

Chapter 1

The Subject Matter

1.1 What is Critical Idealism?

Critical Idealism is the philosophy which concerns itself with questions of knowledge. How do we come to know that which we know? Are there things we can not know? What delineates that which we can know from that which we can not know? What does it mean "to know"? These are questions of vital practical importance to science, to religion, and, of course, to philosophy itself. On an applied level, it has much to say of interest to those working in the field of artificial intelligence, neural networks, and cognitive systems engineering.

Critical idealism is the creation of the great 18th century philosopher Immanuel Kant. It was first published in May of 1781 in Kant's masterpiece work, *The Critique of Pure Reason*. This was followed in 1783 by Kant's *Prolegomena to Any Future Metaphysics* and in 1787 by the second edition of *The Critique of Pure Reason*. The *Critique* presents a fundamental theory of the processes of reason; the theory might be termed the "mental physics" of objective thinking.

Some, particularly psychologists, physicists, or engineers, may find my use of the term "mental physics" provocative. By what act of hubridity do I dare put these two words together? The term "physics" implies theories, facts, and "laws of nature" while the term "mental" denotes the *mind*. The juxtaposition of these terms implies the intent to reduce our most prized and fundamental individual possession, our individual minds, to a set of formulas and rules meant to govern us all as if we were some species of automatons. We are all unique individuals and by what presumption does philosophy propose to homogenize us all and rob us of our individual intellectual identities?

Critical idealism will do no such thing. The science of economics provide a useful description of the theory of the firm without entrapping every small business person into behaving in a single prescribed fashion; the science of anatomy provides life-saving knowledge to the medical profession without making us all athletes; the science of physics prescribes rules which describe the behavior of physical objects without robbing us of our individual free will or placing us in a determined universe. What these and all other sciences do is to discern from the chaos of nature those common properties of the objects of their studies which follow basic patterns and which are amenable to our understanding. So it is with critical idealism; we are all different individuals but we share a great deal in common. In particular, our processes of thinking and reasoning are enormously more alike than different. I can not reason with a mouse or a spider but under normal circumstances I *can* reason with and understand *you*. That this is at all possible implies a common structure within the processes of the mind and a common basis for thought.

This in no way implies that all of us think exactly alike or in similar circumstances will come to the same conclusions or act in the same way. There are individual differences to be accounted for. What are the bases for these differences? What are the bases for our similarities? These are questions which are amenable to scientific and philosophical study. If they were not, there could be no basis for psychology nor could any benefit accrue from the efforts of counselors or therapists. There could be no teachers because there could be no workable strategies for teaching.

Like all sciences, critical idealism is based on a small number of basic assumptions and proceeds from these assumptions to construct a logical system of explanation. Also like any science, the passage of time and the discovery of new facts calls for re-examination and modification of the theory. Unlike other sciences, however, the subject matter of critical idealism

does not deal with "objects" in the physical world. Its subject matter is the logical analysis of the processes of thinking and reason on an abstract level. In this, it is more closely related to mathematics than it is to physics or chemistry, engineering or computer science, biology or zoology, or economics, sociology, or psychology. Critical idealism is not neural science. Neural science is the study of the brain; critical idealism is not concerned with brain but rather with mind, e.g., understanding the logical structure of the process of reasoning and the constraints and limitations under which it must operate. To whatever extent systematic order and common principles can be found which govern these mental processes, the appellation "mental physics" is appropriate.

This book is intended to provide an in-depth presentation of critical idealism. The three main elements of the theory are: 1) the transcendental esthetic of the sensibility; 2) the transcendental analytic, and; 3) the transcendental dialectic. These topics deal with intuition and imagination, with thinking and understanding, and with reasoning, respectively. Since the theory is based on logical analysis of these topics, we will also have a need to discuss logic itself in order to properly explain the arguments and conclusions of the theory. As critical idealism is a work of philosophy and inasmuch as many of the readers of this book can not be expected to have a formal background in philosophy, it will also serve us well to discuss at an elementary level some of the terms and concepts of philosophical thought. Many of these terms and concepts are in everyday use in modern society but, in these surroundings, the crisp meanings and subtle connotations of many of these terms have been obscured by common everyday usage to the point where the *philosophical* meaning of the words may no longer be evident. To minimize misunderstanding, therefore, some discussion of this background is appropriate within this text from time to time.

1.2 Fundamental Terms

There is no more appropriate place to begin than to remind ourselves of what is meant by such terms as knowledge, reason, and thought. We will find later on that the architectonic (or structure) of critical idealism follows from these basic definitions quite closely. By defining these terms here and now, we not only clarify some important aspects of our subject matter but also head off some common misunderstandings at the beginning (and save the reader from having to stop later downstream to get out the dictionary).

Def. 1 Knowledge:

- 1). The fact or condition of being aware of something;
- 2). The range of one's information or understanding;
- 3). The fact or condition of apprehending truth or fact: Cognition.

Def. 2 Reason:

- 1). Proper exercise of the mind;
- 2). The power of comprehending, inferring, or thinking in orderly, rational ways;
- 3). A sufficient ground of explanation, especially, a principle or law that supports a conclusion or explains a fact;
- 4). A rational ground or motive.

Def. 3 Thought:

The action or process of thinking.

These definitions are common and straightforward but upon closer inspection we are led to inquire more closely about the meaning of these definitions. Definition 1 contains three facets and from

each of these facets we encounter a substructure of meaning. Let us explore definition 1 more deeply.

Def. 4 To be aware:

To have or show realization or perception.

Def. 5 Condition:

Something essential to the appearance or occurrence of something else.

Def. 6 Understanding:

- 1). The power of comprehending, especially the capacity to apprehend general relations of particulars;
- 2). The power to make experience intelligible by applying concepts and categories.

Def. 7 Cognition:

- 1). The act or process of knowing including awareness and judgment;
- 2). The product of this act.

That which we call knowledge is not merely a collection of facts ("the range of one's information"). Knowledge is also comprised in part of *conditions* without which awareness (perception) can not occur. Knowledge is comprised in part of the range of the power of a faculty for *understanding*. Knowledge includes *cognition* which includes both an end (the product of cognition) and a *process* of awareness and judgment. From all of this, it is clear that our philosophy must deal with each of these elements in turn; we will require an architectonic (a structure) which places these diverse elements in relation to each other and describes how these elements work together as a whole. The development of this architectonic will occupy a large fraction of this work.

Reason is any equally multi-faceted term. The *act* of reasoning is the exercise of proper control of the processes of the mind. But what is this thing called "mind" which is exercised by reason?

Def. 8 Mind:

The element or complex of elements in an individual that feels, perceives, thinks, wills, and, especially, reasons.

The *faculty of reason* is therefore the "control system" which governs these processes "in an orderly, rational way." The faculty of reason is a faculty based on *principles* which govern this process in such a way as to supply the grounds for the formation of conclusions or the explanation of facts. Finally, that which we call reason includes the grounds or motives which supply a basis for and a purpose of the carrying out of acts of reason.

Notice that our common definition of the mind distinguishes between reasoning and thinking. Thought is the action or process of thinking but what does it mean to think?

Def. 9 To think:

- 1). To submit to the processes of logical thought;
- 2). To exercise the powers of judgment, conception, or inference: cogitation.

Subdefinition (1) of definition 9 is patently circular but subdefinition (2) supplies us with the meaning we employ for the verb "to think." To think is to obtain knowledge and to exercise the faculty of the understanding to form concepts and cognitions and to engage in inference.

Def. 10 Inference:

The act of passing from one proposition, statement, or judgment considered as true to another whose truth is believed to follow from that of the former.

Def. 11 Judgment:

- 1). The process of forming an opinion or evaluation by discerning or comparing;
- 2). A proposition stating something believed or asserted;
- 3). The product of this act.

We also commonly use the phrase "to think" to describe the state of certainty with which we affirm the truth of some fact or opinion. There is an important distinction among the terms *to know*, *to believe*, and *to think*. "To know" implies assurance of truth based on sound logical or factual information. "To believe" implies assurance of truth based on trust or faith. "To think" implies merely the *possibility* of truth based on mental appraisal of pertinent circumstances. To be able to discern what we may *know* versus what we may *believe* or *think* is an important question which critical idealism has the duty of addressing.

Inference, as a part of thinking, involves the formation of propositions which are known to be or thought to be true. No philosophical discussion can proceed very far before having to face the inevitable question, "what is truth?". It is appropriate for us to deal with that question now.

Def. 12 Truth:

The property of a statement or proposition of being in accord with fact or reality.

A proposition is an assertion of a predicate to a subject. In ordinary language, a sentence contains a subject clause and a verb clause which is the predication being made concerning the subject. On a more technical level, objective thought involves the formation of a *concept* concerning an *object*. Truth is the accordance of this concept with its object.

Since the birth of western philosophy, an old question has oftentimes been employed to push philosophers into a corner. This question is, "What is truth?" The desire behind this question is to be told the universal and secure criterion of the truth of all knowledge. This desire assumes that it is possible to abstract the object and content out of the statement. When we do so, what is left? Since the definition of truth relates precisely and only to the accordance of concept with object, when the object and the content are taken away the question, "what is truth?" becomes absurd and void of any possible meaning and can only be answered by citing the definition given above.

We have nearly completed our discussion of the fundamental terms. Only a few more items remain. Understanding includes the power of comprehending. What is it "to comprehend"?

Def. 13 To comprehend:

- 1). To grasp the nature, significance, or meaning of;
- 2). To include as an integral part.

Subdefinition (2) is an important one. A concept can not be said to be comprehended unless its place and relationship to the totality of all concepts is established. Understanding involves the integration of new concepts within the totality of previously formed concepts. The relation is reciprocal; a new concept may require the modification of certain older concepts so that the manifold of concepts of our understanding is unified and free of contradiction. We will refer to this state of the understanding as the *unity of the manifold of the concepts of the understanding*.

Thinking involves the exercise of the powers of conception.

Def. 14 Conception:

The capacity, function, or process of forming or understanding ideas or abstractions or their symbols.

To think is to exercise the power for the *spontaneous* formation of new ideas, concepts, and abstractions as part of the process of achieving the unity of the manifold of the concepts of the understanding. These new concepts and ideas go beyond the simple perceptions of awareness in cognition.

Def. 15 Perception:

- 1). A mental image: concept;
- 2). Awareness of the elements of environment through physical sensation;
- 3). Physical sensation interpreted in the light of experience; apperception.

Def. 16 Experience:

- 1). The usually conscious perception or apprehension of reality;
- 2). Facts or events or the totality of facts or events observed.

Def. 17 To apprehend:

- 1). To grasp with the understanding;
- 2). To recognize the meaning of.

Def. 18 Conscious:

Perceiving, apprehending, or noticing with a degree of controlled thought or observation.

This completes, for now, our list of fundamental terms.

1.3 Three Troublesome Words

In the course of the main discussion of this text, we will have to face certain concepts of a metaphysical flavor. These concepts involve three of the most troublesome words in philosophy. These are *being*, *reality*, and *existence*. These words lie at the root of many difficulties in philosophical thought and it is worthwhile at the beginning of this study to examine what these terms mean in their normal usage. In philosophy, *ontology* is the branch of metaphysics concerned with the nature "of being" and the kinds of "existents." The term ontology takes its definition from the Greek philosopher Parmenides who lived in the sixth and fifth centuries B.C. Parmenides was concerned with understanding the "true nature of being" which underlies the world of sensation and perception. In Greek, the word *ov* (*ón*) means "being" or "creature" and was the term used by Parmenides for "things as they are." The word "ontology" derives its present day meaning from this term.

Now, what exactly is meant by phrases such as Descarte's *cognito ergo sum* ("I think therefore I am") or Hamlet's "to be, or not to be"? I think, therefore I am *what*? To be, or not to be *what*? In these two case, "to be" is supposed to mean "to be real" or "to exist". But what, exactly, is meant by "I think, therefore I exist"? This is a difficult question made harder by the multiple definitions of the terms *to be*, *real*, and *exist*. The following definitions of these terms illustrate this point.

To be: 1 a: to equal in meaning: have the same condition as; b: to have identity with; c: to constitute the same class; d: to have a specified qualification or characteristic; e: to belong to the class of; 2 a: to have an objective existence: to have reality or actuality; b: to have, maintain, or occupy a place, situation, or position <the book *is* on the table>; c: to remain unmolested, undisturbed, or uninterrupted <let him *be*>; d: to take place or occur.

Real: 1: of or relating to fixed, permanent, or immovable things (as lands or buildings); 2 a: not artificial, fraudulent, illusory, or apparent: GENUINE; also: being precisely what the name implies (as in *real* economic growth); b (1): occurring in fact <a story from *real* life>; (2): of or relating to practical or everyday concerns or activities <he left school to live in the *real* world>; c: having objective independent existence <what he told me was *real*>; d: FUNDAMENTAL; ESSENTIAL; e (1): belonging to the set of real numbers; (2): concerned with or containing real numbers; (3): real-valued; f: measured by purchasing power <*real* income>; g: COMPLETE, UTTER <he is a *real* idiot>; 3: exact as regards repetition of musical intervals in transposition.

To exist: 1 a: to have real being whether material or spiritual <do unicorns *exist*?>; b: to have being in space or time; c: to have being in a specified place or with respect to understood limitations or conditions; 2: to continue to be; 3 a: to have life or the functions of vitality; b: to live at an inferior level or under adverse circumstances; 4: to have contingent but free and responsible being.

The multiplicity of these meanings for these three words is reflected in the following definitions.

Reality: 1: the state or quality of being real; 2 a (1): a real event, entity, or state of affairs <his dream became *reality*>; (2): the totality of real things and events; b: something that is neither derivative nor dependent but exists necessarily.

Existence: 1 a: reality as opposed to appearance; b: reality as presented in appearance; c (1): the totality of all existent things; (2): a particular being <"all the fair *existences* of heaven">; d: sentient or living being: LIFE; 2 a: the state or fact of having being, especially independently of human consciousness and contrasted with nonexistence; b: the manner of being that is common to every mode of being; c: being with respect to a limiting condition or under a particular aspect; 3: continued or repeated manifestations; 4: the condition of a person aware of his radically contingent yet free and responsible nature.

A quick count shows there are 9 different meanings of "to be", 12 different meanings of "real", 7 different meanings for "to exist", 4 different meanings of "reality", and 10 different meanings of "existence" in the lists above. Some of these meanings, as in "existence 1a" vs. "existence 1b", are opposite of each other. Better still, some of these definitions point to each other in a circular manner, as in "to exist 1a". In the case of "to exist 1a", which definition of "real" and which definition of "being" are we to refer to? The point I am trying to make here is this: In a difficult and abstract study, the ambiguity in such basic terms as *to be*, *reality*, and *existence* demand care and clarity when such terms are used if misunderstanding is to be avoided. For the reader, the appearance of any of the above terms or their derivatives is a signpost warning of the need for caution and particular attention to what is actually being said. This is why I call these terms the three troublesome words.

1.4 The Ontological Premises

In formulating the theory of critical idealism, we must have a starting point. For a theory of knowledge, this starting point must provide a reference frame within which we can establish what we know and what we can know. For critical idealism, this reference point is the thinking subject: the first person singular subject *I* of the predication "I think."

As the thinking subject, I am aware of myself as a real entity. Of my own existence I have no possible doubt. The certainty of this knowledge falls under the classification of the *I know*. This is the *cognito ergo sum* of Descartes. As the thinking subject, I am also aware of a torrent of experiences¹. My uncritical belief, *i.e.*, my "common sense", is that these are experiences of a world external to myself and quite apart and independent of my own existence. On deeper reflection, however, I am aware that some of my experiences, such as those in a dream, do *not* seem, in common sense, to be part of any independently existing external world. If the dreams are not real in the sense of having an independent external existence, on what grounds may I regard my waking experiences as something separate from myself? Is the certainty of my knowledge of the apparently external merely something *I believe* or is it possible to raise the status of this knowledge to the *I know*?

A concept may be thought of either as incomplex or as complex². It is incomplex if it is merely the concept of a thing (*οντα*), such as "man" or "joy"³. It is complex if it is a predication, such as, "the man runs." A predication or judgment is always complex and involves *matter* and *form*. Matter is the actual substance of thought or expression (as opposed to the way in which it is stated or conveyed) while form is the shape or structure or mode in which a thing exists, acts, or manifests itself. In spoken language, for instance, propositions are expressed as a subject clause attached to a verb clause which asserts a predicate on the subject.

In logic, the status of the knowledge conveyed by judgment or predication is described by its domain of applicability and by its *modality*. The domain may be either *universal* or *contingent*. Universality of a judgment or proposition is the property wherein a judgment or proposition admits no possible exceptions. Contingency of a judgment or proposition is the property where the truth of that judgment or proposition depends on the matter of the proposition or judgment. Such a judgment is called *empirical*.

The modality of a proposition or judgment categorizes that judgment as *problematic*, *assertoric*, or *apodictic*. A problematic judgment is a judgment which is merely possible (*x* may be *y* or *x* may not be *y*). A judgment is assertoric if it is viewed as an established fact (*x* is *y*; *x* is not *y*). Finally, a judgment is apodictic if it is necessary, *i.e.*, if it can not be any other way (*x* must be *y*; *x* must not be *y*).

Possibility, necessity, and universality are properties of knowledge from which the ontological premises of critical idealism are established. The ontological premises serve as the axiomatic basis of the theory. Our first task, then, is to establish these premises from what is given to us with certainty.

The existence of *the I* is certain. Now, *the I* is first person singular, that is, it is always contemplated as a *unity*. As the thinking subject, I am conscious of myself as a single entity, never as a multiplicity. The experiences, however, are perceived in the plural. Now, how is it possible to have this conception as immediately given? The *concepts* of unity and plurality are not given as objects of immediate experience; these concepts have no ground in either the perception of self nor in the contingent experiences. Rather, unity and plurality as concepts must, therefore, have their

¹ Definition 16, subdefinition 2.

² This division of concepts was enunciated by Aristotle, *c.f.*, *The Organon or Logical Treatises of Aristotle*, tr. Octavius Freire Owen, London: George Bell and Sons, 1901.

³ An incomplex concept need not denote a thing of material existence; it merely denotes something which may be used as the subject of a predication.

ground elsewhere than experience. To put it another way, "one" and "many" are not *things*; they are *concepts associated with things*. I can only *know* the experiences are plural and *the I* is singular if plurality and unity exists as knowledge *prior to experience*.

Knowledge which has its grounds elsewhere than in experience will hereafter be called knowledge *a priori*. Knowledge which has its grounds in experience itself will be called knowledge *a posteriori*. The existence of knowledge *a priori* is a necessary condition for the possibility of knowing *the I* to be a unity and the experiences to be plurality. We thus have, in addition to the axiom of the existence of *the I* a second axiom: the existence of knowledge *a priori*.

Axiom 1: The *I* exists as the self-aware thinking subject.

Axiom 2: Knowledge *a priori* exists.

Now, the *distinction* between unity and plurality is also known *a priori*. Unity and plurality are different concepts. The knowledge that unity and plurality are different from each other and that, in any given concept, the concepts of unity and plurality are mutually exclusive can be expressed in the disjunctive proposition, "unity or plurality but not both". However, the *possibility* of forming this judgment necessitates knowledge *a priori* of the logic function "exclusive disjunction." The possibility of knowing, "unity is not plurality" and "plurality is not unity" necessitates the existence of knowledge *a priori* of the concept of the negative and the logical function of negation. Additionally, it is also known *a priori* that a concept can be thought as a unity *composed* of plurality. For example, the statement, "a logical proposition has matter and form" makes a unity (logical proposition) out of plurality (matter *and* form). The logical function of conjunction is therefore knowledge *a priori*.

Unity, plurality, and their synthetical unity (totality) compose the three elements defined in logic under the heading called *Quantity*. They are logical categories of *judgment*. This is a clue to a unifying axiomatic principle of knowledge *a priori*, namely, that the primitive logical functions of judgment are among the catalog of items contained within knowledge *a priori*.

Axiom 3: Knowledge *a priori* includes the logical functions of judgment.

The proposition, "I exist," denotes my existence *as a real thing* in the sense of definition 2(c) of the word "real." The possibility of forming this judgment necessitates the *a priori* existence of the *concept* of reality (in the sense of definition 2(c) of "real" and definition 1 of "reality"). The *I* uncritically accepts the material truth of its own existence *as a real thing* and this acceptance forms a basis determination of other classifications of things as having *real being*.

Axiom 4: The thinking subject has real being.

Are the experiences themselves "real" in this same sense or are they illusions of thought, merely "apparently" real? At this point, we have no axiomatic basis for answering this question. The axioms given above merely allow the thinking subject, *the I*, to *state* this question as a proposition, "the experiences are real or the experiences are not real."

Whatever the reality or nonreality of the experiences may be, it is given to the thinking subject to recognize that the most basic incomplex objective experiences are first manifested by means of *sensations*. Whether or not these sensations exist in *objective* reality, the existence of some *things* which we call sensations is undoubtable. We name them vision, hearing, touch, taste, and smell. All objects thought in experience⁴, to which we can give the name *phenomena*, have their origin as unthought *appearances* in sensation.

⁴ As opposed to abstract concepts of thought

Now, it is given to the thinking subject to know that these appearances are manifested as a succession of changes, one following upon the other. This manifestation of succession is not *thought* (although it is possible to *think about*) but rather is directly perceived. Succession of change provides a *form* to sensation. This form may be called a *pure intuition* where the adjective "pure" is used to denote that this intuition of succession is an *a priori* form which provides a structure, namely succession of changes, to the appearances.

In addition to this form, another type of form, *i.e.*, another pure intuition, is given to the appearances. The thinking subject possesses an intuition of being in some *place* whereas the appearances are intuited as being located at some *other* place. The thinking subject conceptualizes this as "here or not here" but this conception can not arise without an intuition of place. This intuition provides another aspect to the form of appearances. The combination of the sensational *matter* of appearances with the *form* of pure intuitions of succession and place may be called, collectively, a *sensible intuition*.

Axiom 5: A faculty of sensibility exists which produces representations called sensible intuitions of appearances; the sensible intuitions have matter composed of sensations and form structured as pure intuitions of place and succession.

The constituents of sensation (vision, sound, *etc.*) may be termed the *qualities* of a sensation. The fundamental concept of Quality is another classical head of the logical functions of judgment. Quantity and Quality may be termed the *extensive* and *intensive* aspects, respectively, of a particular kind of logical connection. Anticipating the forthcoming discussion of the transcendental logic, we term this kind of connection a composition (*compositio*).

It is immediately given to the thinking subject that different appearances may possess the same qualities but in differing *degree*. For instance, a sound may be "loud" or "quiet." Such a representation is possible, however, only if: 1) sensation itself produces qualities in various degrees, and; 2) the logical functions of judgment contain the concepts of Quality. Now, the *quantity* of a *quality* (its degree) is termed *intensive quantity*.

Axiom 6: Sensations possess intensive quantity.

Now, an appearance is not an object of thought; rather, the objects of thought, or phenomena, are concepts derived from the appearances and are the *interpretation* of appearances by the mind. These interpretations are predications of the form "appearance is object." However, the possibility of mentally constructing such a predication from the sensible intuition necessitates the thinking subject being in possession *a priori* of concepts of matter and form in general. It also necessitates the existence of some faculty by which the sensible intuitions of appearance can be formulated into the matter-and-form structure of functions of judgment. The sensible intuitions are not "images" themselves; rather, they are the raw elements of information from which "images" (objective perceptions in general) are formed.

Axiom 7: Knowledge *a priori* includes the concepts of matter and form in general and the concept of the structure of predications as matter and form.

Axiom 8: A faculty of *imagination* exists which mediates between the sensible intuitions and the logical functions of judgment.

The thinking subject *thinks*. From the definition of this term in section 1.2, we know this activity involves more than mere apprehension of objects from the appearances. To think is to comprehend, *i.e.*, include as an integral part, and to infer. Comprehension requires the logical

connection of concepts and the objects of experience in a unity of a manifold of "things understood." This meaning of the word *connection*, in the sense of uniting or putting together, is expressed by the latin word *conjunctio*. The *possibility* of the thinking subject performing this activity necessitates the existence *a priori* of the logical function of conjunction. Similarly, the possibility of the thinking subject to make inferences necessitates the existence *a priori* the logical function of implication.

The cognition of abstract connections among appearances and among previously cogitated concepts requires the ability to recall in imagination past appearances which are no longer present in immediate sensation. Therefore, the faculty of imagination must be capable of producing non-sensational intuitions.

Axiom 9: The faculty of imagination is a faculty of non-sensational intuition.

Furthermore, the action of *conjunctio* involves the establishment of relations among the objects of experience. The possibility of establishing any such relation among objects necessitates the possession by the thinking subject of the knowledge *a priori* of the concepts of relation. Relation is another of the fundamental heads of logical functions of judgment.

Inherent in the definition of "to think" are several mental faculties the existence of which are necessary conditions for the possibility of thinking. Objects of experience are cogitated from the basis of the sensational appearances. These objects do not, however, vanish from the mind with each new appearance in the succession of appearances. Experience itself is possible only if the thinking subject is in possession of a faculty of *memory*. Comprehension itself requires a faculty of *understanding* in which the objects of experience are *thought*. However, it is given in the knowledge of the thinking subject that this faculty is not directed simultaneously at all objects of experience. Rather, the thinking subject directs its *attention* to only a subset of experience during any particular act of thinking and this attention is determined solely by the thinking subject. This, however, is possible only if there exists a necessary faculty which directs the faculty of understanding in what it is to think *about*. We will call this the faculty of *reason*.

Axiom 10: The thinking subject is in possession of faculties of memory, understanding, and reason.

Thinking and reasoning involve judgment, comprehension, and inference. The process of judgment is the process of evaluation by discerning or comparing. The process of comprehension is the process of unifying the concepts of the understanding into an integral whole. The process of inference is the act of passing from one proposition or judgment considered as true to another whose truth is believed to follow from the former. These activities are directed by the reason and involve analysis and synthesis and comparison.

In an analytic judgment, the predicate is contained within the subject, either explicitly or implicitly. For example, the predication, "all motor vehicles have engines" is an analytic judgment since the concept of "engine" is contained within the concept of "motor vehicle." An analytic judgment adds no new concepts to knowledge; rather, it serves to focus on subordinate concepts contained within a given concept. Analytical judgments, therefore, are of the nature of *division* of a unity into parts or particulars. Analytical judgments are the principle tool of deductive logic.

In a synthetical judgment, the predicate is not contained within the subject. Synthetical judgments involve the integration of different concepts, not contained within each other, into the unity of a new concept. For example, the predication, "my sister is an artist" is a synthetical judgment since the concept of "sister" does not contain or imply the concept of "artist" and *vice versa*. While analytical judgments involve the division of the general into the specific, synthetical