes are of the second figure, because the middle term is always predicate.

258. **Darapti.**

A. All metal is mineral;
A. All metal is body:
I. Therefore, some body is mineral.

Felapton.

E. No metal is vegetable;
A. All metal is body:
O. Therefore, some body is not vegetable.

Disamis.

I. Some metal is lead;
A. All metal is body:
I. Therefore, some body is lead.

Datisi.

A. All metal is body;
I. Some metal is lead:
I. Therefore, some body is lead.

Bocardo.

O. Some metal is not lead;
A. All metal is mineral:
O. Therefore, some mineral is not lead.

Ferison.

E. No metal is vegetable;
I. Some metal is lead:
O. Therefore, some lead is not vegetable.

These are of the third figure.

SECTION V.—*Compound Syllogisms.*

259. Compound syllogisms are conditional, disjunctive, copulative.

260. The conditional, or hypothetical syllogism is that which is formed of a conditional proposition, of a simple one in which either of the parts of the conditional is affirmed or denied, and of the conclusion.

The conclusion is called the consequence; the conditional, the antecedent:—

If the sun heats the tube of the thermometer, the mercury will rise;
The sun heats the tube:
Therefore, the mercury rises.

RULES ON THE CONDITIONAL SYLLOGISM.

I.

261. The antecedent affirmed, the consequence must be affirmed.

It is clear that, the relation of the heat of the sun with the rising of the thermometer being supposed, the thermometer will rise if this heat is present. But it is to be noted that the affirmation of the consequence does not authorize the affirmation of the antecedent; for we cannot say: if the mercury rises, the sun heats it: because mercury rises under all kinds of heat, as well as under that of the sun.

II.

262. The consequence denied, the antecedent must be denied.

If the mercury does not rise, it is plain that there is no cause to make it rise, and consequently there is no heat acting from the sun.

But the negation of the consequence cannot be inferred from the negation of the antecedent. This reasoning would not avail: if the sun does not heat the tube, the mercury does not rise; for the mercury can rise by any kind of heat as well as by solar heat.

263. The disjunctive syllogism is that which consists of a disjunctive proposition, of a simple one which affirms, or denies, one of the members of the disjunction, and of the conclusion.

Anthony is French, or German;
He is French:
Therefore, he is not German.

RULES ON THE DISJUNCTIVE SYLLOGISM.

I.

264. There can be no middle term between the terms of the disjunction.

The example cited would not be conclusive if Anthony were Spanish, or of some other nation.

II.

265. If the conclusion is affirmative, it needs for its legitimacy the negation of all the other members; and, if it is negative, it needs the affirmation of one.

The action is useful, or dangerous, or indifferent;
It is neither useful, nor indifferent:
Therefore, it is dangerous.

Here one extreme is properly affirmed, because all the others are denied.

The action is useful, or dangerous, or indifferent:
It is useful:
Therefore, it is neither dangerous, nor indifferent.

Here one extreme is affirmed, and therefore the others must be denied.

266. The copulative syllogism is that which consists of one copulative negative proposition, of a simple one, and of the conclusion:—

Man cannot follow the bent of his passions and be virtuous.

Tiberius follows the bent of his passions: therefore he is not virtuous.

RULES ON THE COPULATIVE SYLLOGISM.

I.

267. The members of the copulative syllogism should be incompatible. No incompatibility, the syllogism leads to nothing. If one should wish to prove that a wise man is not virtuous by the fact that he is wise, he would prove nothing, for there is no incompatibility between wisdom and virtue.

II.

268. The affirmation of one member leads to the negation of the other:—

If he is virtuous, he does not follow the impulse of his passions; and if he obeys the impulse of his passions, he is not virtuous.

III.

269. The negation of one member does not lead to the affirmation of the other:—

A man cannot be French and Russian:

He is not French:

Therefore, he is Russian.

The syllogism is not conclusive; because, although the qualities of French and Russian are incompatible, the man may be neither French, nor Russian, but German, Italian, or a native of some other country.

SECTION VI.—*The various kinds of Argumentation.*

270. The enthymeme is a syllogism in which one of the premises is silent, because, without being expressed, it is understood:—

All metal is mineral;
Lead is metal:
Therefore, lead is mineral.

This syllogism can be converted into either of these enthymemes:

1. All metal is mineral:
Therefore, lead is mineral.

2. Lead is metal:
Therefore, it is mineral.

271. The epicherema, or the *proof*, is a syllogism whose premises are accompanied with proof:—

Man ought to profess the true religion, because without this it is impossible to please God, who is truth itself; the Catholic religion is the true one, as miracles, the fulfilment of the prophecies, and other certain evidences attest: man therefore ought to profess the Catholic religion.

272. The dilemma is an argumentation which consists of a disjunctive proposition, and of two conditionals, both leading to the same conclusion:—

The world was converted to Christianity either by miracles, or without them. If by them, Christianity has miracles in its favor, and, therefore, it is true; if without them, Christianity is in itself a great miracle for converting the world without miracles: therefore, again, it is true.

The man who obeys his passions either obtains what he desires, or not:

If he obtains what he desires, he becomes disgusted, and, by consequence, unhappy.

If he does not obtain what he desires, he is anxious, and, by consequence, unhappy.

RULES ON THE DILEMMA.

I.

273. There can be no midddle term between the terms of the disjunction in the dilemma :—

The judge either condemns the man to death, or he liberates him ;

If he condemns him to death, he is cruel, and, therefore, violates justice ;

If he liberates him, he does not comply with the law, and thus again he violates justice :

Therefore, whatever he does, he violates justice.

The dilemma is inconclusive : because between the penalty of death and liberation, there are other punishments.

II.

274. The conditionals in the dilemma should be true.

In the example adduced, the syllogism would be inconclusive if the sentence of death were not cruelty, or if the liberation were not contrary to the law.

III.

275. In the dilemma care must be taken against retortion :—

The sovereign either suffers the prisoner to die, or he pardons him. If he suffers him to die, he deserves censure for inhumanity ; if he pardons him, he is also worthy of censure, for he interferes with the operation of justice : therefore, in any view of the case he deserves censure.

Retorted thus:—

The sovereign either suffers the prisoner to die, or he pardons him: if he suffers him to die, he does not merit censure, because he allows justice to take its course; and if he pardons him, he is not deserving of censure, because he is merciful in the exercise of his right: therefore, in no case is he worthy of censure.

276. The sorites, or gradation, is a series of abbreviated syllogisms:—

Mercy is a virtue; virtue is agreeable to God; that which is agreeable to God gets a reward; mercy, therefore obtains a reward.

This is equivalent to the following syllogisms: Mercy is a virtue; virtue obtains a reward: therefore, mercy obtains a reward.

Proof of the minor: that which is agreeable to God obtains a reward: virtue is agreeable to God: therefore, virtue obtains reward.

277. Induction is an argumentation by which, enumerating all the parts, and seeing that to each of them one predicate corresponds, we infer that the same predicate is applicable to them all as a class.

The only rule for this argumentation is to properly enumerate the parts, and not to pass lightly from one, or a few, to all. In general, it is difficult to enumerate all the parts, and hence propositions of too absolute a nature should be guarded against. We will treat of this in another place.

278. Analogy is argumentation by similitude: as when, having found out the cause of a phenomenon, we infer that other phenomena like it have been produced by the same cause. Of this more extensively in another place.

Section VII.—*Paralogisms or Fallacies.*

279. The vicious argumentation is called a paralogism, a sophism, a fallacy. The name of sophism, and less still that of fallacy, is not generally applied to the vicious argumentation, when the latter is used in good faith. In that case, it is called a paralogism. But some give the name of paralogism to the argumentation which is vicious in its matter; and of sophism, or fallacy, to that which is wrong in its form.

280 Although the vicious argumentations can be detected by the rules which we have given in preceding pages, we will rapidly enumerate those generally counted in the schools, according to Aristotle.

281. The fallacies are thirteen: six of diction, and seven of the thing. The first are called grammatical; the second dialectical.

282. Those of diction, or of word, are the following: equivocation, amphibology, composition, division, accent, figure of speech. Some of these are strange and even ridiculous:—

Equivocation.—The climate is delicious: therefore, it is grateful to the palate.

Amphibology.—He who sinks his wealth in enterprises does a mad act; therefore, it is necessary to put him in bedlam.

Composition—or transition from the sense divided to the sense collected:—He who is sitting down can stand on his feet: therefore, at one and the same time he can sit and stand.

Division—or transition from the sense collective to the sense divided:—White cannot receive a flesh tint; therefore, paper cannot receive a flesh tint.

Accent.—If he is just. If he is just. The first is absolute; the second conditional.

Figure of Speech.—The existence of Mars is fabulous: therefore, there is no planet Mars.

283. The following are the fallacies of the thing:—Accident; transition from the dicto simpliciter to the dicto secundum quid, or from the dicto secundum quid to the dicto simpliciter; ignoratio elenchi; consequence; petitio principii; non-cause for cause; taking the complex for the simple.

284. *Accident* (fallacia accidentis).—Some wise men have been vicious; therefore, science is dangerous. Here science is condemned by reason of an accident.

285. *Transition from the dicto simpliciter to the dicto secundum quid*, and reciprocally.—The man deceives: therefore, he lies. This is not conclusive, because the man may act in good faith. We do not know the cause of the terrestrial heat: therefore, we do not know that the cause exists. Non-conclusive, also.

286. *Ignoratio elenchi.*—Bringing into the question what does not belong to it. Man cannot think without blood: therefore, blood thinks. To investigate the subject of thought, is not the same as investigating a condition necessary for life, and, consequently, for thought.

287. *Consequence.*—The fallacy of consequence is committed when the rule given in No. 260 is violated;

as: if he is wise, he is laborious; he is wise: therefore, he is laborious.

288. *Petitio principii.*—Begging the question. This fallacy is made when the thing to be proved is *supposed* as proved. As: smoke ascends in the air because it has no gravity, for it belongs to the class of light bodies Precisely, this last is the thing to be proved, but it is taken as proved. The *petitio* is also called the *vicious circle.*

289. *Non-cause for cause.*—The patient is worse: therefore, the physic has done him harm. The harm could have arisen from other causes.

290. *The complex for the simple.*—Are the Mexicans, the Brazilians, the Spaniards, the French, Europeans? Yes. Are the Mexicans Europeans? No. Therefore, the French are not Europeans.

SECTION VIII.—*Reduction of all the Rules of Reasoning to one.*

291. We have said (235) that all reasoning consists in showing that one judgment is contained in another. We now proceed to explain this observation, which, if well understood, is sufficient for knowing whether any reasoning whatever is legitimate or not, without the necessity of recollecting the special rules.

292. The legitimate consequence should be affirmed in the premises. To draw it out is to make explicit what is implicit; the means is only the instrument for unfolding the premises, and showing that in one of them the conclusion is contained. From this it follows that all reasoning is founded on the principle of contradiction;

and every consequence, in order to be legitimate, should be such that, not admitting it, gives the contradiction of a thing being and not being at one and the same time

293. A sophism is an argumentation in which an illegitimate consequence is deduced with the appearances of legitimacy. In every sophism it is pretended that one judgment is contained in another, when really it is not. The secret for disentangling sophisms is to unsay them in what they assert, reflecting attentively on the true sense of the proposition on which the fallacy rests.

294. By the aid of these observations it can be settled at once whether an argumentation is legitimate, or sophistical. In dialectics many rules are given for this purpose; their utility is not denied, and in these pages they have not been at all depreciated; still it is difficult to retain them in the memory; and, although they may be remembered, it is yet the case that each of them rests on the principle laid down, namely, the principle of contradiction.

Let us apply this remark to a simple syllogism.

295. The fundamental principle of simple syllogisms is the following: things identical to a third thing are identical among themselves. This principle is reducible to the principle of contradiction. If A is C, and B is C, A is B. It being given that A is C, it is evident that, when I say that B is C, I also say that A is B. If I deny it, I fall into the contradiction of affirming and denying one and the same thing at one and the same time.

296. Hence it is that all the rules of the syllogism can be reduced to a single one: namely, to compare the *same* extremes with the *same* means. On the other hand, all the vices of syllogisms are reduced to one:

the change of the extremes or of the means, even though the words which are used remain unaltered.

297. All body is heavy: the air is a body: therefore, the air is heavy. The consequence is legitimate; because, having affirmed that every body is heavy, I affirm the same thing of air, if air is a body: the conclusion, therefore, is contained in the major; and all needed for the manifestation of the minor is to say that the air is a body, that is, one of those things of which weight is affirmed.

298. This species of syllogism rests on the principle: that that which is affirmed of all, is affirmed of each one. The use of the principle of contradiction is evident in this case: for, when I speak of *all* distributively, I also speak of each one. If I affirm a predicate of all bodies, and then deny it of one body, I affirm of all and not of all, which is a contradiction.

299. Some body is vegetable; metal is body: therefore, metal is vegetable. The syllogism is non-conclusive; because, in affirming that some body is vegetable, the affirmation belongs only to certain bodies; and in affirming in the minor that metal is a body, I refer to bodies different from those intimated in the major: there is, therefore, no comparison of the two extremes with one and the same means; and, consequently, there is no contradiction in denying that they are identical among themselves. The defect of this syllogism is expressed in the rule,—that from two particular propositions nothing follows.

300. All pine is timber; all silver tree is timber: therefore, all silver tree is pine. Non-conclusive: because in the major the middle term expresses one kind of

timber, and in the minor a different one. The fault of this syllogism is indicated in the rule,—that in one of the premises the middle term should be taken distributively. The reason is: this gives a comparison with one and the same means: for when, in one of the premises, expression is made of *all*, it follows that the other premise in speaking of one, contained in the same *all*, expresses what the first premise has already declared.

301. It is easy to extend these observations to all the forms of argumentation; and an exercise of this nature would be good for students, because it would accustom them to distinguish between legitimate and sophistical reasoning; and, simplifying the rules of all good argumentation, they would retain them without difficulty in the memory.

BOOK THIRD.

METHOD.

CHAPTER I.

THE CRITERIA.

302. METHOD is the order which we observe for avoiding error and finding truth.

Sometimes, by method is understood a body of means for achieving an end. We shall treat of the two things in this book.

303. The sources whence we get the knowledge of truth, are called criteria; and it is clear, that, if we did not know these criteria, it would be impossible to proceed in good order in the investigation of truth. Hence, before giving the rules of method, it is necessary to explain in what the criteria consist.

In general, by criterion is understood a means for owing truth.

There are two classes of criteria: those which are in ourselves, and they are the criterion of consciousness, of evidence, of common sense, and that of the external senses; the second kind is that which is outside of ourselves—as authority. We will explain farther on (Section III), that the criterion of the external senses is reduced to the criteria of consciousness and common

sense, or rather, that it is formed of the combination of these two. It will also be shown that the criterion of authority is composed of that of the consciousness, of common sense, of evidence, and of the external senses.

SECTION I.—*The Criterion of Consciousness, or of the Internal Sense.*

304. The consciousness, or the internal sense, is the internal presence of our state of mind. To feel, to imagine, to think, to wish, are affections of our soul, which cannot be conceived without their internal presence. What would feeling be, if we did not experience the sensation? What would thinking be, if we did not experience the thought? What would wishing be, if we did not experience the act of the will? The feeling, the imagination, thought, will, would all disappear, if there were not this inward presence; for then every thing would be reduced to words that either signified nothing, or that expressed contradictory things.

305. The consciousness acts in two ways; the direct, and the reflective. The direct consists in the simple presence of the internal affection; the reflective is the intellectual act which is directed on this presence. I feel a pain, without expressly thinking that I feel it: the internal presence of the painful affection is direct consciousness. But if I think on the sensation so as to exercise an intellectual act which may be thus expressed, "I know that I suffer,"—then there is reflective consciousness.

306. The direct consciousness accompanies all internal affections: without it, neither sensibility, nor intelligence, nor will, is conceivable.

307. Some believe that there are internal intellectual

affections of which we have no consciousness: if reflective consciousness be meant, it is certain that there are many affections of which we do not expressly take note; but, on direct consciousness, the assertion would be contradictory.

308. The criterion of the consciousness is all infallible, provided it is confined to its own sphere. This sphere is that which passes in our interior. If I experience a pain like that which a blow produces, I cannot be deceived in the consciousness telling me that I feel that pain. If the consciousness tells me I feel it; to feel it, to experience it, to have consciousness of it, to find it present in my soul,—these are identical things: to affirm one of them and deny the others, would be a contradiction.

309. The errors of the criterion of the consciousness arise from passing from internal affection to its causes, or to circumstances which are not under its jurisdiction. I am not, and I cannot be deceived, if, in experiencing a pain like that of a blow, I affirm that I experience it: but if, besides saying that I experience the pain I tell the causes of the blow, still using the same criterion, then I can be deceived: because in that case the criterion operates out of its sphere.

310. A man experiences an impulse to a certain belief, or towards a certain action: interiorly, it appears to him that he hears a voice inculcating such a doctrine to be accepted, or advising such a course to be pursued: he is not, and he cannot be deceived as to the internal phenomenon, provided he limits himself to saying: "within I feel this;" thus far the criterion of his consciousness is infallible. But if, resting on this criterion, he says, God has inspired me to do this: then he

passes from the phenomenon to the cause, and he is liable to error. This is the spring of the fanaticisms and of the extravagances of the sects who have abandoned the principle of authority, to found themselves on private judgment alone.

The entire doctrine of the criterion of the consciousness is summarized in the following rules:—

RULES ON CONSCIOUSNESS.

I.

311. The criterion of the consciousness is infallible when it refers to what passes in our interior.

II.

312. The criterion of the consciousness is fallible when it goes beyond the limits of what passes in our interior—taking in causes, effects, or other circumtances of the internal phenomenon.

SECTION II.—*The Criterion of Evidence.*

313. Evidence is generally defined: the internal light by which we perceive ideas with all clearness. This definition has the inconvenience of being composed of metaphorical words, which need to be explained. It is therefore insufficient, and it is necessary to examine to the foundation this important point.

314. It is evident that three and two make five. Wherefore? Because, analyzing that which we understand by five, we see that in this idea are found the three and the two, and that the five is nothing but the union of these two numbers. It is evident that three and two are not six. Why? Because, analyzing what we understand by six, we see that this number is composed of three, plus two, plus one; and, therefore, the

anion of the three and the two does not complete the six. It is evident that all the radii of a circle are equal. Why? Because, examining what we understand by a circle, we see that in its construction the equality of the radii is supposed. It is evident that the diameter is greater than the radius. Why? Because, examining what we understand by diameter, we see that it is formed of two radii—of one put in continuation of another.

315. Evidence, therefore, may be defined: the perception of the identity, or of the repugnance of ideas.

316. Speaking in rigor, evidence is the act by which we find in our ideas that which is in them, or by which we deny what we deny of them. It is a species of loading and unloading by which the understanding balances the discharges with the arrivals: that which has not been received cannot be discharged; and that which has been discharged, is no longer present.

All evidence is founded on the principle of contradiction; the understanding has no evidence but when it discovers a conflict between affirmation and negation; it affirms with evidence, because it cannot deny without contradicting its own affirmation; it denies with evidence, when it cannot affirm without being at variance with its own negation.

317. Evidence is immediate and mediate. There is immediate evidence when we instantly perceive the identity, or the repugnance, of two ideas, without the necessity of any reflection, and by simply understanding the meaning of the words in which the thing is declared.

There is mediate evidence when, to discover the identity, or the repugnance of ideas, it is necessary to re-

flect on them, examining them under various aspects, or comparing them with other ideas. If a circular triangle is spoken of, we see the absurdity at once without any reflection, because the simple idea of triangle excludes that of circle: this is evident with immediate evidence, and for all men—for the ignorant as well as for the masters in geometry. But one uneducated in the elements of this science, could very well believe that a triangle, the sum of whose angles is greater than two right angles, is not absurd. This is impossible—contradictory: but, the contradiction is not discovered at first sight, even although it may be known what an angle is, what the triangle, and what the two right angles are. Here, then, there is not immediate evidence. But, by the knowledge of the way to compare angles, it is demonstrated that the sum of the angles of a triangle is always equal to two right angles, and that the opposite cannot be held without falling into contradiction. In this case there is mediate evidence.

318. The touchstone of true evidence is the principle of contradiction, and the illusions which we form with this criterion arise from the bad application of the same principle. In instances of immediate evidence there is no difficulty. But when, to perceive identity, or repugnance, we are under the necessity of comparing various ideas among themselves in a long process of reasoning, then it is essential to be careful.

RULES ON EVIDENCE.

I.

319. To be certain that we have, in fact, immediate evidence, it is necessary to see, at the first look and with all clearness, that the judgment is interlaced with the principle of contradiction: that is, that if the pro-

position is affirmative, it cannot be denied, or that if it is negative, it cannot be affirmed without violating this principle.

II.

320. When there is not immediate evidence, it is necessary to follow the acts of reasoning with the greatest carefulness, and never to go beyond the limits permitted by the principle of contradiction.

SECTION III.—*The Criterion of Common Sense.*

321. The criterion of common sense, which may be also called intellectual instinct, is the natural inclination we have to give assent to certain propositions which we hold neither by evidence, nor by the testimony of the consciousness. It is easy to show many examples of this irresistible instinct.

All men are certain that there is an external world: and yet they have not this certainty from their consciousness, for consciousness is limited to phenomena purely internal; nor do they know the fact by evidence, because, even supposing the possibility of a true demonstration, many would be incapable of comprehending it, and because the majority have never thought, and never will think, of such demonstrations.

All humanity knows the moral truths, and adjusts its conduct according to them: at least all men know that they ought to do this. These truths are not purely internal phenomena, for they express the relations man has with himself, with his fellow-man, and with God. Nor are they known by demonstrations, for the immense majority of men, although moral beings, do not think on moral theories.

No one believes that acts performed at chance always give the desired result; that firing without aim always kills the particular bird; that going without seeing

where, the proper place is always reached; that putting the hand in an urn containing thousands of litttle balls, a certain one is sure to be drawn, that moving a writing pen at random, gives for result every kind of literary composition that may be wanted. The certitude that these extravagances do not succeed, rests neither on the testimony of the consciousness, for that is confined to internal phenomena; nor on evidence, because, in the occurrence of such extravagances, there is no opposition to the principle of contradiction.

322. The preceding examples show that there is in us an intellectual instinct which impels us in an irresistible manner to give assent to certain truths which are attested neither by consciousness, nor by evidence. This instinct is called the criterion of *common sense*. We call it intellectual instinct. It has the name of *sense*, because it seems to have something in it resembling a *sentiment*; and it is called *common*, because, in fact, it is common to all men. Those who put themselves in contradiction with this universal instinct, those who have not the common sense, may be looked on as monstrous exceptions in the order of intelligence.

323. The criterion of the senses consists of two elements: the testimony of the consciousness, and the intellectual instinct. By the first, we are certain of the presence of the internal phenomena, of the sensation considered in itself, inasmuch as it is a fact purely subjective; by the second, we attribute reality to the object of the sensations, making a transition from the internal phenomena to the external world, not thinking at all of how this transition is made.

324. The criterion of evidence is also founded in the testimony of the consciousness combined with the intel

lectual instinct. We believe not only that things appear to us as such, but also that they are such as they appear to us. It appears to us that a circle is not a triangle: but we do not limit ourselves to the affirmation of appearance. We affirm that, in reality, and independently of internal appearance altogether, a circle cannot be a triangle. It appears to us that a thing cannot be in and out of existence at one and the same time; but our assent is not confined to *appearance:* it extends to the thing itself, and we are certain that in reality, independently of our understanding, this contradiction can never be verified. The testimony of the consciousness is limited to *appearance:* why then do we pass from appearance to reality? why do we confer an objective value on our ideas? why do we not regard them as facts purely subjective, to which things could be conformed, or not? The answer is in the intellectual instinct. That is an irresistible impulse for which we cannot give any reason either from consciousness, or from evidence, or from any source, under the penalty of proceeding *ad infinitum.* Thus it appears to me, thus it is, and it cannot be in any other way. Why? For such a reason. And in what is this reason founded? In another appearance. And thus we should go on for ever, always stopping at our interior, at a fact purely subjective, without being able to give any other reason for the transition we make from subject to object, but that which nature has formed in us.

325. The criterion of human authority is formed of a combination of the criteria already explained. We hear an account of an occurrence which we have not witnessed, and we credit the narrator. Here it is necessary, first, to hear the narrator's words, and this gives the criterion of sense; second, to know that the narrator is neither deceived himself, nor deceiving us:

and this we find out by reasoning. Finally, perhaps, we believe the narrator instinctively, and then we act by the common sense.

326. What is here said on human authority shows that that criterion may lead us into error in various ways; because, to be deceived by it, it is sufficient to make an imperfect use of the other criteria. We may deceive ourselves by hearing and reading negligently; and error and bad faith in those who address us, are competent to produce the same result.

The common sense, to be infallible, should have the following conditions, or rules:—

RULES ON COMMON SENSE.

1.

327. The inclination to the assent must be irresistible, so that it cannot be shaken off, even by reflection.

II.

328. Every truth of common sense is absolutely certain for the whole human race.

III.

329. Every truth of common sense can bear the test of reason.

IV.

330. Every truth of common sense has for its object the satisfaction of some great necessity of the sensitive, intellectual, or moral life of man.

331. When these characters are found together, the criterion of the common sense is absolutely infallible; and sceptics who then present an exception against it may be discredited. In proportion as these conditions are united in the highest degree, all the more certain is the criterion of the common sense.

CHAPTER II.

HOW WE SHOULD ACT ON THE VARIOUS QUESTIONS THAT ARE OFFERED TO OUR UNDERSTANDING.

SECTION 1.—*General Classification of Questions.*

332. The acts of the understanding are divided into speculative and practical: the first are confined to knowledge; the second direct us in our operations.

333. In the simple knowledge of a thing there are three questions: 1st, Is it possible, or not; 2d, Does it exist, or not; 3d, What is its nature—what are its properties and relations?

334. In practical questions we always design some end, which gives two considerations: 1st, What is, or what ought to be the end; 2d, What are the best means for achieving the end?

SECTION II.—*Questions of Possibility.*

335. Impossibility, as impossibility, is metaphysical, physical, ordinary, and of common sense. Each kind gives rise to important considerations.

METAPHYSICAL, OR ABSOLUTE IMPOSSIBILITY.

336. Metaphysical, or absolute impossibility, is that which implies contradiction, or, in other terms, that

which has in it the absurdity of a thing being and not being at one and the same time. Two plus two are equal to three; the diameters of the same circle are unequal; virtue is reprehensible; vice is laudable: these things are absolute impossibilities; the first, for it asserts that three are three and not three; the second, for it declares that the circle is a circle and not a circle; and the third and fourth, for they lay down that virtue and vice are vice and virtue, at one and the same time.

The following rules should be observed in judging on metaphysical impossibility:—

RULES ON METAPHYSICAL IMPOSSIBILITY.

I.

337. There is absolute impossibility when the idea of one thing evidently excludes that of another.

This evidence is the light with which we judge of first principles. We know that it is impossible for a thing to be in existence, and out of existence, at one and the same time, that the whole cannot be less than a part, that the radii of the same circle are unequal; for we see this impossibility in all evidence by the simple comparison of ideas.

II.

338. When there is no contradiction, the thing is absolutely possible.

Absolute, or metaphysical, possibility is no more than the simple absence of contradiction; and, therefore, between the possible and impossible there is no middle ground: by the mere fact that a thing is not contradictory, it is absolutely possible.

III.

339. When, at the first sight, we do not discover

that two ideas are in contradiction, it is necessary to compare them with other ideas which may illustrate them.

This proposition,—the three angles of a triangle are more than two right angles,—is contradictory; but the contradiction is not evident to one unacquainted with the elements of geometry. In such a case the thing to be done is to compare the two ideas, namely, the sum of the three angles of the triangle, and that of two right angles, with the nature of triangle itself. This shows the contradiction.

IV.

340. The metaphysically impossible is so under all aspects, and no power is capable of realizing it.

Three and two can never make seven. Blasphemy can never be a virtuous act. When it is said that God can do all things, it is not understood that He can do what is absurd; otherwise it would follow that He could sin, and even destroy himself.

V.

341. In affirming absolute impossibility, it is necessary to have very clear and distinct ideas of the extremes compared.

All the arguments used in proving that there are contradictions in the mysteries of religion, violate this rule; for their authors attempt to prove contradictions in things of which they have very obscure ideas.

VI.

342. When the contradiction is evident, we have a sure criterion for denying the reality of the contradiction in all cases.

Hence is verified without any exception the principle, that, when the power to do an act is denied, the act itself must be denied; because the thing that is abso-

lutely impossible, can never be. A circle can never be a triangle. Virtue can never be reprehensible.

PHYSICAL, OR NATURAL IMPOSSIBILITY.

343. Physical, or natural impossibility is the opposition of a fact to the laws of nature. It is not absolutely impossible for a dense body to mount up in the air: but it is physically so, for such a thing is in opposition with the laws of gravity.

To judge properly on this subject, it is necessary to observe the following rules:

RULES ON PHYSICAL IMPOSSIBILITY.

I.

344. Avoid deciding with too much haste that a fact is contrary or not to the laws of nature. If in the last century it had been said that there was a country in which, without the aid of horses or other animals, the people travelled twenty leagues an hour, there would have been many to say that such a thing was naturally impossible. But this is done to-day in all countries by means of steam. The electric telegraph is another instance. The civilized world is full of the realization of things which were once believed to be naturally impossible.

II.

345. To discover that a fact is naturally impossible, it is necessary to consider the causes in operation to produce it, and the circumstances by which it is surrounded.

In remote ages, the phenomenon of the railroad would not have appeared impossible to one who followed a good method in the investigation of its pos-

sibility. Among the machines of those times, however rude they were, there were some in the list that were not moved by animal power, and that moved at various degrees of swiftness. With these facts for a foundation, the question of the possibility of a new agent of motion was natural enough. To a man of judgment, the solution of this question might have appeared difficult, but not impossible. The telegraph is another instance. The transmission of signs by electricity would not have appeared impossible to a man who knew the velocity of the air in transmitting sounds, and of bodies of light in diffusing their rays. For such a man the problem was reduced to this: is it possible that in time men will discover some natural agent by whose means they can imitate those instantaneous transmissions? The resolution could not have been doubtful. however narrow the state of the natural sciences may have been.

346. We assist at an entertainment in which a man transforms various objects. There is no apparatus. The means he employs are mysterious words, and extravagant movements of the hands. Watching all the circumstances of person, of place, of time, we perceive no causes sufficient to produce such surprising performances. What judgment should we form? This: that there is present no secret action of the laws of nature, but that the whole thing depends on the ability of a dexterous juggler, who offers appearances for realities. To decipher the enigma, all our attention should be directed not to the efficacy of the laws of nature, but to the hands of the showman, to the instruments he uses, or to cunning assistants near him. On the other hand, if we should see astounding things in the experimenting office of a natural philosopher, where there is no disguise of the various apparatus for moving and combining the agents of nature, we should hesitate

to affirm that any thing we witnessed, however wonderful it may be, was naturally impossible.

ORDINARY, OR MORAL IMPOSSIBILITY.

347. Ordinary, or moral impossibility consists in opposition to the regular, or ordinary course of things.

It is morally impossible that a person, generally known by a certain name and surname and by his position in society, is not the man whom all believe him to be. But it is possible for that person to be an impostor who has taken advantage of favorable circumstances to put himself where he is. There are many instances of this kind of deception.

In this class of judgments the following rules are to be observed:—

RULES ON MORAL IMPOSSIBILITY.

I.

348. When there is no contrary sign, we must be satisfied with the criterion of ordinary impossibility.

Society and families rest on this criterion. If we needed absolute, or natural certainty in all things, it would be necessary to renounce our relations with men

II.

349. To decide in a given case on the certainty of moral impossibility, an examination should be made into the causes that might make possible the contrary fact.

It is morally impossible for a firm assent, generally received, to be untrue. This security should satisfy us in matters of minor importance. But, in things of consequence, the least indication of error should be enough to weaken the idea of moral impossibility. This is attested by common experience.

THE IMPOSSIBILITY OF COMMON SENSE.

350. The impossibility of common sense does not belong to any of the preceding kinds. Examples will explain what it is, better than any definition. A man has in his hand a quantity of pebbles, and he pretends that, closing his eyes, and then pelting them at random, he can make each one of them pass through a hole equal to itself in dimensions. Twenty blindfolded men take an equal number of loaded rifles in their hands; before firing they are made to move their weapons in various directions; and then it is pretended that each of them can send his bullet through a hole corresponding to itself in diameter. Another man proceeds to scatter a case of types on a table, and it is claimed that the result will be a piece of copy regularly set up. It is clear that all these things are impossible: and yet in none of them is there that essential repugnance of ideas, which absolute impossibility demands. Nor is any of them in opposition even with the laws of nature after the manner of physical impossibility. But the impossibility manifested is that of common sense: for, without any reflection, all men believe that undertakings of these kinds can never be realized; and the belief of mankind against the performance of such acts is much stronger than that which arises in instances of ordinary impossibility. This shows that these two impossibilities should not be confounded.

RULES ON COMMON SENSE IMPOSSIBILITY.

I.

351. In all cases like the preceding, which produce a general and instantaneous conviction, the impossibility of common sense is a sure criterion that the fact has not been, and never can be, verified.

II.

352. When the conviction on this impossibility is not general and instantaneous, the event is more or less probable.

To determine the degrees of this probability, a fraction ought to be formed whose numerator represents the favorable cases, and whose denominator stands for the possible ones.

In an urn containing ninety-nine white balls and one black one, the probability of drawing the black one is equal to $\frac{1}{100}$: because there are a hundred possible cases, for the balls are a hundred; and there is only one favorable case, which is the solitary black ball. So that there are ninety-nine degrees of probability in favor of each white ball, while there is only a single degree for the black one.

353. Thus we understand the profound reason which is imbedded in the impossibility of common sense. Let us suppose a man placed in the centre of a great hall; his eyes are bandaged; a rifle is put in his hand; and by a random shot he is required to send the ball through a hole an inch in diameter. All would say at once, without any reflection, that such a feat is impossible. And why? They do not know it; and yet a calculation will show the depth of this instinctive judgment. The supposed hall has four walls, each twenty yards long, and eight in height. All this surface is equal to 829,440 square inches; and as the hole could be in any one of these squares, it is clear that the number of possible cases is 829,440, while there is but one favorable case. The probability of the required feat can then be thus expressed $\frac{1}{829,440}$. But the probability is even much less than this. To demonstrate this, let us suppose that all the square inches of the four walls are painted: in

that event, if one should be holed, the probability in its favor would not be expressed by the fraction given. That fraction gives the idea that the number of the possible cases is one of the marked, or painted inches, and that if the ball does not go through one of them it will go through another. But this is incorrect, for the ball may go through the lines separating the squares.

And thus we see that the probability of performing the required act is what may be called infinitely little

SECTION.—III. *Coexistence and Succession.*

354. To know the existence of an unknown thing, we are compelled to begin at a known thing, and we must know, in addition, that the two things are united by some bond. Without this it is impossible to proceed. How can I acquire a knowledge which I have not, if I have not something on which to rest? such an act is like designing an edifice without a foundation.

355. Of objects, some are subjected to our immediate experience, and, with objects of this class, others are found connected. I see smoke; I know its existence by immediate experience; I infer fire: this is known to me by the connection fire has with smoke.

356. As the internal nature of objects is but little known to us, we often find ourselves compelled to consider them in dependence among themselves, either because in many instances they are united, or because some of them emanate from others. This fact, which is a fundamental one in the sciences of observation, and which we are constantly using in the regular course of life, is one that is calculated to lead us into error. To prevent that, the following rules are to be observed:—

RULES ON COEXISTENCE AND SUCCESSION.

I.

357. The simultaneous existence of two or more things, or their immediate succession, considered solely in themselves, does not prove that one of them depends from the other.

We are constantly seeing things in coexistence and succession that are in no way related. To be in one and the same place, to exist at one and the same time, and to exist in times immediately successive, are things which are very distant from the relation of dependence.

II.

358. When a constant, unchanging experience shows us that two or more objects exist at one and the same time, in such a way that, when one is presented, the other is also presented, and that, when one is absent, the other is also absent,—in a case like this we may unhesitatingly judge that the objects have some connection between them; and, therefore, from the existence of one we may legitimately infer the existence of the other.

With the presence of certain bodies coincides what we call light and vision; it little matters that we do not know the internal nature of these phenomena: their coexistence makes us sure of their relation.

III.

359. If between two objects there is indefectible succession, so that, the first being given, the second is always sure to follow it, and, the second being given, the first is always present,—in such a case, it can be held with certainty that the objects have some dependence between them.

Heat applied to a caldron of water makes the water

boil. Men did not wait for the developments of science to affirm that this movement of the water comes from the fire. The lightning forks its way through the air, and, in a moment after, the thunder-clap is heard: the constant occurrence of these phenomena caused it o be believed that the first depended from the second, long before the theory of electricity and the principle of the transmission of sound were understood.

IV.

360. The dependence indicated by coexistence, or succession, is not always direct from the objects themselves: for dependence may come from a third or unseen cause.

When a country has a certain fruit, it always has a certain other one. This does not prove that the first depends on the second, nor the the second on the first: it only shows that the two fruits depend from a cause which has produced them. When a certain disease is common, a certain other disease is also common: this does not establish the relation of cause and effect; the two diseases can be independent of each other, but dependent, both of them, on one and the same cause. Two persons meet at the same point, at the same hour for many days: here there is no proof that the departure of one has any relation with that of the other; but the two departures, although purely casual with respect to each other, have still their proper cause; such, for instance, as a common necessity to be at business at a common hour.

361. The reason by which we instinctively attribute a connection, either mutual or not, to facts which constantly coexist, or succeed to each other, rests on a principle deeply engraved in our soul: where there is

order, where there is combination, there is a cause which orders and combines. Pure chance is a word without sense.

JUDGMENT ON THE HUMAN ACTS.

362. Judgment on the human acts is subject to rules which are quite different from those that operate on the phenomena of nature. Man, being endowed with free will, conjectures upon his acts, hidden or yet to come, cannot be subjected to rigorous calculation. Probable rules, however, can be given on this point :—

PROBABLE RULES ON THE HUMAN ACTS.

I.

363. But little should be made of the virtue of most men when it is exposed to a severe ordeal.

Strong passions, powerful interests, produce vehement impulses, which are resisted with great difficulty, excepting where there is very elevated virtue; and this is found only in a few; and, therefore, they who love danger, perish in it.

II.

364. The maxim, "*Think what is bad and you will not err*," is inadmissible, not only from motives of charity, but also from good logic.

It is evident that this maxim is not applicable in the case of the good. And it is equivocal when applied to the bad. A liar, however great a liar he may be, lies only when he has some interest or taste at stake. Hence it is that if we compare his assertions among themselves, it will always be found that he tells more truth than falsehood. The drunkard passes more hours with his head clear than muddled; the dissolute indulge their passions only in opportunity. It is, therefore, very hazardous to put down as bad the generality of human actions.

Such a rule condemns as bad many acts that are not bad in any degree.

III.

365 To conjecture on the conduct of a man in a given situation, it is necessary to know his intelligence, his disposition, his character, his morality, his interests, and, in a word, every thing that might influence his determination. Man, although endowed with free will, is subject to various influences that contribute to decide his will. To leave one of these unconsidered, is to neglect a point in the problem.

IV.

366. We should not think that others would do as we ourselves would do.

Disregarding this rule, we fall into errors grave and frequent. We have a natural inclination to judge others by ourselves: without observing it, we attribute to them our ideas, affections, and character. The good man is deceived by his goodness; the bad man by his badness.

HUMAN AUTHORITY.

367. In many cases we are unable to know the truth by ourselves, either immediately, or mediately; and, in consequence, we must use the testimony of men. Distance in time and place disconnects us from facts, and we cannot develop them by argument: sometimes, because they depend on human liberty, and sometimes, because they proceed from causes of which we have no knowledge. How can I know what happens at this moment in Pekin or in any other far-off city? If the question refers to the free acts of man in those places, it is impossible for me to know them, because they do not depend on any necessary cause; and if the question is of natural occurrences, as, for instance, floods,

tempests, earthquakes, I am insufficiently acquainted with the relations of the causes which operate in the world to determine, *a priori*, what effects they are producing at the present time in such or such a part of the globe. This is an illustration of the barrier distance of place erects before our intelligence. And so as to distance of time: it, too, impedes the knowledge of facts, excepting where evident signs of them remain; as when an abundance of lava proves a volcanic eruption, and as numerous petrifactions and shells give evidence of the previous presence of water.

368. To have a human testimony true, there must be two conditions: that the witness himself is not deceived; and that he has no design to deceive his hearers. The veracity and good faith of a narrator are little worth, if he himself is deceived; and the knowledge of a liar is of no value, if he tells us the contrary of what he knows.

RULES ON HUMAN AUTHORITY.

I.

369. We should examine both the means at the disposal of a narrator for finding the truth, and the probability of all he says.

II.

370. In an equality of circumstances, the ocular witness is to be preferred.

III.

371. In an equality of circumstances, and where the witnesses are ocular, the witness who has no part or interest whatever in the matter at stake, is the one to be preferred.

IV.

372. It is necessary to compare the testimony of a witness with that of another who has different opinions and interests.

V.

373. In narrations, it is necessary to carefully distinguish between the fact narrated and the causes given for it, between the results attributed to it, and the judgment of the writers.

VI.

374. Anonymous witnesses deserve little confidence

VII.

375. Before reading a narration, it is very important to know the situation, and, especially, the circumstances of the narrator.

VIII.

376. Posthumous works published by unknown or uncertain agents, may be suspected of being apocryphal, or of being altered.

IX.

377. Narrations founded on secret memoirs, or unedited papers, deserve no more credit than is due to the person who makes himself responsible for them.

X.

378. Accounts of hidden transactions, the secrets of states, piquant anecdotes on the private life of celebrated personages, histories of dark intrigues, and other such things, should all be received with extreme suspicion.

XI.

379. In the matter of ancient, or very remote people, but little credit is due to all that refers to the riches of the country, to the number of its inhabitants, to the treasures of the monarchs, to the religious ideas, and to the domestic customs.

XII.

380. Much confidence should not be placed in the narrations of travellers who have not remained long in the country they describe.

SECTION IV.—*Questions on the Nature of Things.*

381. In questions connected with the internal nature of things, the following rules should be kept in sight:—

RULES ON THE INTERNAL NATURE OF THINGS.

382. The internal nature of things is frequently unknown to us; we know of it but little, and that little imperfectly.

The truth of this observation is all the better known, the better our studies are made: the result of the most assiduous and profound labors is the conviction of our own ignorance.

383. The best resolution of many questions is the knowledge that it is impossible to resolve them.

Men lose much time in disputing problems that rest on nothing. There are questions in the world that make great noise, and that may be compared to this: the number of the stars is equal, or unequal

III.

384. As things differ much among themselves, in their nature, in their properties, in their relations, so

the modes of examining them, and the methods of reasoning on them, should, also, be very different. To apply the mathematical methods to the political and moral sciences, is to fall into grave errors; and to judge the merit of a literary work by a metaphysical or dialectical analysis, is like dissecting a living body.

IV.

385. In the consideration of *necessary things*, it is important to keep in view the relations of pure ideas. In the sciences that are concerned with nature, it is necessary to be founded on observation. When it is man we consider, the human heart should be studied. In moral questions, we must have with us the eternal principles of reason, illustrated by universal tradition and, above all, by the Christian religion.

V.

386. All rules avail nothing if we have not a profound love for truth, and if we do not know how to silence our passions so as to see in things that which is really in them, and not that which we desire they should contain.

Section V.—*The Use of the Hypothesis.*

387. The Hypothesis is a supposition of which we make use to explain a thing. A business, found to be in a good state for a long time, is suddenly ruined, and the cause of the misfortune is unknown; still, conjecture is made, and the disaster gets explanation in the bad will of an enemy, who had the power in his hands to effect it. This is a hypothesis. In explaining natural phenomena, where the cause is unknown, hypothesis is often used. Works on mechanics show this.

388. The employment of hypothesis, when used with judgment, is beneficial; for it exercises the understanding by accustoming it to reduce variety to unity, and also because the knowledge of possible causes, which it confers, often leads to real causes. But it must be remembered that the hypothesis, by itself alone, proves nothing in favor of reality. To say *this* could have happened in such a manner, and then to lay down that it has *so* happened, is to make an illegitimate conclusion. Thus, in the preceding example, the business could in fact have been ruined by the bad will of an enemy; but this does not exclude many other causes, as the injudicious officiousness of a friend, or the superior activity of a rival, and so on.

389. Suppositions, when they are ingenious, and, especially, if they have some resemblances of probability, frequently deceive us, leading us into grave errors: and this both in the study of the sciences and in the common practice of life. *It could* have happened thus; therefore, it *has* happened thus: this is desperate argument, and yet it is in common use as an unanswerable proof.

390. From possibility to reality there is a long distance. We should seek not that which can be, but that which is. In matters independent of our understanding, the observation of facts, such as they are in themselves, is essential; and, if these facts are hidden from us, it is better to know and to confess our ignorance than to delude ourselves by taking for realities the productions of our fancy.

SECTION VI.—*Synthesis and Analysis.*

391. When in operations we pass from the simple to the compound, the method is called synthetical; when the proceeding is the opposite of this, the method is

analytical. If we take separately the different parts of a watch, and after considering them first in themselves, and then in the relations they have to each other, we go on putting the article together, the method is synthetical. On the other hand, it taking the watch already constructed, we examine the movement as a whole, investigate the relations of the parts among themselves, coming finally to the knowledge of the structure of each one of them, and of the functions it performs in the watch,—then we have the analytical method. Beginning at the first principles of geometry, and amplifying them successively by means of demonstrations, we reach the formation of the curve, and the knowledge of its nature and properties: this method is synthetical. Considering the curve in itself, and decomposing it in different ways, leads also to the knowledge of its nature and properties: here we have the analytical method.

392. It is sometimes asked which of these methods is to be preferred: and the common answer is, that synthesis is preferable for instruction, and analysis for investigation and invention. This is a judicious solution: for the master who knows beforehand the point to which he wishes to conduct his pupil, can begin by the simple to come to the compound, which is already known. But, in investigating truth, objects must be taken as they are presented, and it is clear that they are presented not decomposed into parts, but forming a whole.

393. But no exact limits can be drawn between these methods: utility and necessity are constantly uniting them. One is often substituted for the other. The preference between them depends on circumstances.

394. When the synthetic method is followed, the

mania of composing without sufficient elements must be avoided; and, in the analytical way, it is necessary to remember that too great a separation of parts, endangers the just conception of their relation with the whole.

SECTION VII.—*Necessity of Labor.*

395. Man has many happy inspirations which cost no toil: but, in general, he must labor, or continue to live in ignorance. Even the spontaneous inspirations themselves, as a rule, come only to those who have cultivated their talents with great assiduity. Without activity the mind does not develop; but, like the body which remains unemployed, it feels its forces diminishing, and it leads a languid, crawling sort of existence. Some believe that the great geniuses are lazy. A great error! All great men have been distinguished by indefatigable activity: this is a necessary condition for their greatness; without it they would not be great. Vanity sometimes makes men conceal the labor a work costs them. But it is certain that, without much labor, it is very little of what is excellent that can be accomplished. Those who have extraordinary facility have acquired it by constant exercise. It is a puerile vanity that much can be done with little toil. No one should be ashamed of the conditions imposed on the human race; and one of these is, that there is no progress without labor.

To labor with profit, it is proper to keep in view some observations on reading, conversation, and meditation.

SECTION VIII.—*Observations on Reading.*

396. In reading, there are two essentials: to select good books, and to read them well.

397. Books that mislead the understanding, or cor-

rupt the heart, should never be read. Irreligious and immoral readings conduct to no science; on the contrary, they are a spring of frivolous superficiality.

398. We should read authors whose names are generally known and respected: this saves much time, and is pregnant with advancement. Eminent writers teach not only by what they say, but also by what they make us think. The mind is nourished by the doctrine they communicate, and it develops and unfolds by the reflections which they inspire. Of two men, one mediocre, the other eminent,—who would prefer to consult the mediocre?

399. No art, no science should be studied by dictionaries or encyclopædias. It is necessary to begin at elemental works in order to find fruit in the study of those that are far advanced. Dictionaries and encyclopædias are good as books of reference, but not for sounding things to the bottom.

400. *Non multa, sed multum.* To read *much*, but not *many books*, is an excellent rule. Reading is like food: the nutrition is in proportion, not to the quantity consumed, but to the quantity digested.

401. Reading should be slow, attentive, reflective. It should be often interrupted in order to reflect on what has been perused. By this means the substance of the author becomes our own; and an act is performed in the understanding like that which takes place in the nutritive functions of the person.

402. It is often said that, in reading, it is best to keep a pen in the hand, so as to make notes of striking points. This, undoubtedly, is a wise rule: but, in regard to it,

ul.. following hints may be kept in view: first, it exposes us to the danger of putting down many useless remarks, and, therefore, to a waste of time which could be more profitably employed in reading; second, by putting every thing on paper, the growth of the memory is interfered with: the best note-book is the head: it neither mislays papers, nor confuses them; third, proper names and dates had better not be entirely intrusted to the memory.

403. The immoderate desire of universality is a fountain of ignorance. Wishing to know all, ends in knowing nothing. It is very few men that are born with talents, sufficient to enter on all the sciences: hence, it is very important to possess even one science to the foundation. And, therefore, our studies should always be undertaken after a due consideration of our capacities, of the time at our disposal, and of the profession we are to pursue. What is the use of a knowledge of botany to a soldier, if he is ignorant of the art of war? What profit would geometry be to an advocate, if he were unacquainted with jurisprudence?

Section IX.—*Conversation and Dispute.*

404. Conversation with men is a great means for increasing our knowledge. Discussion is a fountain of light, provided we suppress personal vanity, the partiality of disposition, and avoid the dangers of giving offence.

405. It is worthy of remark that, in the warmth of discussion, and sometimes even in the mild activity of tranquil conversation, thoughts occur to us which we never before experienced. The difficulties of our opponent, the observations of a friend, the doubts of the indifferent, even the deficiencies of the ignorant, are

often the means of shedding new light on disputed questions. The human intellects have the faculty of fecundizing each other.

406. Unfortunately, however, men fall with too much frequency into the faults pointed out above. All of us can attest cases in which previously formed judgments were stubbornly held to the last; in which the aim was, not to find out the truth, but to fight a battle and gain a victory, and in which the pride of the contestants became exalted and their words offensive. And thus it too often is, that that which ought to be an association where each one could contribute his assistance as to a common fund with the object of discovering the truth, is converted into a literary arena where passion predominates.

407. The mere spirit of dispute is to be avoided. It is better to be contented with silence than to go into discussions from which nothing can be hoped in favor of the truth, even when propositions are put forth which could be easily undone. This prudence in escaping noisy contentions is conformable to good morals, to good education, and it saves much precious time to be employed in useful operations.

408. But, for all this, it is necessary to look for intercourse with judicious and intellectual persons. It is incredible what benefit arises from conversing with others on things that have engaged our study. By communication of this nature the mind unfolds itself, vivifies itself, recovers its power weakened in solitude. gains knowledge of its errors, rectifies its equivocations. confirms itself in the possession of truth acquired, discovers new ways for more acquisition: in a word, it gathers the fruit of the labors of its interlocutor, in turn

ommunicates its own, it gives and receives, it learns, nd it gives gratification.

Section X.—*Meditation.*

409. Meditation is the intellectual labor by which we endeavor to know a thing to the foundation. It is clear that it would be a sterile act, were there no ideas on which to fix it. Hence, to meditate with fruit, it is necessary to have a supply of materials, acquired through reading, conversation, and observation.

410. Intercourse with thinking men, and the reading of profound authors, insensibly accustom us to meditate. We should do all in our power to generate this custom in our minds, by contracting the habit of reflecting on every thing offered to our consideration. Here we include the pursuits of business, as well as the subjects of science nd letters: many errors, practical as well as speculative, have their birth in deficient reflection. There are men who read much, and meditate none at all on what they read. The heads of such persons are depositories of foreign thoughts, which contain nothing belonging to themselves; and which even in their best moments betray a borrowed intellectuality. It must be remembered that the fruit of study is found in proportion, not alone with study itself, but also with the method of study. Then again, there are others in the management of business, sometimes of the highest importance, who scarcely ever properly reflect on the nature of their responsibility. This is proceeding without plan, without foresight of what may happen, and leads to disasters that, no doubt, could be easily obviated.

Section XI.—*Practical Questions.*

411. The practical acts of the understanding are those which direct our actions. What should I do to manifest my gratitude? To what sacrifice does friendship oblige me? What is the way in which to administer this or that responsibility? How should the motive powers be combined in a machine so as to make it exercise its functions? These are practical questions. It will be seen that they are divided into two classes: to the class of free action, and to that of actions that fall under the necessary laws.

412. When man wishes to operate, he always, proposes to effect some end. Without this condition the will does not move. The object of an act is to accomplish a proposed end. Hence, in every operation it is essential to consider the end and the means.

413. The end of all acts ought to be normal. Every end contrary to morality, should be inexorably abandoned. Nothing, either in art or science, can authorize the design of bad ends. The immoral, by the very fact that it is immoral, is deficient in truth and beauty. Truth and beauty do not really belong to immoral things.

414. It is not enough that the end is not immoral; it should be also an end that properly corresponds with the agent and with circumstances. The end ought to be proportioned to the means. Aspiring to an end, without means to realize it, is a waste of time.

415. The circulation of external means is less difficult than that of internal means. The former are not made use of without the latter; and, precisely, it is as

to the due knowledge of the latter the greatest difficulty is experienced. Profoundly wise was the saying of the Greeks—"Know yourself."

416. In measuring our forces, we should guard, on one side, against presumption, and, on the other, against pusillanimity. Presumption leads us to undertakings that are beyond our power; but pusillanimity prevents us from employing the capacity we possess; and, assisted by laziness, one of the most general of the human vices, it diseases activity, and makes men inferior to themselves.

417. If a case is urgent, and we feel ourselves under the influence of a passion, we should make an effort to suppose ourselves in a state free of that passion. This act, by the very fact that it excites reflection, calms the passions, and enlightens the understanding, and then we may hope to operate with success.

418. *The means should be moral.* The end does not justify the means: it is never lawful to commit a bad action, however holy may be the end which we have in view.

419. The passions are good auxiliaries, when they are directed by reason and morals: then they inspire the understanding, and give firmness and energy to the will.

RECAPITULATION.

420. A deep love for truth; a fixed selection of vocation; indefatigability in labor; an attention, firm sustained, and accommodated to objects and circum-

stances; an acquired practice in the exercise of the faculties in accordance with the matter that engages us; knowledge of our capacity, without either presumption or pusillanimity; command over ourselves, in subjecting the passions to the will, and the will to reason and morals:—here are recapitulated all the means for thinking well; here are condensed the rules of logic.

THE END.